ORIGINALES

Characteristics of users of a health center associated with COVID-19 vaccination status

Características de usuarios de un centro de salud asociados al estado de vacunación contra COVID-19

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ABSTRACT:
Introduction: To achieve optimal vaccination coverage against COVID-19, it is necessary to identify and address its determinants. The aim of the study was to analyze the sociodemographic-clinical characteristics and the level of basic knowledge about the disease associated with COVID-19 vaccination status.
Methods: A cross-sectional analytical observational study was conducted with 379 users of a health center. Sociodemographic-clinical variables and vaccination status were recorded on a card, and basic knowledge about COVID-19 was measured with the KNOW-PCOVID-19 Scale. The Chi-square test and a logistic regression model were used to estimate the odds ratio (OR) with 95% confidence interval (CI).
Results: 83.38% of participants had had full doses of the COVID-19 vaccine; 15.30% had incomplete doses and 1.32% had received no doses. The characteristics associated with a higher possibility of incomplete vaccination were having the occupation of housewife (adjusted OR (aOR) 2.94; 95%CI:1.01-9.61) and Christian religious affiliation (OR 3.38; 95%CI:0.51-7.43); while being an adult (aOR 0.39; 95%CI: 0.19-0.79) and older adult (aOR 0.13; 95%CI: 0.03-0.51), female sex (aOR 0.38; 95%CI: 0.15 - 0.95) and not being pregnant (aOR 0.21; 95%CI: 0.08-0.57) were associated with a lower propensity for incomplete vaccination. No association was found regarding basic knowledge about the disease.
Conclusion: The percentage of users fully vaccinated against COVID-19 was high. Occupation, religion, age, sex, and non-pregnancy were characteristics associated with vaccination status. These variables should be considered in the planning and design of specific and relevant strategies to increase vaccination coverage.

Keywords: COVID-19 vaccines; COVID-19; vaccination; immunization coverage; characteristics of the population.

RESUMEN:

Introducción: Para alcanzar óptimas coberturas de vacunación contra la COVID-19 se requiere identificar y abordar sus determinantes. El objetivo del estudio fue analizar las características sociodemográficas-clínicas y el nivel de conocimientos básicos sobre la enfermedad asociados al estado de vacunación contra la COVID-19.

Métodos: Estudio observacional analítico de corte transversal, con 379 usuarios de un centro de salud. En una ficha se registró variables sociodemográficas-clínicas y sobre el estado de vacunación y con la Escala KNOW-PCOVID-19 se midió los conocimientos básicos sobre COVID-19. Para el análisis se usó la prueba Chi cuadrado y un modelo de regresión logística para estimar el OR con IC 95%.

Resultados: El 83,38% de participantes tenían dosis completas de la vacuna contra COVID-19; 15.30% dosis incompletas y 1,32% no tenía dosis alguna. Las características asociadas a mayor posibilidad de vacunación incompleta fueron tener ocupación de "ama de casa" (ORa 2.94;IC:1.01-9.61) y afiliación religiosa "cristiana" (ORa 3.38;IC:0.51-7.43); mientras que ser adulto (ORa 0.39; IC: 0.19-0.79) y adulto mayor (ORa 0.13;IC:0.03-0.51), sexo femenino (ORa 0.38; IC:0.15 -0.95) y no ser gestante (ORa 0.21;IC:0.08-0.57) se asociaron a menor propensión de vacunación incompleta. No se encontró asociación con los conocimientos básicos sobre la enfermedad.

Conclusión: El porcentaje de usuarios con vacunación completa contra COVID-19 fue alta; siendo la ocupación, religión, edad, sexo y el no embarazo, características asociadas al estado de vacunación. Estas variables deben ser consideradas en la planificación y diseño de estrategias específicas y pertinentes a fin de aumentar las coberturas de vacunación.

Palabras Claves: Vacunas contra la COVID-19; COVID-19; vacunación; cobertura de vacunación; características de la población.

INTRODUCTION

At the end of 2019, COVID-19 emerged and became a global problem, which has led to the infection of millions of people and deaths [1,2] with a great impact and negative consequences on health systems, as well as on the social and economic spheres. The Region of the Americas accounts for about 30% of all cases and 44% of all reported deaths [3]. Peru is among the countries most affected and with the highest mortality from this disease, with more than 3.6 million confirmed cases of COVID-19 and more than 213,000 deaths, with a case fatality rate of 5.9% up to mid-2022 [3].

Vaccination is currently the main effective strategy for preventing the incidence and protecting against severe forms of COVID-19. History has shown that immunization saves millions of lives every year and is a successful intervention for the control of communicable diseases, with a great impact on the health and development of countries [4].

Significant progress has been made in COVID-19 vaccination around the world and in the Americas, although there are differences between and within countries in terms of full vaccination rates according to their vaccination protocols [2,5]. Various sociodemographic and clinical determinants, as well as knowledge and multiple myths and conspiracy theories about vaccines and disease, influence vaccination decision, practice, and coverage [6–8].

