Perception of COVID-19 vaccination amongst physicians in Colombia, January 2021

Running title: Physicians COVID-19 vaccination perception in Colombia

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Abstract

Introduction: The SARS-CoV-2/COVID-19 pandemic has triggered the need for developing rapidly effective and safety vaccines to prevent infection, particularly in those at-risk populations such as medical personnel. The objective of this study was to assess perception of COVID-19 vaccination amongst Colombian physicians featuring two different sceneries of COVID-19 vaccination.

Methods: A cross-sectional analytical study was carried out through an online survey, directed at medical staff in several cities in Colombia. The percentage of physicians who have a positive perception to be vaccinated and the associated factors that determine that decision were determined. A binomial regression analysis adjusted for age and sex was carried out, taking as a dependent variable the acceptance of free vaccination with an effectiveness of 60 and 80%. The most significant factors were determined in the non-acceptance of vaccination.

Results: Between 77.1% and 90.8% of physicians in Colombia, accept COVID-19 vaccination, according to the scenario evaluated where the effectiveness of the vaccine was 60 or 80%, respectively. Medical specialty, have ever paid for a vaccine, recommend administrating the vaccine to their parents or people over 70 years and dispense the vaccine to their children were the factors to be vaccinated for free with an effectiveness of 60% and 80%.

Conclusions: There is a high perception on the intention to vaccinate physicians in Colombia against COVID-19. But it is very similar to that of the general population, according to results reported in other studies.

Keywords: COVID-19, SARS-CoV-2, pandemic, medical staff, vaccine.

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Introduction

Coronavirus disease 2019 is the name assigned to the pathology caused by infection with the Severe Respiratory Acute Syndrome 2 (SARS-CoV-2) Coronavirus; initially reported in Wuhan, China on December 2019. Due to its rapid worldwide distribution, the World Health Organization (WHO) declared it a pandemic in 2020 (1). Although it displays a wide-age distribution, some groups are at higher risk for severe illness and death, such as the elderly (> 70 years), people with comorbidities such as diabetes, hypertension, cardiovascular disease, and obesity. Additionally, other age groups have shown to be particularly susceptible, as is the case of children, young adults, pregnant women, who can also present unfavorable complications of the disease (2). SARS-CoV-2 is an airborne infection causing a significant respiratory impact, leading to rapid development of hypoxemia and death in at-risk populations (3).

Therefore, prevention measures, such as hand washing, social distancing (quarantines) and use of personal protection elements according to the spaces where people carry out their daily activities (4) are essential measures to tackle viral transmission. Due to the significant stress the pandemic has posed on many levels, control measures have been prioritized. However, some of these preventive measures, seeking to mitigate the spread of the virus, have proved largely ineffective, raising concerns as to causing economic crisis or secondary problems of confinement (5). Strategies have also been designed to support the most seriously ill, and to prevent deaths. Some interventions such as hydroxychloroquine, antivirals, macrolides, convalescent plasma, and steroids have not significantly impacted mortality reduction (6). To date, there is no specific treatment for SARS-CoV-2 infection, which continues circulating widely, while threating to become endemic.

In addition, efforts have not ceased in search to provide optimal care and treatment for those seriously ill and to prevent disease progression. In this last scenario, vaccines play an important role (7). In fact, the WHO has foreseen vaccination as the ultimate strategy to protect the most vulnerable. Physicians as well as other healthcare workers are included in this population, given their permanent risk for exposure despite utilization protective measures (8). However, some studies exploring the “intention to vaccinate” in the general population have raised concerns that not all groups will accept to receive vaccination once widely available (9,10). Without doubt, vaccination appears to be the best option to halt this pandemic, with health personnel being one of the priority groups. Caring for physicians and other frontline workers is a crucial step during the pandemic, generating greater confidence when caring for others, reducing the fear of being affected by the disease, and avoiding transmission to other family members (11).

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Finally, although the intention to be vaccinated in the general population is widely recognized, acceptance amongst physicians remains unknown. Therefore, the objective of this work was to determine the perception of COVID-19 vaccination by physicians in Colombia with two different sceneries of the COVID-19 vaccine.

Material and methods

A descriptive-analytical cross-sectional study was carried out. Data was collected from the self-completion of an electronic survey directed to physicians from different specialties in different cities of Colombia.

The survey was created on the Google forms platform. Dissemination of the survey was carried out by sending a link to the different medical societies, which in turn were in charge of sending it to their fellow members according to each of their databases.

Once the survey was voluntarily self-completed, information provided by each of the participants was uploaded onto an Excel file, to which only the leading researcher of the study and the data analyst had access. For the statistical analysis, a descriptive analysis was initially performed, where the categorical values are presented as proportions and the continuous variables as means and standard deviation (SD). A bivariate analysis where two scenarios of possible vaccines were established generating two dependent variables: a) "agree to apply a free vaccine with 60% effectiveness" and, b) "accept to apply a free vaccine with 80% effectiveness"; and independent of all variables in the survey. The variables that obtained a p=0.20 in the bivariate analysis were maintained in the multivariate models. All p values were taken in two tails, considering p=0.05 as statistical significance. The association between the dependent variables (accepting to be vaccinated for free with a 60% and 80% effective vaccine) and independent variables (other variables) in this study was evaluated using binomial regression models with their corresponding goodness of fit evaluation. All data were analyzed using Stata® version 14.0 statistical software (Stata Corporation, College Station, TX).

