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COVID-19 Vaccine Hesitancy in Three Latin American Countries: Reasons Given for Not Becoming Vaccinated in Colombia, Ecuador, and Venezuela

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ABSTRACT

Although vaccines have been developed to prevent COVID-19, vaccine hesitancy is a significant barrier for vaccination programs. Most research on COVID-19 vaccine hesitancy has blamed misinformation and misstated concerns about effectiveness, safety, and side effects of these vaccines. The preponderance of these studies has been performed in the Global North. Although Latin American has been substantially and negatively impacted by COVID-19, few studies have examined COVID-19 vaccine hesitancy there. We explored reasons volunteered for COVID-19 vaccine hesitancy from a sample of 1,173 Colombians, Ecuadorians, and Venezuelans. Overall, COVID-19 vaccine hesitancy in these three countries is higher than desirable, but most people who are COVID-19 vaccine hesitant offered one reason or fewer. The reasons offered are diverse, including myths and exaggerations, but also individual-level contraindications for vaccination and structural barriers. Because of the diversity of reasons, single-issue mass campaigns are unlikely to bring about large shifts in COVID-19 vaccine hesitancy in Colombia, Ecuador, and Venezuela. Our data suggest that interpersonal communication, particularly in Ecuador, and addressing structural concerns, particularly in Venezuela, are likely to have the greatest impact on vaccine uptake.

COVID-19 has been, and remains, a significant threat to health and people's livelihoods. Although prevention measures such as mask wearing, social distancing, and handwashing have been used to slow the spread of COVID-19 (Regmi & Lwin, 2021), the development of several vaccines is essential to prevent this disease and stop the pandemic (Robinson et al., 2021). The rapid development of these vaccines is an important achievement, but it is essential that people who can be vaccinated become vaccinated because noncompliance threatens public health (Stoddard et al., 2021). Indeed, it has been estimated that a minimum of 75–80% of a country's population be vaccinated to prevent future outbreaks (Adil Mahmoud Yousif et al., 2021).

COVID-19 vaccine hesitancy is a major challenge to preventing COVID-19. Research in different countries has found between one-quarter to more than half of people state that they would decline to receive a COVID-19 vaccination (El-Elimat et al., 2021; Killgore et al., 2021; Shacham et al., 2021; Q. Wang et al., 2021). Although rates of refusal to take a COVID-19 vaccine have declined over time, COVID-19 vaccine hesitancy remains an important concern (Robinson et al., 2021). If, however, we are to address COVID-19 vaccine hesitancy, we must understand the reasons people offer for being hesitant to become vaccinated against COVID-19 if we are to be able to address these concerns. Moreover, we must evaluate COVID-19 vaccine hesitancy in each country if we are to successfully address it in each context (Sallam, 2021).

Reasons for COVID-19 vaccine hesitancy

Even in environments, such as employees within the same clinic, where everyone has equal access to COVID-19 vaccines, perceptions of these vaccines still remain an important explanation for why some people choose to get vaccinated and others do not (Dzieciolowska et al., 2021; Fossen et al., 2021). COVID-19 vaccine hesitancy is often attributed to a person's belief in myths and disinformation (Allington et al., 2021a; El-Elimat et al., 2021; García-Montero et al., 2021; Hornsey et al., 2021; Kumari et al., 2021; Montalti et al., 2021; Ullah et al., 2021). Specifically, within media and communication research, addressing these irrational evaluations of COVID-19 vaccines have been the primary targets for investigation (Allington et al., 2021a, 2021b; Chou & Budenz, 2020; Langford, 2020; Lazarus et al., 2021; Resnicow et al., 2021; Rhodes et al., 2020) along with an emphasis on overcoming exaggerated concerns about safety, efficacy, and side effects (Levin-Zamir, 2020; Thaker, 2021). More generously, simple erroneous beliefs about efficacy, safety and vaccine mechanisms are also used to explain COVID-19 vaccine hesitancy (Almaghaslah et al., 2021; Puteikis & Mameniškienė, 2021; Soares et al., 2021).

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Indeed, when predicting willingness to be vaccinated, associations are frequently sought between having the "correct" knowledge of COVID-19 and willingness to vaccinate (Benis et al., 2021; Dorman et al., 2021).

Although there is a desire to promote correct information, mis- and disinformation about COVID-19 vaccines is prevalent in both traditional and social media (Loomba et al., 2021; Piltch-Loeb et al., 2021; Scales et al., 2021). Lay persons often become spreaders of this mis- and disinformation, especially on social media such as Twitter (Germani & Biller-Andorno, 2021; Griffith et al., 2021) and TikTok (Basch et al., 2021). Even if a person seeks out and processes information from credible sources and mass media, they may misrepresent accurate media reports when they rephrase them for their interlocutors (Finney Rutten et al., 2021; Montagni et al., 2021; Pullan & Dey, 2021). Although these critiques of media reports and their public dissemination have primarily been noted in North America, Europe, and East Asia, initial reports from Brazil (Santana et al., 2021) and Mexico (García-González et al., 2021) indicate that mis- and disinformation may be prevalent, and with similar impacts, in Latin America as well. Some concerns about vaccination are real, such as concerns about preexisting conditions making vaccination inadvisable, potential allergic reactions, and/or the frequency and severity of side effects, but in popular understanding these concerns may be exaggerated (Rzymski et al., 2021). In their scoping review of studies of healthcare workers' COVID-19 vaccine hesitancy, for example, Biswas et al. (2021) argued that these concerns, though prevalent, are largely unsupported by evidence.

