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# Covid-19 vaccine hesitancy, conspiracist beliefs, paranoid ideation and perceived ethnic discrimination in a sample of University students in Venezuela



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## ABSTRACT

Due to complex social, political and economic causes, Venezuela has encountered difficulties managing the Covid-19 pandemic. Although a vaccination program has started, it is still comparatively slow and largely inefficient. One particular challenge has been vaccine hesitancy. Venezuelan policymakers have traditionally not rendered much attention to ethnic disparities. In this study, we assess whether vaccine hesitancy varies across ethnic groups, in a sample of 273 Venezuelan university students. Results come out showing that marginalized ethnic groups in Venezuela are more prone to vaccine hesitancy, and also have greater levels of acceptance regarding conspiracy theories. Coefficients of correlation of ethnic discrimination with vaccine hesitancy and conspiracy beliefs are moderate. Coefficients of correlation of paranoid ideation with vaccine hesitancy and conspiracy beliefs are weak. This suggests that in order to successfully complete the vaccination program, policymakers in Venezuela must begin to approach racial disparities.

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## 1. Introduction

For complex political and economic reasons, in the recent decade Venezuela has undergone a deep humanitarian crisis [1]. In turn, this has had deep implications on healthcare services, to the point that they have been near collapse.

While Venezuela has exported large quantities of migrants, the current humanitarian crisis has at the same time implied that, as opposed to previous decades, the nation has remained relatively isolated, due to a shortage of incoming flights and precocious transportation routes towards other countries. In the wake of the Covid-19 pandemic, this served partially as a protective factor, to the extent that, being a largely isolated country, the arrival of the virus was delayed [2].

However, once the first cases were reported, Venezuela was ill-prepared to handle the pandemic. Hospitals did not have the proper infrastructure to assist patients, and supplies were not sufficient.

As vaccines began to be developed by various laboratories worldwide, Venezuela was also in the mist of political controversies. Given that Venezuela's government is not recognized by many nations (including the United States and the European Union),

there have been logistical problems articulating the arrival of vaccines. Venezuela has had to rely on Russia and China for the distribution of vaccines. More recently, there has been a plan to receive the Abdala vaccine from Cuba. While the vaccination program has begun and there seems to be some success, it is still very slow in its development [3]. One particular development may have slowed down the vaccination process in Venezuela. In Europe, there were concerns about the safety of the AstraZeneca vaccine, but European governments quickly addressed this issue, and with enough empirical data assured citizens that reports of harmful side effects were not significant. Consequently, the vaccination program with AstraZeneca resumed. However, in Venezuela, President Nicolás Maduro insisted that the AstraZeneca vaccine was not safe, and refused to accept its application in the nation. Ultimately, this political move delayed the arrival of effective vaccines, and it may have had negative consequences in the handling of the pandemic, as vaccination efforts lost precious time.

One of the main problems that the vaccination program in Venezuela will face, is vaccine hesitancy, possibly due to conspiracy beliefs. As part of the political and economic crisis of the last decade, Venezuela has seen a growth of conspiracy theories. Most of these conspiracies are related to political events in the country's recent turbulent history [4]. But, there is substantial research showing that belief in one conspiracy theory is a good predictor

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of belief in other conspiracy theories [5], and consequently, it is probable that conspiracy theories about political circumstances easily derive into conspiracy theories about medical procedures. For example, during the Cold War, conspiracies about the alleged harmful effects of water fluoridation came to the fore, as in the United States, conspiracy mongers claimed that water fluoridation was a Communist plot to reduce population size. Likewise, in some regions of Africa theories about the origins of AIDS as an engineered virus remain rampant. These two examples are good illustrations of how political conspiracy theories can eventually shift towards matters related to medicine.