In Peru, vaccination against COVID-19 began in February 2021 with the immunization of health personnel and then gradually, in accordance with the scientific evidence, the Ministry of Health (MINSA) has expanded the target population and adjusted the vaccination schedule with the inclusion of a third and fourth dose up to the time of the development of this study [9–11]. Despite the efforts made by the state and health services to achieve greater vaccination coverage, the existence of people who have not completed the doses established according to the vaccination protocol has been

generating gaps. At the national level, at the beginning of 2022, 79% of the target population had received a second dose and only 20% had the third dose of the vaccine, generating the need to analyze the factors or reasons limiting the adoption of the practice of vaccination against COVID-19.

Globally, many studies on COVID-19 vaccination have been carried out, most using intention to receive the vaccine, vaccine hesitancy, or vaccine acceptability as indicators of vaccine receipt behavior; However, in a real life scenario, manifestations of intention, hesitation or acceptance, do not always translate into action. In Peru, previous studies estimated vaccination intention and acceptability rates between 64% and 74% in various population groups and identified some associated factors [12,13]; however, no study has measured the effective practice of receiving doses of the COVID-19 vaccine according to the provisions of the national vaccination protocol.

According to the Nola Pender Health Promotion Model, external or internal factors determine the healthy behavior of people regarding vaccination against COVID 19, with personal, biological, psychological and sociocultural characteristics as well as experiences, knowledge, beliefs, and emotions and the interpersonal and situational influences of the environment, being predictors of commitment or adoption of healthy practices. The identification of these factors and the analysis of their influence is a necessity to guide decisions and implement specific strategies to improve access to the vaccine and close the gaps in vaccination coverage, which allow the control of COVID-19.

In this context, the present study was carried out with the aim of analyzing the sociodemographic-clinical characteristics and the level of basic knowledge about the disease associated with COVID-19 vaccination status in users of a primary care health center.

MATERIAL AND METHODS

Study design

Observational, analytical, cross-sectional study, conducted between May and June 2022 in outpatient and emergency room users of a primary care health center located in the district of Villa El Salvador, south of Lima, Peru.

Population and sample

The reference population consisted of 28,080 users treated at the health center during 2021. Using the formula for finite population, with an expected proportion of 50% of users with full vaccination (considering that no previous studies were found in this regard), with a 5% random error and a 95% confidence interval (95% CI), a sample size of 379 users distributed in the different health services offered by the health center according to their reported production in 2021 was estimated. In each service, the users served in odd random order were selected for the survey, taking as a starting point the first person seen in the clinic.

Inclusion and Exclusion Criteria

The inclusion criteria were being a user treated in the outpatient or emergency services of the health center, age between 18 and 80 years, consent to participate in the study. The exclusion criteria were: limitation in understanding and answering the questionnaire (individuals with psychological disorder or discapacity, not speaking Spanish).

Variables

The outcome variable was vaccination status referring to the COVID-19 vaccination status observed in the users of the health center at the time of data collection, Vaccination status was defined as complete vaccination when people had received three more doses of the COVID-19 vaccine, according to the vaccination schedule established by the MINSA (9,10) and unvaccinated/incomplete vaccination when they had not had any doses or had had one or two doses of the vaccine. Additionally, the intention to vaccinate with a next dose was explored, with the question "Do you plan to get vaccinated later?"

The explanatory variables were: sociodemographic-clinical characteristics, such as: age, sex, marital status, level of education, religion, occupation, presence of comorbidity, pregnancy, and basic knowledge about COVID-19.

Techniques & Instruments

To measure vaccination status, a card was used to record the vaccination doses administered. These data were obtained by review of the vaccination card carried by the users or through access to the MINSA vaccination registration web application (https://carnetvacunacion.minsa.gob.pe/#/auth).

A questionnaire was used to collect data on sociodemographic and clinical variables. To verify the condition of gestational, the pregnancy control card was requested. To measure the level of basic knowledge about COVID-19, the KNOW-P-COVID-19 Scale, validated in Peru, was used [14], which consists of 9 indicators, the results of which were categorized as high (8 to 9 points), "medium" (5 to 7 points) and low (0 to 4 points). The content validity of this instrument was evaluated by expert judgment and was analyzed with Aiken's V Test>0.70, with statistically significant V coefficient values; a KMO coefficient of 0.690 and a Chi-squared p-value of <0.001; a Goodness of Fit Index of 0.992; a Comparative Fit Index of 0.916 and a Root Mean Square Error of Approximation of 0.034 [14].

The instruments were applied to the users at the end of the health care consultation in the waiting rooms of the health center, after obtaining signed informed consent to participate. COVID-19 prevention measures were implemented to protect study participants and data collectors.

Statistical analysis

A descriptive analysis of the study variables was performed, expressing the qualitative variables in frequencies, and percentages and the median with interquartile ranges (IQR) for age, considering the asymmetric distribution of the data.