Because an "infodemic" from incomplete media representations or from deliberate disinformation campaigns has accompanied the COVID-19 pandemic, this infodemic is often blamed for COVID-19 vaccine hesitancy. In response to this infodemic, vaccine advocates have suggested that public and governmental communicators provide more information in their public messaging (AlAwadhi et al., 2021; Finney Rutten et al., 2021; Gehrau et al., 2021; Medina et al., 2021; Nohl et al., 2021; Rzymski et al., 2021) or that they provide better information (Chen et al., 2021; Dinga et al., 2021; El-Elimat et al., 2021; Germani & Biller-Andorno, 2021; Montalti et al., 2021; Young et al., 2021). Other vaccine advocates call for broader social marketing campaigns by health advocates and governments (Evans & French, 2021; Green et al., 2021; Stevens, 2021; Viswanath et al., 2021). Experimental research, however, shows that messages that emphasize knowledge have little to no impact on individuals' perceptions of COVID-19 vaccine efficacy or intention to become vaccinated (Kerr et al., 2021).

The limited impact of information-based mass mediated campaigns may be because, as a much smaller branch of research indicates, some reasons people give for not planning to become vaccinated are neither irrational nor addressable by public communication campaigns. According to the Vaccine Hesitancy Determinants Matrix (Macdonald & The SAGE Working Group on Vaccine Hesitancy, 2015) decisions to accept or reject particular vaccines are influenced by factors at the contextual, individual and vaccine-specific levels, and, in turn, these factors are premised on "3 Cs" identified by the WHO's EURO Vaccine Communications Working Group. These "3 Cs" (Complacency, Confidence, and Convenience) provide a broad outline of the topics that a health communicator should address when promoting vaccination if they wish to be successful (Dube et al., 2014; Larson et al., 2014). These 3 Cs have also been found to be useful in describing vaccination behavior for a variety of other diseases in Latin America (Guzman-Holst et al., 2020). Most previous research on COVID-19 vaccination hesitancy has emphasized vaccination *complacency*, the individual's choice to emphasize the relative risks of being vaccinated against a disease with the risks of the disease itself, as well as the relative risk of the disease against all other health conditions that the person experiences or expects to experience. Some research has considered vaccination *confidence*, or an individual's trust in efficacy and safety of a specific vaccine and in the health and political system that is encouraging vaccination. Less often discussed are issues of vaccination *convenience*, or the individuals' perception of the physical and geographical accessibility of a vaccine, its affordability, and similar topics.

Although previous research in communication and media studies has focused on issues of confidence and complacency, it has been less likely to discuss topics regarding convenience. Beyond confidence and complacency, there are additional structural and individual-level barriers to accepting a COVID-19 vaccine. For example, persons living with Parkinson disease report difficulties in travel and accessing clinics as reasons for not getting vaccinated, both of which are issues of convenience (Phanhdone et al., 2021). Alternatively, both perinatal Qatari and Turkish women reported that, alongside concerns about safety and erroneous beliefs of a lack of governmental approval (issues of confidence), a perceived lack of vaccine availability was significant reasons they would choose to not get a vaccine (an issue of convenience) (Goncu Ayhan et al., 2021; Mohan et al., 2021). More broadly, in multiple national contexts, persons who have been marginalized and/or medically underserved are also more likely to be COVID-19 vaccine hesitant, indicating that access concerns should be taken seriously as a factor in getting or not the vaccine (Abedin et al., 2021; Dzieciolowska et al., 2021; Fossen et al., 2021; Green et al., 2021; Peteet et al., 2021). These findings may be indicative of different kinds of barriers to vaccination if we account for the full Vaccine Hesitancy Determinant Matrix.

These structural barriers are likely to be more prevalent in the Global South than in the Global North. Although Latin America has been substantially and negatively impacted by COVID-19, even more so than North America, Europe, and East Asia (Gonzalez et al., 2021; Schaal & Ardavin, 2020), to date, we were able to identify only two studies examining COVID-19 vaccine hesitancy in Latin America. In Brazil, Oliviera and his colleagues found that about 17.5% of persons were COVID-19 vaccine hesitant. In addition to some demographic differences, their study revealed that contextual conditions in which a person lived, in addition to their knowledge and attitudes toward vaccines, should be considered when attempting to overcome COVID-19 vaccine hesitancy (Oliveira et al., 2021). A broad study of Latin America and Caribbean participants by Urrunaga-Pastor et al. (2021) found that greater rurality and economic adversity, along with fear of adverse effects, were associated with greater COVID-19 vaccine hesitancy. It may be that individuals living in Latin America state they are unlikely to receive the COVID-19 vaccine due to structural factors in addition to attitudinal and information factors.

We ask then,

RQ1: What is the level of COVID-19 vaccine hesitancy in Colombia, Ecuador, and Venezuela?