It is important to understand how belief in political conspiracies eventually make their way into medical conspiracy theories. In medicine, there are power dynamics at play. Even if thorough reforms are implemented and patients are empowered significantly, ultimately, patients are still the vulnerable party, and physicians have the upper hand in terms of power. Given this inevitable power imbalance, this is always fertile ground for the proliferation of conspiracy theories concerning medical procedures. This is even more so, when there are public health issues that concern both politicians and healthcare providers. If in the general population, there are feelings of alienation and disenfranchisement, then ultimately whatever conspiracy theory arises in regards to the political establishment, it will also target the medical establishment, as there may be the perception that, inasmuch as physicians enjoy some measure of power, they are aligned with powerful politicians.

In this regard, policymakers and public health promoters in Venezuela need to have a deeper understanding of what particular circumstances are associated with vaccine hesitancy and conspiracy beliefs, so as to target those circumstances and enact reforms that would ultimately have an impact on greater acceptance of vaccination programs.

Prior research has shown that vaccine hesitancy is related to conspiracy beliefs about vaccine [6], and in turn, these beliefs are associated with general conspiracist beliefs. It has also been assumed that general conspiracist beliefs are associated with paranoid personality traits [7]. In this study, we approach a sample of Venezuelan university students, and we test whether or not vaccine hesitancy is associated with conspiracist beliefs, and paranoid personality traits.

Additionally, there is also an increasing corpus of evidence that suggests that conspiracist beliefs are more common in ethnic minorities and socially marginalized groups [8]. This line of research has seldom been explored in Venezuela. This is possibly due to the fact that, in the prevailing national narrative, Venezuela is an ethnically diverse nation, but racism and ethnic discrimination virtually do not exist, as most Venezuelans are racially mixed. This is largely a myth. Venezuela's racism, although subtler than in the United States or Europe, remains a reality, whether in wealth distribution, educational standards, or perceptions of beauty [9]. Consequently, one important research question that arises is whether there are ethnic differences regarding vaccine hesitancy and conspiracist beliefs. Likewise, it is also important to ask whether perceptions of ethnic discrimination are associated with both vaccine hesitancy and conspiracist beliefs.

## 2. Methods

350 students were randomly selected from a database of the Faculty of Humanities in a public university in the Zulia State of Venezuela. Given that the questionnaires used in this study were extensive, recruitment of participants presented some difficulties, as not every potential participant had the time or the desire to

answer to every question. Therefore, the sampling method rely on non-probabilistic convenience.

Questionnaires were evaluated by an Institutional Review Board. Questionnaires were sent by email to those 350 students. They were informed that they could refuse to answer questions at any time, their answers would remain anonymous, and they were asked to offer informed consent. Exclusion criteria was having already received the Covid-19 vaccine.

Responses were collected over a period of three weeks in February 2021. 6 questionnaires were returned with incomplete answers, and 273 questionnaires were returned with complete answers. That sample of 273 is made up of 115 males (mean age 22.69, s.d. 3.32) and 158 females (mean age 22.96 s.d. 3.39).

Questionnaires were divided in six parts.

First, basic demographic information was asked: age, gender, and ethnicity. Ethnicity was asked with a closed question, giving 5 options: White, Afro-Venezuelan, Indigenous, Mixed Race, other. If a participant responded "Indigenous", he/she was asked to specify what Indigenous tribe he/she belonged to. If a participant responded "other", he/she was asked to specify ethnicity, too.

Second, the following question addressing vaccine hesitancy was included: "Do you plan to receive the Covid-19 vaccine when it is made available for you?" Options for answers were "yes", "maybe", "no". Answers were arranged on a scale (1 = yes, 2 = maybe, 3 = no).

Third, the Vaccine Conspiracy Beliefs Scale (VCBS) was included in the questionnaire. This is a 7-item questionnaire that assesses the degree of acceptance of conspiracy theories regarding vaccines [10]. Questions ask subjects to express their level of agreement on a Likert scale from 1 (strongly disagree) to 5 (strongly agree), to the statements (e.g. "Vaccine data is often fabricated", "Vaccine efficacy data is often fabricated"). The VCBS has good reliability, with Cronbach's alpha at 0.94; it has also been validated, one study concluding that "using the VCBS, researchers will be able to investigate how such beliefs impact vaccine hesitancy and uptake."