Additionally, a theoretical relationship of the study variables was established. To represent the theoretical association between the intention to get vaccinated and the medical specialty, having paid for a vaccine, living with people over 70 years of age, giving the vaccine to their children and recommending

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vaccination to parents or those over 70 years of age, adjusting for potentially confusing variables. The DAG is a graphical tool used to represent a priori assumptions about the qualitative causal structure of the variables involved, around a research question. The graph makes it possible to reveal systematic bias sources and identify possible design and analysis problems in the study (12).

Ethical considerations

The study was conducted under the Declaration of Helsinki. This research's preparation and execution fully complied with the fundamental ethical principles of autonomy, justice, beneficence, and non-maleficence. The ethical approaches outlined in the code of medical ethics (Law 23 of 1981) and resolution 8430 of 1993 of the Ministry of Health of Colombia were complied with, which establish the standards for health research in which they participate. Humans. The ethics committee of the Cardiovascular Research Foundation Colombia approved it in Act No. 511, meeting on August 25, 2020.

Results

A total of 1066 surveys were completed and analyzed. Twenty-nine surveys were excluded since they did not match physicians with any specialty. Physicians answered 46.3% of the surveys. Departments such as Santander (11.9%) and Antioquia (10.8%) were the ones with the highest response, as well as the city of Bogotá (29.2%) which had the highest proportion of participation. Table 1 describes the population's characteristics according to the acceptance of free vaccination with an effectiveness of 60% and 80%, respectively.

Table 1. Characteristics of the population according to the acceptance of free vaccination with an effectiveness of 60% and 80%.

Characteristics	60% effectiveness		p-values	80% effectiveness		p-values
	No (n=245)	Yes (n=821)		No (n=99)	Yes (n=967)	
Age (years)	47.4 [18]	45.1 [19]	0.003¥	48.7 [20]	45.3 [19]	0.004¥
Gender						
Male	440 (53.5)	123 (50.2)	0.031‡	44 (44.4)	519 (53.6)	0.187‡
Female	380 (46.2)	121 (49.3)		55 (55.5)	446(46.1)	
Indeterminate	1 (0.41)	1 (0.12)		0 (0.0)	2 (0.2)	0.024
Number of years of graduate	19.6 [19]	17.8 [19]	0.0312¥	20.8 [20]	17.9 [19]	0.0248¥
Specialty						
Pediatrics	48 (19.5)	277 (33.7)	<0.0001†	17 (17.1)	308 (31.8)	0.021†
General medicine	22 (8.9)	69 (8.4)		7 (7.0)	84 (8.6)	
Surgical	98 (40.0)	289 (35.2)		42 (42.4)	345 (35.6)	
Clinics	61 (24.9)	163 (19.8)		27 (27.7)	197 (20.3)	

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Characteristics	60% effectiveness		p-values	80% effectiveness		p-values
	No (n=245)	Yes (n=821)		No (n=99)	Yes (n=967)	
Administrative	16 (6.5)	23 (2.8)		6 (6.0)	33 (3.4)	
Work performance area						
External consultation	99 (40.4)	317 (38.6)	0.004†	42 (42.4)	374 (38.6)	0.005†
Critical or intermediate care (adult / pediatric)	41 (16.7)	142 (17.3)		15 (15.1)	168 (17.3)	
Emergencies	39 (15.9)	128 (15.5)		12 (12.1)	155 (16.0)	
Hospitalization	21 (8.5)	140 (17.0)		8 (8.0)	153 (15.8)	
Administrative	8 (3.2)	24 (2.9)		2 (2.0)	30 (3.1)	
Other	37 (15.1)	70 (8.5)		20 (20.2)	87 (9.0)	
Department where you currently work						
Caribbean coast	53 (21.9)	130 (16.0)	0.180†	20 (20.2)	163 (17.1)	0.302†
East	49 (20.2)	155 (19.1)		21 (21.1)	183 (19.2)	
Bogotá D.C (Capital)	58 (23.9)	253 (31.2)		20 (20.2)	291 (30.5)	
Pacific Coast	30 (12.4)	91 (11.2)		16 (16.1)	105 (11.0)	
Center (Antioquia, coffee region)	45 (18.6)	152 (18.7)		19 (19.1)	178 (18.6)	
Plains (Meta, Arauca, Caquetá, Casanare)	7 (2.8)	29 (3.5)		3 (3.0)	33 (3.4)	
Do you have teaching functions?						
No	127 (51.8)	437 (53.2)	0.702‡	47 (47.4)	517 (53.4)	0.255‡
Yes	118 (48.1)	384 (46.7)		52 (52.5)	450 (46.5)	
Have you carried out research projects that have generated the publication of articles or conference papers?						
No	106 (43.2)	356 (43.3)	0.979‡	37 (373)	425 (43.9)	0.209‡
Yes	139 (56.7)	465 (56.6)		62 (62.6)	542 (56.0)	
The number of patients seen per day.	16.3 [10]	17.1 [10]	0.371¥	15.7 [14]	17.0 [10]	0.295¥
Do you know someone with a confirmed positive diagnosis for COVID-19						
No	4 (1.6)	30 (3.6)	0.114‡	1 (1.0)	33 (3.4)	0.195‡
Yes	241 (98.3)	791 (96.3)		98 (98.9)	934 (96.5)	
Do you know anyone who has died from COVID-19?						
No	32 (13.1)	145 (17.6)	0.089‡	16 (16.1)	161 (16.6)	0.901‡
Yes	213 (86.9)	676 (82.3)		83 (83.8)	806 (83.3)	
Do you know any person who has had a positive diagnosis for COVID-19, who has not died?						
No	2 (0.82)	22 (2.6)	0.084‡	0 (0.0)	24 (2.4)	0.113‡
Yes	243 (99.1)	799 (97.3)		99 (100)	943 (97.5)	
How many people live with you (who eat and sleep in the same house)?						
0	17 (6.9)	64 (7.8)	0.079†	11 (11.1)	70 (7.2)	0.243†