RQ2: What reasons are given for COVID-19 vaccine hesitancy in these three Latin American countries?

RQ3: Are there differences in the level of COVID-19 vaccine hesitancy among demographic groupings?

RQ4: Are there differences in reasons given for COVID-19 vaccine hesitancy among the three countries or by rural/urban residence?

Material and methods

Context

Although it is possible that there are similarities among all Latin American countries in reasons given for not becoming vaccinated immediately, the region is diverse and there are likely differences among nations. To account for potential differences due to national governments and economic experiences, but to also account for possible similarities, we engaged people in Colombia, Ecuador, and Venezuela. These countries were chosen for four reasons. First, strong cultural and historical ties exist among the three countries, yet significant differences exist in the political and economic stability of each country. Second, all three countries face significant challenges from COVID-19, experiencing higher per capita cases counts, higher rates of mortality, and more precarious healthcare systems than many countries in the Global North (Bates, Moncayo et al., 2020; Bates et al., 2021; Bates, Villegas Botero et al., 2020). Third, all three countries announced their intention to purchase and distribute COVID-19 vaccines around the same time, and all three countries' deployment programs began with a week of one another, making them ideal cases to compare (Horwitz & Zissis, 2021). Finally, within Latin America, immunization coverage is relatively high, but less than the 95% target for common diseases set by the Pan American Health Organization (Guzman-Holst et al., 2020). These three countries have different rates of vaccination, ranging from some of the lowest uptake for being vaccinated against all of tuberculosis, diphtheria, pertussis, hepatitis B, polio, and measles, with about half of Venezuelans being so vaccinated, to some of the higher levels of uptake, with more than 70% of Ecuadorians, and more than 80% of Colombians being so vaccinated (UNICEF, 2020). For these other diseases, the Vaccine Hesitancy Determinants Matrix has shown across Latin America that some factors of complacency are present, but most hesitancy to vaccinate can be explained by factors of confidence, such as distrust of national governments or pharmaceutical companies, or factors of convenience, such as issues of access or beliefs that national vaccine campaigns are linked to neocolonial control of recipient countries' economies (Matos et al., 2021). Thus, these three counties provide an excellent context in which to explore issue of COVID-19 vaccine hesitancy.

Participants

The data for this study were collected online from March 1 to March 31, 2021, using the Qualtrics platform. We recruited participants using Facebook posts, boosted through advertising. Separate advertisements were created for each of Colombia, Ecuador, and Venezuela. Advertisements were run for one week each, and each advertisement invited people to both participate personally and to share the post to their networks. People who identified as Colombian, Ecuadorian, or Venezuelan, and who were aged 18 or greater, were asked to click a link that brought them to the first study page.

This page informed participants that the study was completely anonymous and voluntary, why we were conducting the study (to understand perceptions of COVID-19), and how long the study would take to complete. Participants were asked to confirm their willingness to participate, their country of residence, and that they were at least 18 years old. This study protocol was approved by the Institutional Review Board at Ohio University (20-E-210) and the Research Ethics Committee at the Pontifical Catholic University of Ecuador (CEI-OE-05-2021) as an exempt study with a waiver of signed informed consent.

Measures

As part of a larger study of attitudes and practices related to COVID-19 prevention, participants were asked "For what reason(s) might you refuse the vaccine." Participants were asked to select or not ten common reasons for refusing to be vaccinated; participants could choose zero to ten of these reasons. These ten reasons were generated from a review of factors of Confidence, Complacency, and Convenience identified in the Vaccine Hesitancy Determinants Matrix as well as culturally specific reasons identified by members of our research team who live and work in Colombia, Ecuador, and Venezuela. In addition to the options provided in the questionnaire, an "other" category was provided. If the participant selected "other," they were asked to provide their additional reasons. Following best practices for coding responses to open-ended questions (Kammeyer & Rother, 1971; Samejima, 1972; Woike, 2007), these other reasons were then coded either into one of the existing categories, coded into a newly created category if other people gave the same reason, or left as "other" if the reason was idiosyncratic and not endorsed by another participant.

The questionnaire also assessed demographic and place of residence variables. These were country of residence, gender, age, civil status, number of persons in the home, education level, and place of current residence (urban or rural). We also asked participants whether they had received vaccines for diseases other than COVID-19.

Statistical procedures

All data analyses were conducted with SPSS version 26.0. First, the list of reasons given for not becoming vaccinated against COVID-19 was developed, using the initial ten categories, and then adding the emergent categories from the coded "other" responses. Second, frequencies of the number of reasons given for declining a COVID-19 vaccine were assessed by counting, by participant, how many unique reasons were offered by each participant. Then, to compare members of different demographic groupings' number of reasons given for declining the vaccine, independent-samples t-tests or one-way analyses of variance tests, as appropriate, were used. Finally, to assess differences in reasons given for COVID-19 vaccine hesitancy among the three countries, Chi-square and Fisher exact tests were used to assess whether there were different distributions in the endorsement or not of each reason by country. The statistical significance level for all tests was set at $p < .05$.