Fourth, the Generic Conspiracist Beliefs Scale (GCBS) was included. This is questionnaire made up of 15 items, seeking to measure "individual differences in generic conspiracist ideation" [11]. In turn, the GCBS is further divided into 5 subscales, corresponding to 3 items each. The five subscales are as follows: government malfeasance (which assesses the acceptance of the belief that the government is perpetrating crimes against common people), extraterrestrial coverup (which assess the acceptance of the belief that governments or some other hidden forces are concealing information about aliens), malevolent global conspiracies (which assesses the acceptance of the belief that there is a cabal pulling the strings and controlling governments and industries behind close doors), personal well-being (which assesses the acceptance of the belief that common people are being hurt by dangers unbeknownst to the population), and control of information (which assesses the acceptance of the belief that powerful groups manipulate scientific activity to meet their goals). The GCBS presents statements, and subjects are requested to express their agreement/disagreement on a Likert scale, from 1 (strongly disagree) to 5 (strongly agree).

The GCBS is considered to have good reliability, with Cronbach's alpha set at 0.98 [11]. It has also undergone adequate validation, with one psychometric study concluding that findings "support the use of overall scale scores as an index of belief in conspiracy theories" [12].

Fifth, the Persecutory Ideation Questionnaire (PIQ) was included. This is an instrument that is used to assess the level of persecutory ideas in both clinical and non-clinical subjects [13]. The PIQ is frequently used as a complementary tool in the assessment of paranoid personality. It is made up of 7 questions that issue statements, and participants are asked to report how closely

those statements describe them (e.g., “I often feel that others have it in for me”; “I sometimes feel that people are plotting against me”). Answers are arranged on a Likert scale, from 0 (very untrue) to 4 (very true).

The PIQ has excellent reliability [14], and it has also been successfully validated across various cultural settings [15].

Sixth, the Brief Perceived Ethnic Discrimination Questionnaire-Community Version (Brief PEDQ-CV) was included in the questionnaire. This is an instrument made up of 16 questions that assess the level of perceived ethnic discrimination amongst subjects [16]. The Brief PEDQ-CV is divided into four subscales of 4 questions each, and they ask subjects about how often particular situations happen to them. The subscales are as follows: Exclusion/Rejection, which assesses to what degree individuals feel isolated, ignored or excluded because of their ethnicity; Stigmatization, which assesses to what degree subjects feel derided in society due to their ethnicity; Discrimination at work/school, which assesses to what degree individuals perceive they are treated unfairly at work/school on account of their ethnicity; Threat/Aggression, which assesses the degree to which subjects feel threatened or harmed because of their ethnicity.

Responses to each item are structured in a Likert scale from 1 (the situation has never happened) to 5 (the situation has happened very often). The Brief PEDQ-CV has had good reliability, with a Cronbach alpha of 0.97 [17], and it has been cross-culturally validated [18], including Spanish-speaking populations [19].

All five questionnaires were translated into Spanish, and then translated back to English, in order to monitor any errors. No corrections were necessary.

Scores for the five questionnaires plus the question regarding the intention to get the vaccine, were compared in terms of gender, age groups and ethnicity, running a one-way ANOVA statistical analysis. Statistical significance was placed at  $p < 0.05$ .

Chi-square analysis was done comparing the intention of different ethnic groups in getting the vaccine. Statistical significance was placed at  $p < 0.05$ .

Spearman’s coefficients were calculated for the correlations between each of latter five constitutive parts of the questionnaire. To the extent that the questionnaires used in this study are based on Likert scales, they employ a rank level of measurement (since their values do not include a true zero). For rank level of measurements, Spearman’s coefficients (instead of Pearson’s) are used by statistical convention. Statistical significance was placed at  $p < 0.05$ .