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Characteristics	60% effectiveness		p-values	80% effectiveness		p-values
	No (n=245)	Yes (n=821)		No (n=99)	Yes (n=967)	
1	37 (15.1)	154 (18.7)		17 (17.1)	174 (17.9)	
2	56 (22.8)	125 (15.2)		22 (22.2)	159 (16.4)	
3	61 (24.9)	215 (26.1)		25 (25.2)	251 (25.9)	
4 and more	74 (30.2)	263 (32.0)		24 (24.2)	313 (32.3)	
How many children do you have?						
0	5 (6.7)	35 (13.3)	0.087†	0 (0.0)	40 (12.7)	0.255†
1	10 (13.5)	42 (15.9)		5 (20.8)	47 (15.0)	
2	35 (47.3)	134 (50.9)		12 (50.0)	157 (50.1)	
3 and more	24 (32.4)	52 (19.7)		7 (29.1)	69 (22.0)	
How many people over 70 years of age live with you (who sleep and eat in the same house)?						
0	202 (82.4)	682 (83.0)	0.973†	80 (80.8)	804 (83.1)	0.557†
1	33 (13.4)	106 (12.9)		13 (13.1)	126 (13.0)	
2 and more	10 (4.1)	33 (4.2)		6 (6.0)	37 (3.8)	
Do you live with someone with at least one of the following comorbidities: Diabetes, Hypertension Heart disease, Congenital malformations, cancer, immunosuppression, obesity?						
No	155 (63.2)	512 (62.3)	0.798‡	66 (66.6)	601 (62.1)	0.377‡
Yes	90 (36.7)	309 (37.6)		33 (3.3)	366 (37.8)	
Do you suffer from any comorbidity?						
No	158 (64.4)	531 (64.6)	0.957‡	70 (70.7)	619 (64.0)	0.185‡
Yes	87 (35.5)	290 (35.3)		29 (29.2)	348 (35.9)	
The answer was yes, which comorbidity?						
No	13 (54.1)	28 (53.8)	0.494†	5 (71.4)	36 (52.1)	0.820†
Hypertension	7 (29.1)	12 (23.1)		1 (14.2)	18 (26.0)	
Obesity	1 (4.1)	0 (0.0)		0 (0.0)	1 (1.45)	
Diabetes	1 (4.1)	5 (9.6)		0 (0.0)	6 (8.7)	
Other	2 (8.3)	7 (13.4)		1 (14.2)	8 (11.5)	
Have you ever paid for a vaccine?						
No	56 (22.9)	108 (13.1)	<0.0001‡	33 (33.3)	131 (15.5)	<0.0001‡
Yes	189 (77.1)	713 (86.8)		66 (66.6)	836 (86.4)	
You would recommend that your parents or people over 70 years get the COVID-19 vaccine, if available.						
No	96 (39.2)	25 (3.0)	<0.0001‡	68 (68.6)	53 (5.4)	<0.0001‡
Yes	149 (60.8)	796 (96.9)		31 (31.3)	914 (94.5)	

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Characteristics	60% effectiveness		p-values	80% effectiveness		p-values
	No (n=245)	Yes (n=821)		No (n=99)	Yes (n=967)	
You would give your children the vaccine for COVID-19, if available						
No	115 (46.9)	37 (4.5)	<0.0001‡	78 (78.7)	74 (7.6)	<0.0001‡
Yes	130 (53.0)	784 (95.4)		21 (21.2)	893 (92.3)	

‡: p-value determined by Chi2 test. ¥: p-value determined by the Mann Whitney U test. †: p-value determined by Fisher's exact test.

Figure 1 shows why a participant would accept free vaccination with an effectiveness of 60% and 80%, against COVID-19, with one (1) being the least important and five (5) the most important. Figure 2 shows why the participant would not accept free vaccination with an effectiveness of 60% and 80%, against COVID-19, with one (1) being the least important and five (5) the most important.

Figure 1. The reason why the participant would accept a free vaccination with an effectiveness of 60% and 80%, against COVID-19, one (1) being the least important and five (5) being the most important.