Results

A total of 1,843 persons consented to the survey. After removing 13 persons who reported being younger than 18 years of age and 86 persons who reported not being from Colombia, Ecuador, or Venezuela, and then removing an additional 571 persons who either chose not to complete all demographic items or who reported residence in a different Andean country than their reported nationality (e.g., removing Venezuelans who reported their residence as being in Colombia or Ecuador), a final sample of 1,173 persons remained. The sample had a plurality of Venezuelans (n = 502, 42.8%), followed by Colombians (n = 360, 30.7%) and Ecuadorians (n = 311, 26.5%). The sample was about two-thirds female, and a majority were 50 years of age or greater. About half were married and lived in a household with two or three people. More educated people were over-represented, as were people living in urban areas as compared to the national population of the three countries. Almost all (n = 1,149, 97.9%) participants reported having received vaccines against diseases other than COVID-19. There was no significant association between having received vaccinations against other diseases with country of residence (X^2 (2, N = 1,173) = 1.54, p = .46) or with urban/rural residence (X^2 (1, N = 1,173) = 0.06, p = .81). Full demographics are reported in Table 1.

The first research question asked what the level of vaccine hesitancy was in these three countries. Overall, COVID-19 vaccine hesitancy is higher than desirable. Most participants (56.0%) did not object to receiving the vaccine for any reason. On average, participants endorsed one reason or fewer for refusing (M = 0.75, s.d. = 1.15), suggesting that objectors are generally single-issue objectors. Table 2 shows the distribution of number of reasons given for not becoming vaccinated. As indicated in Table 1, Ecuadorians give the most reasons for not becoming vaccinated, and Colombians give the fewest reasons, and the differences among all three countries are statistically significant (p = .03).

The second research questions asked what reasons were given for not becoming vaccinated against COVID-19. Eighteen categories of reasons for not becoming vaccinated were articulated and endorsed by multiple participants. The number and percentage of persons endorsing each reason given for not becoming vaccinated is offered in Table 3.

Four myths (untrue statements circulating about the vaccine) about COVID-19 were used to justify not becoming vaccinated, specifically claims that: the vaccines were ineffective; natural immunity being better than vaccination; vaccines causing more problems than they resolve; COVID-19 not being dangerous; and, that the UN/WHO, not just a national government, would need to endorse a vaccine. The belief that the vaccines are ineffective and that they cause more problems than they solve were the most frequently endorsed myth, attracting about 8.5% of participants to endorse each of these myths.

Table 1. Demographics and t-test/ANOVA test of mean differences among demographic groupings, N = 1173.

Country of Residence	Frequency	Percent	Number of Reasons Given (mean)	s.d.
Colombia	360	30.7	0.56_{a}	0.99
Ecuador	311	26.5	1.01_{b}	1.26
Venezuela	502	42.8	0.74_{c}	1.15
Gender				
Male	413	35.2	0.69	1.04
Female	742	63.3	0.77	1.19
Other	14	1.2	1.14	1.41
Age				
18–29	114	9.8	1.06_{a}	1.44
30–49	387	33.1	0.71_{b}	1.12
50+	668	57.1	0.72_{b}	1.11
Civil Status				
Single, never married	287	24.5	0.85_{ac}	1.26
Cohabitating	118	10.1	0.82_{abc}	1.18
Married	536	45.7	0.66_{bc}	1.04
Separated	69	5.9	0.94_{abc}	1.40
Divorced	118	10.1	0.86_{abc}	1.20
Widowed	44	3.8	0.50_{ab}	0.85
Number of Persons in Home				
1	128	10.9	0.60_{a}	1.03
2	321	27.4	0.67_{a}	1.09
3	275	23.4	0.73_{ab}	1.15
4	233	19.9	0.76_{ab}	1.14
5	118	10.1	0.93_{bc}	1.38
6+	98	8.4	1.05_{b}	1.13
Education Level				
Primary School or Less	19	1.6	1.05_{abc}	0.91
Secondary School	159	13.6	1.10_{a}	1.28
Bachelor's	460	39.2	0.83_{ab}	1.21
Master's+	533	45.4	0.56_{ac}	1.00
Home Location				
Urban Area	1028	87.6	0.70_{a}	1.10
Rural Area	145	12.4	1.12_{b}	1.41

Means with differing subscripts within demographic grouping differ significantly at p < .05; Non-responses excluded, totals may not add to 1173; s.d: standard deviation.

Table 2. Summary of number of reasons given for not becoming vaccinated against SARS-CoV-2.

Number of Reasons	N	%
0 (i.e., no objections)	657	56.0
1	324	27.6
2	90	7.7
3	60	5.1
4	25	2.1
5	10	0.9
6	3	0.3
7	2	0.2
8	2	0.2

Table 3. Frequency and percentage of persons endorsing reasons for not becoming vaccinated.