### 3. Results

Descriptive results (mean and standard deviation) for all scores are presented in Table 1, separated by gender, age, ethnicity, and

**Table 1**  
Descriptive statistics.

	Plans to get the vaccine	VCBS	GCBS	Brief PEDQ-CV	PIQ
Gender					
Males (n = 115)	1.99 ± 0.85	15.75 ± 4.51	21.82 ± 4.65	23.23 ± 3.57	9.37 ± 1.90
Females (n = 158)	1.98 ± 0.84	15.94 ± 4.36	22.49 ± 4.74	23.77 ± 4.21	9.46 ± 1.86
Age					
18–20 (n = 79)	1.99 ± 0.84	16.06 ± 3.68	22.19 ± 4.04	23.15 ± 3.88	9.29 ± 1.88
21–23 (n = 80)	2.04 ± 0.86	15.43 ± 4.74	22.69 ± 5.52	23.24 ± 3.68	9.69 ± 1.98
24–26 (n = 52)	1.99 ± 0.84	15.86 ± 4.42	22.21 ± 4.71	23.54 ± 3.96	9.42 ± 1.87
27–29 (n = 62)	1.95 ± 0.82	15.57 ± 4.33	21.95 ± 4.56	23.76 ± 3.87	9.17 ± 1.43
Ethnicity					
White (n = 69)	1.38 ± 0.70	12.87 ± 4.10	20.59 ± 3.72	21.97 ± 1.78	9.12 ± 1.13
Afro-Venezuelan (n = 41)	2.44 ± 0.81	17.63 ± 5.20	25.32 ± 6.12	27.85 ± 5.57	9.15 ± 1.09
Wayuu (n = 14)	2.43 ± 0.85	20.29 ± 5.14	24.14 ± 7.78	25.29 ± 3.54	10.21 ± 1.05
Mixed Race (n = 144)	2.08 ± 0.76	16.56 ± 3.19	22.08 ± 3.76	23.01 ± 3.28	9.58 ± 2.34
Other (n = 5)	1.60 ± 0.89	10.20 ± 2.68	17.20 ± 2.17	20.20 ± 2.49	9.00 ± 0.71
Total (n = 273)	1.99 ± 0.84	15.86 ± 4.42	22.21 ± 4.71	23.54 ± 3.96	9.42 ± 1.87

also presented as a whole. Age range is from 18 to 29. All participants who self-identified as Indigenous reported belonging to the Wayuu tribe. Of the participants who answered “other” in the question of ethnicity, 2 reported it as “Chinese”, and 3 reported it as “Arab”.

One-way ANOVA results for comparison of scores in terms of gender, age and ethnicity are presented in Table 2. There are no statistically significant differences between genders or age groups in scores to responses. There is no statistically significant difference between ethnicities in scores regarding paranoid ideation, but there are statistically significant differences between ethnicities in scores regarding plans to get the vaccine, vaccine conspiracy beliefs, generic conspiracist beliefs, and perceived ethnic discrimination.

Chi-square analysis of intention to get the vaccine by ethnicity are presented in Table 3, with a statistically significant result regarding differences across ethnicities. Amongst Whites, 71% intend to get the vaccine, 13% are undecided, and 16% do not intend to get the vaccine. Amongst Afro-Venezuelans, 20% intend to get the vaccine, 17% are undecided, and 63% do not intend to get the vaccine. Amongst Wayuu natives, 22% intend to get the vaccine, 14% are undecided, and 64% do not intend to get the vaccine. Amongst Mixed Race individuals, 25% intend to get the vaccine, 41% are undecided, and 34% do not intend to get the vaccine. Amongst individuals of other non-specified ethnicity, 60% intend to get the vaccine, 20% are undecided, and 20% do not intend to get the vaccine.

Spearman’s correlations are presented in Table 4. PIQ scores have statistically significant but weak correlations with intention to get the vaccine, VCBS, GCBS and Brief PEDQ-CV. Brief PEDQ-CV has statistically significant strong correlation with plans to get the vaccine and VCBS, and statistically significant moderate correlation with GCBS. GCBS has a statistically significant moderate correlation with plans to get the vaccine, and strong correlation with VCBS. VCBS has a statistically significant strong correlation with plans to get the vaccine.