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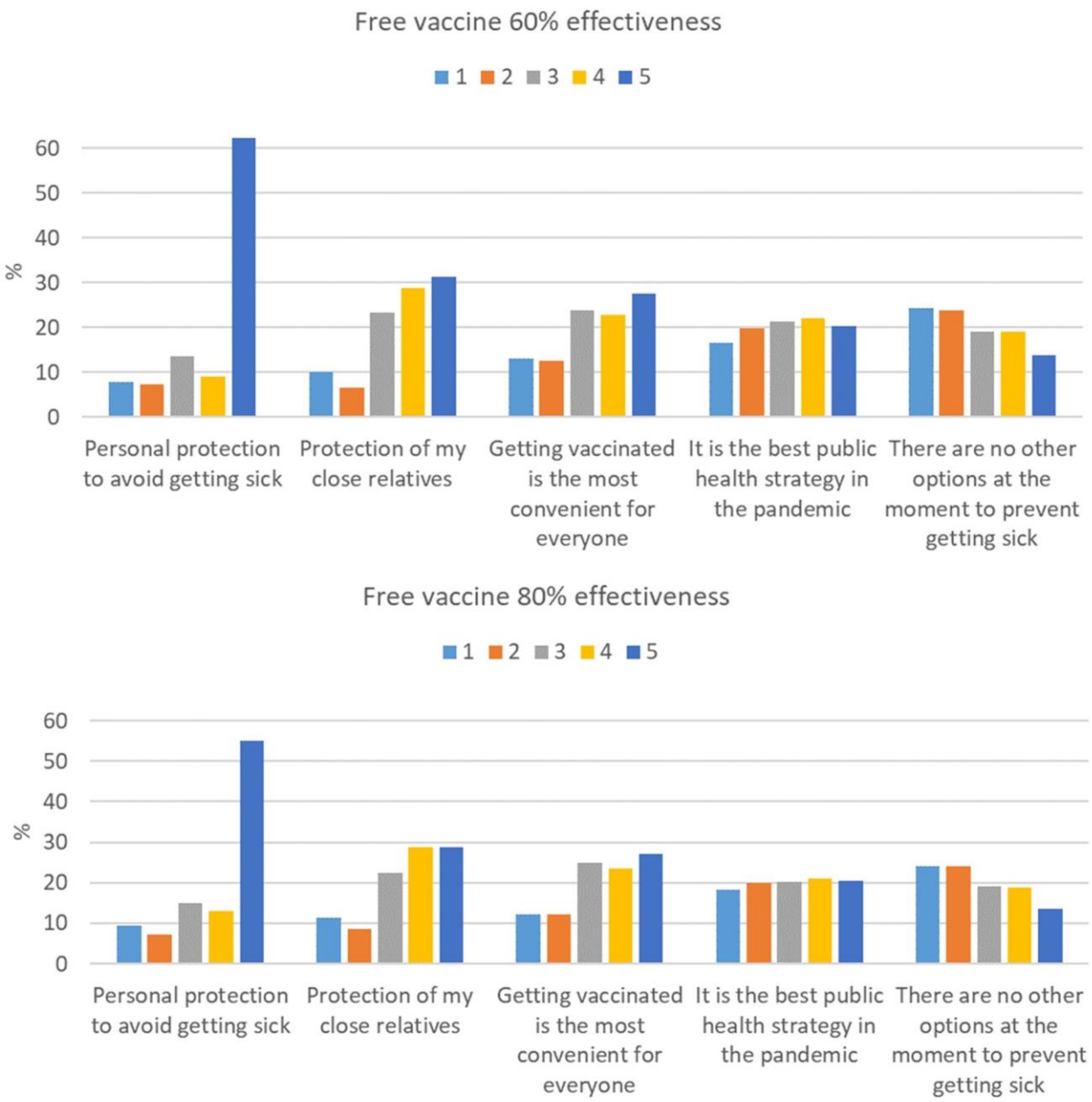

Tables 2 and 3 display the variables associated with the acceptance of being vaccinated for free with an effectiveness of 60% and 80% respectively, finding the same variables except for 60% of the department where they currently work and were related the number of children.

Table 2. Variables associated with the acceptance of free vaccination with an effectiveness of 60%.

Characteristics	**Crude Model**			**Fitted model ***		
	PR	**95%CI**	**p**	**PR**	**95%CI**	**p**
Medical speciality						
Administrative	Ref.			Ref.		

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General medicine	2.18	0.98-4.84	0.055	1.91	0.85-4.28	0.114
Surgical	2.05	1.04-4.04	0.038	2.29	1.15-4.56	0.018
Clinics	1.85	0.92-3.75	0.084	4.48	0.98-4.04	0.057
Pediatrics	4.01	1.97-8.14	<0.0001	0.22	2.19-9.16	<0.0001
Department where you currently work						
Caribbean coast	Ref.			Ref.		
East	1.28	0.81-2.02	0.271	1.26	0.79-1.99	0.317
Bogotá D.C (Capital)	1.77	1.15-2.72	0.008	1.86	1.20-2.88	0.005
Pacific Coast	1.23	0.73-2.08	0.425	1.28	0.76-2.18	0.344
Center (Antioquia, coffee region)	1.37	0.86-2.18	0.174	1.48	0.93-2.37	0.096
Plains (Meta, Arauca, Caquetá, Casanare)	1.68	0.69-4.09	0.246	1.69	0.69-4.12	0.243
How many children do you have?						
0	Ref.			Ref.		
1	0.6	0.18-1.92	0.389	0.58	0.17-1.97	0.386
2	0.54	0.19-1.49	0.241	0.51	0.17-1.57	0.247
3 and more	0.30	0.10-0.88	0.029	0.27	0.08-0.95	0.043
Have you ever paid for a vaccine?						
No	Ref.			Ref.		
Yes	1.95	1.36-2.80	<0.0001	1.83	1.27-2.65	0.001
You would recommend that your parents or people over 70 years get the COVID-19 vaccine, if available.						
No	Ref.			Ref.		
Yes	20.51	12.7-32.9	<0.0001	21.8	13.4-35.2	<0.0001
You would give your children the vaccine for COVID-19, if available						
No	Ref.			Ref.		
Yes	18.7	12.3-28.3	<0.0001	20.5	13.4-31.5	<0.0001

*Model Adjusted for gender, age. PR: prevalence ratio. 95%CI: 95% confidence interval; p: p-value; Ref: reference.

Table 3. Variables associated with the acceptance of free vaccination with an effectiveness of 80%.