Reason	Number of persons endorsing reason (%)
Myths	
Vaccine Ineffective	
Endorsed	98 (8.4)
Not Endorsed	1075 (91.6)
Natural Immunity is Better than Vaccination	
Endorsed	62 (5.3)
Not Endorsed	1111 (94.7)
Vaccine Causes More Problems than It Solves	
Endorsed	101 (8.6)
Not Endorsed	1072 (91.4)
COVID-19 not Dangerous	
Endorsed	22 (1.9)
Not Endorsed	1151 (98.1)
Misconceptions	
Waiting for World/UN to Approve Vaccine	
Endorsed	5 (0.4)
Not Endorsed	1168 (99.6)
Fear of Adverse Reaction/Side Effect	
Endorsed	24 (2.0)
Not Endorsed	1149 (98.0)
Safety Concerns	
Endorsed	196 (16.7)
Not Endorsed	977 (83.3)
Vaccine Was Rushed	
Endorsed	12 (1.0)
Not Endorsed	1161 (99.0)
Long-Term Effects of Vaccine Unknown	
Endorsed	9 (0.8)
Not Endorsed	1164 (99.2)
Distrust of Chinese and Russian Vaccines	
Endorsed	15 (1.3)
Not Endorsed	1158 (98.7)
Individual Level Barriers	
Fear of Needles	
Endorsed	52 (4.4)
Not Endorsed	1121 (95.6)
Religious Objection	
Endorsed	8 (0.7)
Not Endorsed	1165 (99.3)
Preexisting Condition	
Endorsed	10 (0.9)
Not Endorsed	1163 (99.1)
Allergy to Component	
Endorsed	10 (0.9)
Not Endorsed	1163 (99.1)
Health Care Provider Recommends Against	
Endorsed	40 (3.4)
Not Endorsed	1133 (96.6)
Structural Barriers	
Cost	
Endorsed	132 (11.3)
Not Endorsed	1041 (88.7)
Distance from Clinics	
Endorsed	31(2.6)
Not Endorsed	1142 (97.4)
Distrust National Government	
Endorsed	19 (1.6)
Not Endorsed	1154 (98.4)
Other	
Endorsed	27 (2.3)
Not Endorsed	1146 (97.7)

Six misconceptions (statements that are not entirely false but are exaggerated in public discourse about vaccines) were deployed by participants: that global/United Nations approval of the vaccine is preferable to national approval; fear of adverse reactions or side effects; concerns about safety of vaccines; the speed by which the vaccine was developed; the lack of knowledge of long-term effects of vaccination; and, specific distrust of Chinese and Russian vaccines as compared to North American and European vaccines. About 17% of participants endorsed the misconception that there were significant safety concerns about the vaccines; no other misconception was endorsed by more than 2% of participants.

Five individual-level barriers to vaccination (reasons that an individual gives about themselves) were named: fear of needles; religious objection; preexisting conditions that might make vaccination inadvisable; allergy to a component of the vaccine; and a healthcare provider's recommendation against the vaccine. Fear of needles and claims that a healthcare provider recommended against vaccination each attracted endorsement from about 4% of participants.

Finally, three structural barriers (reasons that related to access to the vaccine itself) were named: the cost of the vaccine; the distance to get to a clinic; and, a distrust of the participant's own national government to implement the vaccination scheme. Cost as a barrier was endorsed by about 11% of participants. Twenty-seven participants also offered an idiosyncratic reason that was coded into the "other" category.

The third research question asked what, if any, differences in the level of COVID-19 vaccine hesitancy existed among demographic groupings. Several demographic differences in the number of reasons given for not getting vaccinated emerged in addition to national differences (see Table 1 for all between demographic group comparisons and statistical significance levels). Younger people offer more reasons for not receiving the vaccine compared to both middle-aged and older people. People living in rural areas give more reasons than people living in urban areas. Overall, as more people live in a home, the number of reasons offered increased. As educational level rises, at least from secondary school onward, the number of reasons for not becoming vaccinated declines. Differences that are difficult to interpret emerge in regard to civil status.

The fourth research questions asked whether there were differences in reasons given for COVID-19 vaccine hesitancy among the three countries or by rural/urban residence. Differences in the frequency of endorsement or not of specific reasons differs by country and by place of residence (urban/rural) for some reasons (see Table 4 for all comparisons and statistical significance levels). Overall, Ecuadorians are about twice as likely as both Colombians and Venezuelans to endorse myths about vaccines against COVID-19, endorsing reasons like the ineffectiveness of the vaccines, that natural immunity is better than immunity attained from a vaccine, that the vaccine causes more problems than it solves, and that COVID-19 is not dangerous. Similarly, Ecuadorians are substantially more likely to subscribe to the misconception that adverse reactions and side effects are common outcomes of vaccination and that there are substantial safety concerns as compared to Colombians and Venezuelans. In addition, Venezuelans were more likely to have safety concerns than Colombians.

Turning to individual-level barriers, no statistically significant differences between the three countries emerged. The three countries have similar distributions of persons who fear needles, claim to have allergies, or state they have preexisting

Table 4. Differences in frequencies for specific reasons given for declining a vaccine by country of origin and by place of residence.