### 4. Discussion

In this sample of Venezuelan students, neither age nor gender are relevant in terms of vaccine hesitancy. However, ethnicity is a relevant factor. After performing a chi-square analysis, it is evident that differences amongst ethnic groups regarding their intention to get the vaccine, are statistically significant. When options to get the vaccine are quantified (yes = 1, maybe = 2, no = 3), one-way ANOVA analysis also reveals that there are statistically significant differences between ethnicities.

The group with the lowest levels for vaccine hesitancy is Whites, the ethnicity that has traditionally occupied a dominant

**Table 2**  
One-Way ANOVA (f-ratio value)

	Plans to get the vaccine	VCBS	GCBS	BPEDQ	PIQ
Gender	0.01	0.13	1.35	1.24	0.15
Age groups	0.19	1.08	0.87	1.12	0.95
Ethnicity	13.81**	20.67**	9.62**	22.56**	1.63

\* p < 0.05  
\*\* p < 0.01

**Table 3**  
Chi-square analysis of intention to get the vaccine, by ethnicity

	Yes	Maybe	No
Whites	49	9	11
Afro-Venezuelans	8	7	26
Wayuu	3	2	9
Mixed Race	36	60	48
Other	3	1	1

Chi square: 70.674 (p < 0.01)

position in Venezuela’s socio-economic system [20], traditionally marginalized ethnicities (Wayuu natives and Afro-Venezuelans) have the greatest levels of vaccine hesitancy, and the mixed-race group is located in-between both extremes. This distribution reflects a historical trend in Venezuelan race relations. While ever since colonial times, there has been a dominance of Whites across institutions and many aspects of social life, the mixed-race population (who have been the demographic majority) have served as a bulwark against potential ethnic conflicts, to the extent that they do not have the same privileges as Whites, but still enjoy better positions than Afro-Venezuelans and Indigenous natives [21].

The ethnic pattern of vaccine hesitancy from the present study has been observed in other countries. For example, in one study in the United Kingdom, it is reported that vaccine hesitancy was highest among black, Bangladeshi and Pakistani populations, compared to people with White ethnic background [22]. Another study done in the United States concludes that “COVID-19 vaccine hesitancy was greater among racial and ethnic minorities, and Black participants living in the U.S. were less likely to receive a vaccine than White participants” [23].

One possible explanation for this pattern in vaccine hesitancy, is that vaccine hesitancy has traditionally been associated with lack of information and low educational level [24]. In countries with persistent racism, ethnic minorities typically have lower access to educational opportunities [25], and consequently, their lower educational level ultimately influences their decision to get the vaccine. For much of its history, Venezuelan authorities have refused to tackle issues of racial injustice, and have preferred to embrace a seemingly colorblind approach, which ultimately, reinforces what critics have termed “color-blind racism”. For example, Eduardo Bonilla-Silva asserts that, to the extent that Latin American nations fails to keep track of racial statistics under the guise of a nationalism that treats all citizens equally, deep ethnic inequalities remain unchallenged. Bonilla-Silva effectively demon-

strated how in most Latin American nations, ethnic inequalities remain deeply enshrined in many areas (housing, income, education, health, etc.) [26], and ultimately, these inequalities that arise as a result of colorblind approaches to social policies, enable greater acceptance of conspiracy theories coming from disenfranchised groups.