Characteristics	**Crude Model**			**Fitted model ***		
	PR	**95%CI**	**p**	**PR**	**95%CI**	**p**
Medical speciality						
Administrative	Ref.			Ref.		
General medicine	2.18	0.68-6.97	0.188	1.88	0.58-6.06	0.290
Surgical	1.49	0.59-3.77	0.396	1.76	0.68-4.51	0.238
Clinics	1.32	0.50-3.45	0.563	1.47	0.56-3.88	0.428
Pediatrics	3.29	1.21-8.93	0.019	3.72	1.36-10.20	0.010
Have you ever paid for a vaccine?						
No	Ref.			Ref.		
Yes	3.19	2.02-5.03	<0.0001	2.91	1.83-4.64	<0.0001
You would recommend that your parents or people over 70 years get the COVID-19 vaccine, if available.						

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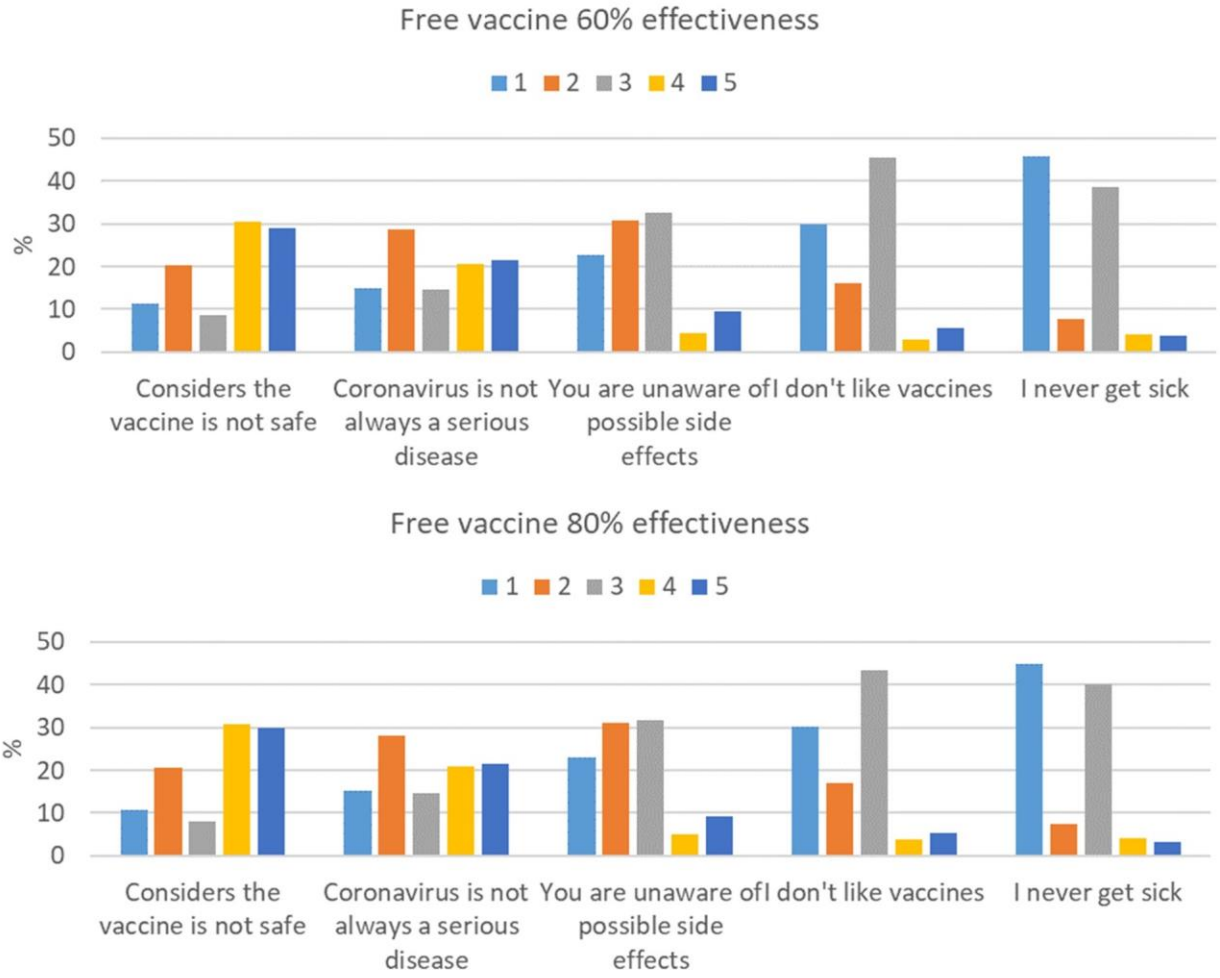
No	Ref.			Ref.		
Yes	37.8	22.7-62-8	<0.0001	44.3	25.8-75.9	<0.0001
You would give your children the vaccine for COVID-19, if available						
No	Ref.			Ref.		
Yes	44.4	26.1-76.6	<0.0001	55.8	31.3-99.3	<0.0001

*Model Adjusted for gender, age. PR: prevalence ratio. 95%CI: 95% confidence interval; p: p-value; Ref: reference.

Figure 2. The reason why the participant would not accept a free vaccination with an effectiveness of 60% and 80%, against COVID-19, one (1) being the least important and five (5) the most important.