Reason	Colombia (n (%))	Ecuador (n (%))	Venezuela (n (%))	X^2-Value Country (d.f. 2)	Exact Sig. Country	Urban (n (%))	Rural (n (%))	X^2-Value Place (d.f. 1)	Exact Sig. Place
Myths									
Vaccine Ineffective				19.291**	–			14.520**	–
Endorsed	26 (7.2)	44 (14.2)	28 (5.6)			74 (7.2)	24 (16.5)		
Not Endorsed	334 (92.8)	267 (85.8)	474 (94.4)			954 (96.8)	121 (83.5)		
Natural Immunity is Better than Vaccination				6.608*	–			0.858	–
Endorsed	14 (3.9)	25 (8.1)	23 (4.6)			52 (5.0)	10 (6.9)		
Not Endorsed	346 (96.1)	286 (91.9)	479 (95.4)			976 (95.0)	135 (93.1)		
Vaccine Causes More Problems than It Solves				12.996**	–			15.663**	–
Endorsed	26 (7.2)	42 (13.5)	33 (6.6)			76 (7.4)	25 (17.2)		
Not Endorsed	334 (92.8)	269 (86.5)	469 (83.4)			952 (92.6)	120 (82.8)		
COVID-19 not Dangerous				–	0.042*			11.923**	–
Endorsed	9 (2.5)	9 (2.9)	4 (0.8)			14 (1.4)	8 (5.5)		
Not Endorsed	351 (97.5)	302 (97.1)	498 (99.2)			1014 (98.6)	137 (94.5)		
Misconceptions									
Waiting for World/UN to Approve Vaccine				–	0.183			–	1.00
Endorsed	0 (0.0)	1 (0.3)	4 (0.8)			5 (0.5)	0 (0.0)		
Not Endorsed	360	310 (99.7)	498 (99.2)			1023 (99.5)	145 (100.0)		
Fear of Adverse Reaction/Side Effect				–	0.013*			0.000	–
Endorsed	4 (1.1)	13 (4.2)	7 (1.4)			21 (2.0)	3 (2.1)		
Not Endorsed	356 (98.9)	298 (95.8)	495 (98.6)			1007 (98.0)	142 (97.9)		
Safety Concerns				32.980**	–			7.835**	–
Endorsed	36 (10.0)	82 (26.4)	78 (15.5)			160 (15.5)	36 (24.8)		
Not Endorsed	324 (90.0)	229 (73.6)	424 (84.5)			868 (84.5)	109 (75.2)		
Vaccine Was Rushed				–	0.934			–	0.652
Endorsed	3 (0.8)	3 (1.0)	6 (1.2)			10 (1.0)	2 (1.4)		
Not Endorsed	357 (99.2)	308 (99.0)	496 (98.8)			1018 (99.0)	143 (98.6)		
Long-Term Effects of Vaccine Unknown				–	0.265			–	1.00
Endorsed	5 (1.4)	1 (0.3)	3 (0.6)			8 (0.8)	1 (0.7)		
Not Endorsed	355 (98.6)	310 (99.7)	499 (99.4)			1020 (99.2)	144 (99.3)		
Distrust of Chinese and Russian Vaccines				4.175	–			–	0.084
Endorsed	1 (0.3)	5 (1.6)	9 (1.8)			13 (1.3)	2 (1.4)		
Not Endorsed	359 (99.7)	306 (98.4)	493 (98.2)			1015 (98.7)	143 (98.6)		
Individual Level Barriers									
Fear of Needles				1.514	–			0.034	–
Endorsed	17 (4.7)	10 (3.2)	25 (5.0)			46 (4.5)	6 (4.1)		
Not Endorsed	343 (95.3)	301 (96.8)	477 (95.0)			982 (95.5)	139 (95.9)		
Religious Objection				–	0.345			–	0.011*
Endorsed	2 (0.6)	4 (1.3)	2 (0.4)			4 (0.4)	4 (2.8)		
Not Endorsed	358 (99.4)	307 (98.7)	500 (99.6)			1024 (99.6)	141 (97.2)		
Preexisting Condition				–	0.092			–	0.356
Endorsed	2 (0.6)	6 (1.9)	2 (0.4)			8 (0.8)	2 (1.4)		
Not Endorsed	358 (99.4)	305 (98.1)	500 (99.6)			1020 (99.2)	143 (98.6)		
Allergy to Component				–	0.284			–	0.116
Endorsed	2 (0.6)	5 (1.6)	3 (0.6)			7 (0.7)	3 (2.1)		
Not Endorsed	358 (99.4)	306 (98.4)	499 (99.4)			1021 (99.3)	142 (97.9)		
Health Care Provider Recommends Against				1.638	–			1.009	–
Endorsed	10 (2.8)	14 (4.5)	16 (3.2)			33 (3.2)	7 (4.8)		
Not Endorsed	350 (97.2)	297 (95.5)	486 (96.8)			995 (96.8)	138 (95.2)		
Structural Barriers									
Cost				19.775**	–			0.137	–
Endorsed	25 (7.0)	27 (8.7)	80 (15.9)			117 (11.3)	15 (10.3)		

(*Continued*)

Table 4. (Continued).