It is also important to note that previous research has also found that oppressed ethnic minorities are more prone to conspiracist beliefs [27]. In the case of African Americans, for example, vaccine hesitancy may be associated with the fact that in United States’ history, African Americans have been subject to deeply unethical medical procedures (such as the infamous Tuskegee syphilis studies), and that has fueled mistrust towards the medical establishment [28]. But, The Tuskegee studies are only the tip of the iceberg amongst the reasons to understand African Americans’ suspicions towards the medical establishment. Across many variables (from life expectancy, to number of African American physicians), African Americans are at the receiving end of health inequalities. These inequalities (whether they have been previously designed or not) eventually promote an ambient of suspicion amongst disenfranchised communities. This particular state of affairs, in addition to the long history of discrimination and oppression, set up a series of circumstances that make it easier for members of these communities to accept conspiracy theories, no matter how outrageous or empirically weak they are. Consequently, although medical conspiracy theories emerging from oppressed communities must be sufficiently addressed and refuted, policy-makers and healthcare providers must do a hermeneutic exercise in order to understand why they have historically arisen in the first place, so as to be in a more empathic position to work with these communities in order to persuade their members to disregard such theories.

Venezuela does not have such history of unethical medical practice targeting ethnic minorities, but it is still relevant to point that, as a whole, marginalized communities tend to be more suspicious of institutions, as they feel that the system has cheated them. When comparing results for the VCBS in this sample, there are statistically significant differences across ethnic groups, and again, Whites score the lowest in terms of their belief in vaccine conspiracies, whereas Afro-Venezuelans and Wayuu score the highest, and the mixed-race group is located in-between. This result is unsurprising, as in this sample there is a strong correlation between vaccine hesitancy and acceptance of conspiracy beliefs regarding vaccines.

**Table 4**  
Spearman’s correlations

	Plans to get the vaccine	VCBS	GCBS	Brief PEDQ-CV	PIQ
Plans to get the vaccine	–	0.72**	0.59**	0.65**	0.23**
VCBS		–	0.61**	0.62**	0.21**
GCBS			–	0.59**	0.26**
Brief PEDQ-CV				–	0.28**
PIQ					–

\*\*p < 0.01



It is important to note that in this sample, ethnic minorities have a greater level of acceptance of generic conspiracist beliefs, too. This pattern has also been found in studies in other countries. For example, in a seminal study on conspiracy theories amongst residents of New Jersey, Goertzel surveyed Whites, African American, and Hispanic subjects; in the study, he found that African American and Hispanics were far more likely to accept conspiracy theories [29]. Another study encountered similar results, concluding that “beliefs in conspiracies are related to feelings of alienation, powerlessness, hostility, and being disadvantaged” [30].

Brotherton provides an explanation of this phenomenon, noting that “it’s not hard to see why members of racial or ethnic minorities might have cause for prudent paranoia, especially when it comes to predominantly White institutions and authorities.” [31]. While the history of racism in Venezuela may not be as traumatic as that of the United States, it is still a fact that ethnic minorities in Venezuela do suffer discrimination, and in turn, this enhances a greater level of mistrust in institutions amongst members of marginalized communities, such as Afro-Venezuelans and Wayuu natives.

Interestingly, in this sample there is a moderate correlation between generic conspiracist beliefs, and vaccine conspiracist beliefs. Research has established that one of the strongest predictors of belief in a conspiracy theory, is belief in other conspiracy theories [32]. Conspiracy theories are part of what researchers call “monological belief systems” [33]. In such systems, subjects adhere to a set of ideas that mutually reinforce each other; as Andrade explains, “medical conspiracy theories are frequently not just about health issues. . . They are enshrined in a grander scheme of things” [34].

Results from the present study show that members of marginalized ethnic communities in Venezuela have greater levels of vaccine hesitancy, vaccine conspiracist belief, and generic conspiracist belief. Additionally, one very important finding is that these three variables are moderately correlated with perceived ethnic discrimination. This result would appear to indicate that in Venezuela, ethnic minorities’ greater vaccine hesitancy and acceptance of conspiracist beliefs is not primarily due to some cultural malfunction within each of the marginalized groups, but rather, due to ethnic discrimination itself inherent to Venezuela’s socio-economic system.

Similar results have been found in other settings. For example, in one study, results come out showing that “perceived ethnic discrimination conditions both trust in and compliance with different authority types”, to the point that marginalized ethnic groups are far less likely to comply with public health measures [35].