A directed acyclic diagram (DAG) was crafted and depicted in Figure 3. The following DAG shows two ways by which two types of bias could occur: the selection bias since the study is conditioned by the response of the surviving population and the residual confounding bias due to the non-adjustment for variables that were not included in the survey, such as the use of vaccines, having or having had a family

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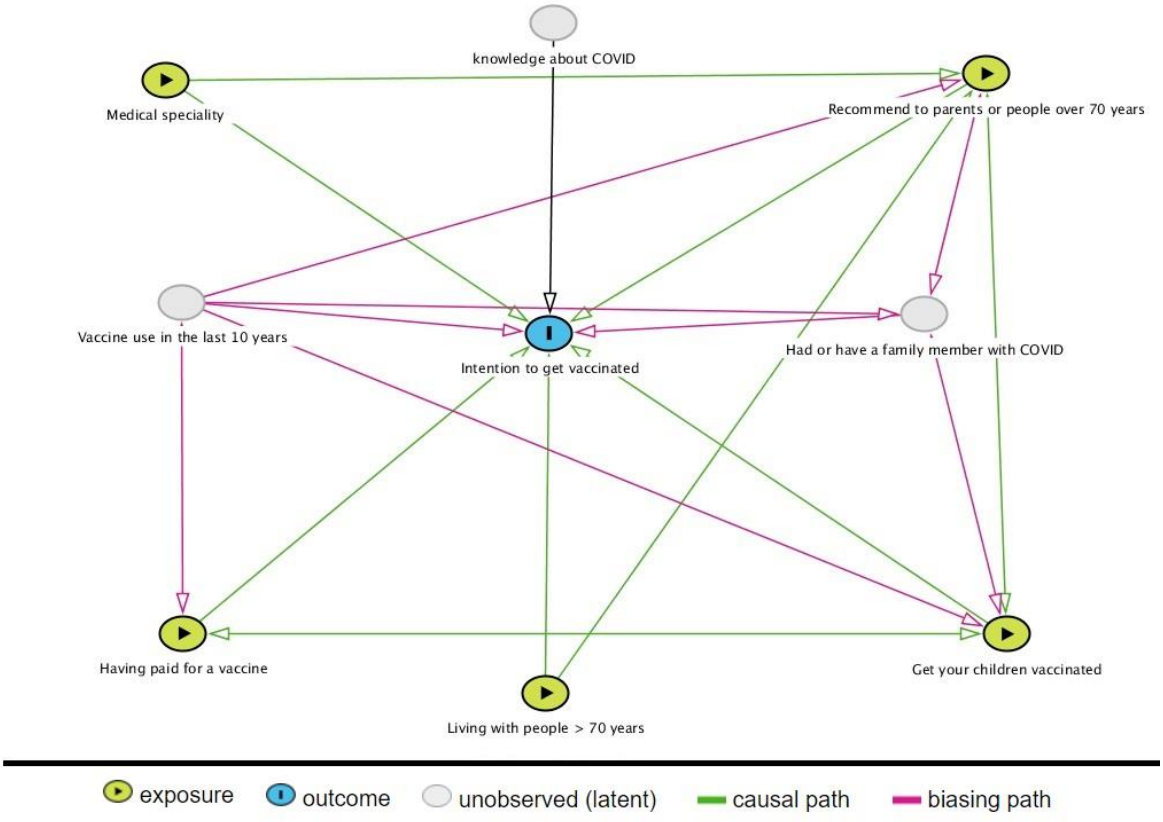
member with COVID-19 (Figure 3). The testable implications were all assessed, showing that the data did not contradict the theoretical model.

Figure 3. A causal diagram to represent the association between the intention to get vaccinated and the medical speciality, having paid for a vaccine, living with people over 70 years of age, giving their children the vaccine, and recommending vaccination to parents or those over 70 years of age, adjusting for potentially confusing variables.



Source: Own elaboration through the website: http://www.dagitty.net/development/dags.html

Discussion

According to our findings, between 77.1 and 90.8% of screened physicians in Colombia would accept vaccination against COVID-19, in scenarios with a vaccine efficacy of 60 and 80% respectively. Few studies have explored physicians' intention to get vaccinated at the time of a wide commercial availability for the vaccine. A study amongst health workers in the Republic of Congo reported that only 27.7% of health workers would agree to be vaccinated (13). However, there is some variability in this trend. In France, a study showed that 76.9% of health personnel would accept COVID-19 vaccination. This work shows that physicians are the most inclined to receive vaccination. Some factors associated with this positive intent included age (older age plus intention), gender, fear of COVID-19, individual risk

perception, among others (14). This difference is likely associated with a better disease knowledge of the medical personnel regarding the benefits of vaccination and the impact of the disease where the surveys were conducted (15).

On the other hand, false information circulating on social media and other networks is likely a determining factor influencing vaccination in some groups (16). In our case, it is unlikely that social networks have influenced the perception that medical personnel have when it comes to getting vaccinated, as demonstrated by our results. Factors such as confidence or acceptance in scientific research and the efficacy of the vaccine are critical factors in the intention to be vaccinated (17). When exploring the main reason for accepting vaccination in our work, self-protection was the main reason, as confirmed in previous work (14). On the other hand, when exploring why they would not accept vaccination, the main factor was that they did not consider the vaccine safe. Very similar findings have been found in the general population, about vaccination against H1N1 influenza (18) as well as in COVID-19 (19).