Reason	Colombia (n (%))	Ecuador (n (%))	Venezuela (n (%))	X^2-Value Country (d.f. 2)	Exact Sig. Country	Urban (n (%))	Rural (n (%))	X^2-Value Place (d.f. 1)	Exact Sig. Place
Not Endorsed	335 (93.0)	284 (91.3)	422 (84.1)			911 (88.7)	130 (89.7)		
Distance from Clinics				–	0.062			3.069	–
Endorsed	4 (1.1)	9 (2.9)	18 (3.6)			24 (2.3)	7 (4.8)		
Not Endorsed	356 (98.9)	302 (97.1)	484 (96.4)			1004 (97.7)	138 (95.2)		
Distrust National Government				–	0.022**			–	0.497
Endorsed	2 (0.6)	3 (1.0)	14 (2.8)			18 (1.7)	1 (0.7)		
Not Endorsed	358 (99.4)	308 (99.0)	488 (97.2)			1010 (98.3)	144 (99.3)		
Other				1.042	–			0.967	–
Endorsed	10 (2.8)	8 (2.6)	9 (1.8)			22 (2.1)	5 (3.4)		
Not Endorsed	350 (97.2)	303 (97.4)	493 (98.2)			1006 (97.9)	140 (96.6)		

When minimum cell counts were less than 5, Fisher's exact test was used instead of chi-square test; *p value <.05; **p value <.01 <.001.

conditions that might make vaccination inadvisable. The dominant religion in the three country is similar, and it is likely that health care providers have received similar messages from national governments and from international organizations in terms of the advisability of vaccination.

Finally, turning to structural barriers, Venezuela faces two challenges more severely than Colombia and Ecuador do. Venezuelans are about twice as likely to believe that they will not be able to afford a COVID-19 vaccine than Colombians or Ecuadorians. In addition, Venezuelans are about three times more likely than Ecuadorians and four times more likely than Colombians to express a distrust of their government's ability to implement a vaccination program. This indicates that the changes needed to bring people to vaccines are not related only to the vaccine, but to the structure of health care delivery in Venezuela.

Regarding urban/rural differences, we did not have sufficient rural residents from the three countries to perform a nested design (i.e., we cannot compare rural Ecuadorians to urban Ecuadorians on reasons given, then Colombians, and then Venezuelans). Across the three countries, rural residents are significantly more likely to believe the myths that the vaccine is ineffective (twice as likely), that the vaccine causes more problems than it solves (twice as likely), and that COVID-19 is not dangerous (three times as likely) than urban residents were to believe these myths. Rural residents were more likely to believe the misconception that there were significant concerns about vaccine safety than urban residents. Finally, rural residents were five times as likely to express a religious objection to receiving a vaccine as were urban residents. Given the small number of religious objectors in all conditions, however, this last result should be read with caution.

Discussion and conclusions

Assessing the reasons for COVID-19 vaccine hesitancy, as well as how common those reasons are and who holds these views, is essential to creating communication interventions to counter COVID-19 vaccine hesitancy.

The first research question assessed the relative level of COVID-19 vaccine hesitancy in the three countries. The level of COVID-19 vaccine hesitancy is higher than desired. Although over half of the participants articulated no objection to becoming vaccinated, the percentage of persons offering reasons to not be vaccinated is on the high end of COVID-19 vaccine hesitancy when compared to residents of countries in North America, Europe, East Asia, and the Middle East (Robinson et al., 2021). Previous research has generally asked simply whether one would become vaccinated or not, rather than exploring reasons why (El-Elimat et al., 2021; Killgore et al., 2021; Shacham et al., 2021; Q. Wang et al., 2021), and, as a result, does not provide targets to address. Fortunately, almost two-thirds of COVID-19 vaccine hesitant persons in this sample were single-issue objectors. This suggests that individually-tailored and targeted communication may be successful if a pro-vaccine communicator is able to identify the objection to becoming vaccinated and talk the message target through that objection. Rather than the mass-mediated communication solutions that have been offered to overcome COVID-19 vaccine hesitancy, such as television, radio, or print campaigns, our data suggests, at least in these three countries, that interpersonal communication solutions between community members or between patients and providers may be a better strategy. Indeed, experiences with influenza vaccines uptake in Ecuador and Puerto Rico indicate that, in some Latin American contexts, interpersonal communication through community health care workers is much more effective and trusted than national, mediated messages (Arriola et al., 2015; Erazo et al., 2021).

Our second research question assessed the reasons given for COVID-19 vaccine hesitancy in Colombia, Ecuador, and Venezuela. We found that participants offer a wide variety of reasons why they might not become vaccinated. Although previous research has emphasized the prevalence of myths about the vaccine (Allington et al., 2021a; El-Elimat et al., 2021; García-Montero et al., 2021; Hornsey et al., 2021; Kumari et al., 2021; Montalti et al., 2021; Ullah et al., 2021) or on overcoming exaggerated concerns about safety and side effects (Levin-Zamir, 2020; Thaker, 2021) as key message

variables in attempts to counter them in mass media, our results indicate that individual-level and structural barriers to becoming vaccination are also offered as reasons for not becoming vaccinated. The two most frequent objections across countries were concerns about safety and concerns about cost, with the former indicating a communication solution and the latter a structural solution. That is, under the Vaccine Hesitancy Determinants Matrix, topics under Confidence and Convenience were more prominent than topics under Complacency. Although previous research in communication and media studies has focused on disrupting Complacency, these approaches are unlikely to be effective. Rather, these findings support the claim we must take issues of structure seriously if we want people to become vaccinated against COVID-19 (Abedin et al., 2021; Dzieciolowska et al., 2021; Fossen et al., 2021; Green et al., 2021; Peteet et al., 2021). Moreover, the wide dispersion of reasons offered indicates that a single-message intervention distributed through mass media is unlikely to succeed. There is not, in Colombia, Ecuador and Venezuela, at least, a silver bullet that will persuade COVID-19 vaccine hesitant persons into vaccination. Indeed, no reason, out of all of those articulated, was expressed by more than 16.5% of the participants, indicating a complex communication and political environment in which to promote vaccination against COVID-19.