Probably the most surprising result in the present study is the low coefficients of the correlation of vaccine hesitancy, vaccine conspiracy beliefs and generic conspiracist beliefs, with paranoid personality traits. All three coefficients indicate weak correlations. Traditionally, it has been assumed that, inasmuch as conspiracy theories construct narratives of paranoia and mistrust towards political systems, they are more prevalent amongst individuals with higher levels of paranoid personality traits.

Indeed, some research show that individuals with higher levels of paranoid ideation and personality traits, are more prone to accepting conspiracy theories [37–38]. But research on this topic remains inconclusive, as it has been noted by relevant researchers that paranoid ideation works on personal levels (i.e., the individual feels personally attacked by most people he/she encounters, and does not give much thought to conspiracies that may be at play in society), whereas conspiracy theories construct narratives about perception of threats as a group, regardless of personalized paranoid ideation [39].

It is also interesting to note that in this sample, the correlation between perceived ethnic discrimination and paranoid ideation is

weak. This may be indicative that the ethnic discrimination perceived by individuals in this sample is real, and not distorted by paranoid ideation. This is an important finding, given that ethnic discrimination is often dismissed as distorted perceptions of groups that feel discriminated when, supposedly, they are not. According to this narrative, groups that report higher levels of perceived discrimination engage in paranoid ideation, and they imagine being discriminated, when in fact, they are not. Although the results of this study do not permit to conclude whether or not the perceived discrimination reported by participants is actually real, the results do indicate that perceived discrimination is not mediated by paranoid ideation, and consequently, it is more probable that when participants report that they perceive ethnic discrimination, such discrimination is probably real.

## 5. Limitations

The present study has had some limitations regarding sampling methods and sampling size. Although some statistically significant results were found at  $p < 0.05$ , the sample size was still relatively small. This warrants that any conclusions that were derived from the present study, can only be issued tentatively, and future studies with larger samples should be pursued. Likewise, given that the sampling method relied on convenient non-probabilistic methods, that also limits the scope of the conclusions. Furthermore, the fact that the sample was made up of university students is another limitation, given that they may have higher educational levels than the rest of the population, and therefore, they may not be representative of Venezuela as a whole. Considering these limitations, future studies should approach the variables of this study, but with greater sample sizes, and sampling methods that rely more on probabilistic conventions.

## 6. Conclusion and implications for health promotion

Amongst the variables evaluated in this study, the greatest predictor of vaccine hesitancy in Venezuela is acceptance of vaccine conspiracy beliefs. Admittedly, there may be other variables at stake that may (or may not) be better predictors of vaccine hesitancy, and future studies still need to consider them. Additionally, the results vary across ethnic groups. Perceived ethnic discrimination has a moderate correlation with vaccine hesitancy and conspiracy beliefs. In contrast, paranoid ideation and paranoid personality traits have a weak correlation with both vaccine hesitancy and conspiracy beliefs.

This indicates that contrary to the traditional national narrative, racism and ethnic discrimination persist in Venezuela. And this sociological reality, far more than personal psychological dispositions (such as paranoid ideation), are a primal factor in vaccine hesitancy. Consequently, policymakers must face this reality, and take prompt action in order to successfully complete vaccination programs in an attempt to curb the Covid-19 pandemic.

In the short term, policymakers must devise programs that provide special vaccination incentives to members of marginalized ethnic communities. But in the long term, policymakers must also begin to consider a change in the traditional approach to health promotion in Venezuela. Up until now, most policies remain color-blind, as Venezuelan officials have largely refused to keep track of racial statistics and ethnic disparities. Such disparities can only begin to be corrected if they are acknowledged in the first place. By addressing discrimination in Venezuelan society at large, policymakers will have taken a significant step in lowering levels of acceptance of conspiracy beliefs amongst members of ethnic minorities in Venezuela, and consequently, this will also increase the acceptance of vaccination programs.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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