Other factors were also found to influence intention to get vaccinated amongst medical staff; the main one was having ever paid for a vaccine. Additionally, working in hospitalization wards was associated with increased acceptance for vaccination. Although there is scarce data regarding this variable, physicians who have repeated contact with COVID 19 patients would have a greater risk of infection and therefore a greater intention to get vaccinated (20). Data from India reveal that 75% of physicians affected by COVID-19 were over 50 years old (14,20). However, specialists such as anesthesiologists, otolaryngology, and intensivists, which are also in close contact with infected patients, had increased acceptance to be vaccinated. However, our data failed to confirm the abovementioned. Although some factors were not significantly associated to intention to be vaccinated, likely, age, contact with people who had the disease, the number of people with whom one lives, living with people, or having some comorbidities are variables with a more significant relationship to get vaccinated.

Determining acceptance of vaccination within the medical / healthcare workers group is crucial to prevent community's misperceptions and potential rejection of vaccination against COVID-19 during the ongoing pandemic (21). Community studies in countries such as Denmark, France, Germany, Italy, Portugal, Holland, the United Kingdom, and Australia have shown the populations wide acceptance to the vaccine ranging between 73.9% and 85.7% (10, 19). Acceptance rate in the United States is around

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70%. However, the same positive perception is particularly highlighted towards vaccine acceptance from the medical community, leading to reassurance and non-rejection by public. It is recognized that in recent epidemics such as H1N1, the intention to be vaccinated has ranged from 50-to-64% (22). However, this does not represent the magnitude of the current situation. Finally, vaccination stands as the main option for disease prevention and control, even though not accepted by all, including some physicians.

On the other hand, an additional factor for accepting COVID-19 vaccination relates to previous history of vaccination against influenza (14). Although, it has been reported that acceptance would be much lower for influenza reports. Besides, some studies show that nursing personnel has a lower intention to be vaccinated than physicians, which may be correlate to knowledge of the disease (13,14,23).

Another interesting finding of the study is the relationship in recommending vaccination in potential risk populations such as children and adults over 70 years of age and the intention to be vaccinated in any evaluated scenario. Previous reports reveal similar findings in caregivers, even accepting less rigorous processes in vaccines' development (24). This can be explained by the fact that it is more feasible to recommend a vaccine if one is willing to use it. Similarly, the impact of the disease in these high-risk populations can influence vaccination priority (5).

Limitations

This study's main strength is that it is the first to be carried out in Colombian territory and with medical personnel. One of the limitations is that it did not embrace overall individual vaccination history in the last decade or if they had or have a relative or acquaintance with COVID-19, as well as to the participants' socioeconomic level. However, this was theoretically explored (Figure 3) as to what could have been the assumption of confounding bias we could not control.

Conclusions

Globally, there are still multiple challenges in the control of COVID-19 (25, 26). Vaccination is a critical tool for the integrated control of this deadly emerging disease (27,28), particularly amongst healthcare workers, a risk population, that has been significantly impacted, particularly in Latin America and moreover Colombia (29,30). There is a high perception of the intention to vaccinate doctors in Colombia against COVID-19. But it is very similar to that of the general population, at least based on data reported in other studies. This intention supports the community's perception and disposition to be vaccinated at

the time of vaccine availability, as a tool to halt the epidemic in a country significantly affected by COVID-19, were over 2 million cases have been reported to date.

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References

1. Fisher D, Teo YY, Nabarro D. Assessing national performance in response to COVID-19 -19 Lancet. 2020: 15:S0140-6736(20)31601-9.
2. Mehraeen E, Karimi A, Barzegary A, Vahedi F, Afsahi AM, Dadras O, Moradmand-Badie B, Seyed Alinaghi SA, Jahanfar S. Predictors of mortality in patients with COVID-19-a systematic review. Eur J Integr Med. 2020: 40:101226.
3. Xu P, Sun GD, Li ZZ. Clinical Characteristics of Two Human-To-Human Transmitted Coronaviruses: Corona Virus Disease 2019 vs. Middle East Respiratory Syndrome Coronavirus. Eur Rev Med Pharmacol Sci. 2020: 24(10):5797-5809
4. Wang Y, Wang Y, Chen Y, Qin Q. Unique Epidemiological and Clinical Features of the Emerging 2019 Novel Coronavirus Pneumonia (COVID-19 -19) Implicate Special Control Measures. J Med Virol. 2020: 5:10.
5. Adhikari SP, et al. Epidemiology, Causes, Clinical Manifestation and Diagnosis, Prevention and Control of Coronavirus Disease (COVID-19 -19) During the Early Outbreak Period: A Scoping Review. Infect Dis Poverty. 2020: 17;9(1):29.
6. Farhad Hossain , Sharifa Hasana, Abdullah Al Mamun et al.COVID-19 Outbreak: Pathogenesis, Current Therapies, and Potentials for Future Management. Front Pharmacol 2020: 16; 11:563478