Regardless of the strategy employed, it is important to identify persons who are more likely to be COVID-19 vaccine hesitant so that we can address these people in more effective ways. Our third research question asked if there were differences in the level of COVID-19 vaccine hesitancy among demographics groupings. Generally, we found greater hesitancy among younger, less educated, and rural people. Like Oliveira et al. (2021) and Urrunaga-Pastor et al. (2021), we found that persons who live on social margins in Latin America perceive and experience vaccination differently from those who are not marginalized. This suggests that, as the three countries move beyond vaccinating the elderly and urban elites, they will encounter more COVID-19 vaccine hesitancy and should prepare appropriate strategies for overcoming additional hesitancy.

Our fourth research question asked about potential differences in reasons given for COVID-19 vaccine hesitancy among the three countries. Overall, Ecuadorians offer more objections and endorse more myths about vaccines against COVID-19 than residents of the other two countries. Thus, it may be necessary to explicitly counter these myths in Ecuador, but that strategy will have less impact in Colombia and Venezuela. Similarly, Ecuadorians subscribe to more misconceptions about adverse reactions, side effects, and safety concerns than Colombians and Venezuelans, but also Venezuelans were more likely to be concerned about safety concerns than Colombians. These findings indicate that, to counter misconceptions about COVID-19 vaccinations, Ecuador and Venezuela may wish to look to Colombia as a model for its messaging about side effects and about vaccine safety.

Communication solutions may be more effective for Ecuador, but structural solutions appear to be necessary in Venezuela. Venezuelans were found to express more concerns about being able to afford a vaccine than people in Colombia and Ecuador. Although the government of Venezuela has promised that all COVID-19 vaccines in Venezuela will be free to the recipient, Venezuela's medical system is highly inequitable and underfunded, making these concerns quite real. Indeed, recent journalistic and anecdotal reports claim that there is a thriving "black market" in COVID vaccinations in Venezuela in which rich and connected people are able to access vaccines and poor and marginalized people cannot (e.g., Herrero & Faiola, 2021; Venezuela Investigative Unit, 2021). Concerns that COVID-19 vaccines will cost to much in Venezuela may not be only a matter of perception. In addition, Venezuelans are much more likely than Ecuadorians and Colombians to distrust of their government's ability to implement a national vaccination program. Similar to relationships between low trust in government and COVID-19 vaccine hesitancy in China (C. Wang et al., 2021), these findings indicate that the changes needed to bring people to vaccines are not related only to communication about the vaccine, but to the structure of health care delivery in Venezuela.

Limitations

This study is part of an ongoing effort to identify COVID-19 vaccine hesitancy and ways of responding to it in Latin America. Because our research follows the logic of exploratory data analysis, in which we seek to discover, explore, and empirically detect patterns in COVID-19 vaccine hesitancy, we did not test hypotheses; rather, this study should be viewed as a starting point for countering specific reasons given in three specific national contexts for COVID-19 vaccine hesitancy. Our study presented participants with a list of potential reasons for not being vaccinated against COVID-19, but also allowed participants to identify additional reasons for not becoming vaccinated. Nonetheless, there may be other reasons that we did not identify because participants did not immediately recall them or because they believed our list was exhaustive. Future research may consider implementing a qualitative framework of interviews or focus groups to identify and extend the list of reasons for not becoming vaccinated against COVID-19. Alternatively, a study framed explicitly through a structural lens or through a socioecological approach might use policy analysis, document analysis, or other strategies to identify reasons of which participants themselves may not be aware. Second, although we involved participants from across the three countries, our sample overrepresented urban people, women, and people with higher levels of education. Moreover, nearly all of our participants had received vaccines for other diseases; there were very few people who have never been vaccinated before. Although our sample sizes were large enough to offer between-group comparisons, future research that collects larger samples from primary school completers and rural residents, in particular, would allow for nested designs and interactions that would be informative beyond main effects research. Future research may also consider an intentional recruiting focus on persons who have never been vaccinated against diseases, as their reasons for declining all vaccines may be different from people who decline COVID-19 vaccines specifically. Finally, all data for this study were collected online. Although online data collection in an age

of COVID-19 protects better the health of both researchers and participants, it also tends to recruit from economically advantaged persons who live in cities. The digital divide in Colombia, Ecuador, and Venezuela may have limited the ability of impoverished people and rural people to participate.

Conclusion

In summary, COVID-19 vaccine hesitancy is higher than desired in Colombia, Ecuador, and Venezuela. The diversity of reasons given for declining a vaccine makes a single communication solution difficult to identify and unlikely to succeed. COVID-19 vaccine hesitancy is lowest in Colombia and may provide a model for both communication and structural interventions to promote vaccination. Communication solutions to counter myths and misconceptions are most likely to be needed in Ecuador. Structural solutions may be required in Venezuela to overcome people's reasons for not becoming vaccinated.

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