7. Bhagavathula AS, et al Vaccines and Drug Therapeutics to Lock Down Novel Coronavirus Disease 2019 (COVID-19 -19): A Systematic Review of Clinical Trials. Cureus. 2020: 28;12(5):e8342
8. Kluytmans-van den Bergh et al. Prevalence and Clinical Presentation of Health Care Workers With Symptoms of Coronavirus Disease 2019 in 2 Dutch Hospitals During an Early Phase of the Pandemic JAMA Netw Open. 2020: 1;3(5):e209673
9. Neumann-Böhme S, et al. Once we have it, will we use it? A European survey on willingness to be vaccinated against COVID-19. Eur J Health Econ 2020: 26;1-6
10. Dodd RH, et al. Willingness to vaccinate against COVID-19 -19 in Australia. Lancet Infect Dis 2020: 30;S1473-3099(20)30559-4.
11. Labetoulle R, Detoc M , Gagnaire J, et al. COVID-19 in healthcare workers: lessons from SARS and MERS epidemics and perspectives for chemoprophylaxis and vaccines. Expert Rev Vaccines. 2020: 11;1-11.
12. Hernán MA, Robins JM. Causal inference without models. In: causal Inference. 2017:. 1–130.
13. Kabamba Nzaji M, Leon Kabamba Ngombe L, Ngoie Mwamba G, et al. Acceptability of Vaccination Against COVID-19 Among Healthcare Workers in the Democratic Republic of the Congo Pragmat Obs Res. 2020: 29;11:103-109.
14. Gagneux-Brunon A , Detoc M Bruel S, et al. Intention to get vaccinations against COVID-19 in French healthcare workers during the first pandemic wave: a cross sectional survey. J Hosp Infect. 2020: 28.
15. Arda B, Durusoy R, Yamazhan T, Ta M, Pullukçu H. Did the pandemic have an impact on influenza vaccination attitude? A survey among health care workers. BMC Infect Dis. 2011: 11(1). doi:10.1186/1471-2334-11-87
16. Azhar Hussain,Syed Ali, Madiha Ahmed, and Sheharyar Hussain. The Anti-Vaccination Movement: A Regression in Modern Medicine. Cureus. 2018: 10(7): e2919. doi: 10.7759/cureus.2919.
17. Palamenghi L, Barello S, Boccia S, Guendalina Graffigna G. Mistrust in biomedical research and vaccine hesitancy: the forefront challenge in the battle against COVID-19 in Italy. Eur J Epidemiol. 2020: 17: 1–4.
18. Schwarzinger M, Flicoteaux R, Cortarenoda S, Obadia Y, Moatti JP. Low Acceptability of A/H1N1 Pandemic Vaccination in French Adult Population: Did Public Health Policy Fuel Public Dissonance? PLoS One. 2010; 5(4): e10199.
19. Neumann-Böhme S, Elsem Varghese N, Iryna Sabat I et al. Once we have it, will we use it? A European survey on willingness to be vaccinated against COVID-19. Eur J Health Econ. 2020 Sep;21(7):977-982. Eur J Health Econ. 2020; 21(7): 977–982.
20. P.Iyengar K, Ish P, Upadhyaya GK, Malhotra N, Vaishya R, KumarJain V. COVID-19 and mortality in doctors Diabetes & Metabolic Syndrome: Clinical Research & Reviews 14 (2020) 1743e1746.
21. Asma S, Akan H, Uysal Y, et al. Factors effecting influenza vaccina- tion uptake among health care workers: a multi-center cross-sectional study. BMC Infect Dis. 2016:1–9.
22. Reiter PL, Pennell ML, Katz ML. Acceptability of a COVID-19 vaccine among adults in the United States: How many people would get vaccinated? Vaccine 38 (2020) 6500–6507.
23. Dror A, Eisenbach N, Taiber S, Morozov NG, Mizrachi M, Zigron A, Srouji S, Sela E. Vaccine hesitancy: the next challenge in the fight against COVID-19 European Journal of Epidemiology. (2020) 35:775–779.
24. Caregivers' Willingness to Accept Expedited Vaccine Research During the COVID-19 Pandemic: A Cross- Sectional Survey. Clin Ther. 2020; 42(11):2124-2133.

25. Dhama K, Khan S, Tiwari R, Sircar S, Bhat S, Malik YS, Singh KP, Chaicumpa W, Bonilla-Aldana DK, Rodriguez-Morales AJ. Coronavirus Disease 2019-COVID-19. Clin Microbiol Rev. 2020 Jun 24;33(4):e00028-20.
26. Malik YS, Kumar N, Sircar S, Kaushik R, Bhat S, Dhama K, Gupta P, Goyal K, Singh MP, Ghoshal U, El Zowalaty ME, O R V, Yatoo MI, Tiwari R, Pathak M, Patel SK, Sah R, Rodriguez-Morales AJ, Ganesh B, Kumar P, Singh RK. Coronavirus Disease Pandemic (COVID-19): Challenges and a Global Perspective. Pathogens. 2020 June 28;9(7):519.
27. Patel SK, Pathak M, Tiwari R, Yatoo MI, Malik YS, Sah R, Rabaan AA, Sharun K, Dhama K, Bonilla-Aldana DK, Rodriguez-Morales AJ. A vaccine is not too far for COVID-19. J Infect Dev Ctries. 2020 May 31;14(5):450-453.
28. Petersen E, Lucey D, Blumberg L, Kramer LD, Al-Abri S, Lee SS, Pinto TCA, Obiero CW, Rodriguez-Morales AJ, Yapi R, Abubakar A, Tambyah PA, Holmes A, Chen LH. COVID-19 vaccines under the International Health Regulations - We must use the WHO International Certificate of Vaccination or Prophylaxis. Int J Infect Dis. 2021 January 20;104:175-177.
29. Henriquez-Marquez KI, Lainez-Murillo DC, Sierra M, Muñoz-Lara F, Valenzuela-Rodriguez G, Pecho-Silva S, Arteaga-Livias K, Zambrano LI, Rodriguez-Morales AJ. High impact of SARS-CoV-2 or COVID-19 in the Honduran health personnel. J Med Virol. 2020 Nov 28:10.1002/jmv.26702.
30. Valenzuela-Rodriguez G, Zambrano LI, Muñoz-Lara F, Pecho-Silva S, Arteaga-Livias K, Rodriguez-Morales AJ. Intranational differences in the case fatality rates for COVID-19 among Peruvian physicians. Int J Infect Dis. 2020 Dec;101:226-227.