The Chi-square or Fisher's exact test was applied for the bivariate analysis of the variable "Vaccination status" with the explanatory variables, in order to identify differences and association, with a level of significance <0.05. Then, performing logistic regression analysis, the odds ratio (OR) was determined to establish the magnitude of association between the study variables that were statistically significant using 95% CI.

Microsoft Excel was used to organize the database and SPSS v28.0 for statistical analysis.

Ethical Considerations

Prior to execution, the research project was approved by the Institutional Research Ethics Committee of the Universidad Científica del Sur (Certificate No. 121-CIEI-Scientific-2022) and authorization was obtained from the Directorate of Integrated Health Networks (DIRIS) of South Lima (Certificate No. 019-2022). In compliance with the ethical principles for research in human subjects, the participants were invited to be part of the study and signed informed consent was obtained prior to the application of the instruments, which were filled out anonymously. The autonomy of the participants was respected at all times and the identity and confidentiality of their data was safeguarded. The data are protected and are only accessible to researchers.

RESULTS

A total of 379 users of the health center agreed to participate and met the inclusion and exclusion criteria; 34.30% (130) from the emergency department, 25.59% (97) from medicine, 11.35% (43) from gynecology and 28.76% (109) from other services.

The main characteristics of the sample were that more than half were adults aged 30 to 59 years (56.99%), with a median age of 37 years (IQR 28.00 - 49.00), 73.88% were female, 60.15% had a primary or secondary education, 56.47% were married or cohabiting, 45.38% were housewives, 71.24% were of the Catholic religion, 23.22% had comorbidities and 9.29% were pregnant women. In relation to basic knowledge about COVID-19, the average level of knowledge predominated (75.69%) (Table 1).

Table 1. Sociodemographic-clinical characteristics and basic knowledge about COVID-19 among users of a health center (n = 379**).**

Characteristics	Total	
	N	%
Age		
Median (IQR)*	37,00 (28,00 - 49,00)	
Age groups		
Young (18-29)	118	31.13
Adult (30-59)	216	56.99
Elderly (60 +)	45	11.87
Sex		
Male	99	26.12
Female	280	73.88

Education		
Primary	45	11.87
Secondary	183	48.28
Technical	93	24.54
University	58	15.30
Civil status		
Single	131	34.56
Married	85	22.43
Cohabitating	129	34.04
Separated/Divorced	19	5.01
Widowed	15	3.96
Occupation		
Housewife	172	45.38
Students	20	5.28
Dependent work	96	25.33
Independent work	77	20.32
Retired/Not working	14	3.69
Religion		
Catholic	270	71.24
Evangelical	21	5.54
Christian	49	12.93
Others	39	10.29
Comorbidity		
Yes	88	23.22
No	291	76.78
Pregnancy (n=280)		
Yes	26	9.29
No	254	90.71
Basic knowledge of COVID-19		
High	26	6.86
Medium	288	75.99
Low	65	17.15

* IQR: interquartile range
Source: self-made

Regarding COVID-19 vaccination status, 98.68% (374) of the participants had received some dose of the vaccine and among those vaccinated, people with a third dose predominated (82.89%). 83.38% (316) of the participants met the condition of fully vaccinated status against COVID-19; 16.62% had an unvaccinated or incompletely vaccinated state. Among the latter, 1.32% (5) had received no dose and 15.30% (58) had had a first or second dose. A total of 71.77% (272) expressed their intention to vaccinate with a next dose (Table 2).

Table 2. COVID-19 Vaccination status in users of a health center (n = 379).

Vaccination	Total	
	N	%
Has had some dose of COVID-19 vaccine		
Yes	374	98.68
No	5	1.32
Vaccination dose (n=374)		
1st dosis	1	0.27
2nd dosis	57	15.24
3rd dosis	310	82.89
4th dosis	6	1.60
Vaccination status		
Complete vaccination (3rd or 4th dose)	316	83.38
Not vaccinated / incomplete vaccination	63	16.62
Vaccination intention with a next dose		
Yes	272	71.77
No	58	15.30
Do not know /no answer	49	12.93

Source: self-made

In the bivariate analysis of vaccination status with the explanatory variables, statistically significant differences were found with the variables of age groups (p=0.004), religion (p=0.048) and pregnancy (p<0.001). No statistical association was found with the remaining sociodemographic variables studied, or with basic knowledge of COVID-19 and comorbidity (Table 3).

Table 3. Sociodemographic-clinical characteristics and basic knowledge associated with COVID-19 vaccination status in users of a health center

Characteristics	Vaccination status against COVID-19					
	Complete vaccination		Not vaccinated / Incomplete vaccination		Total	p-value
	n	%	n	%		
Age						
Median (IQR)*	38.00 (28.00-51.75)		30.00 (22.00-38.00)			
Age groups						
Young (18-29)	87	73.73	31	26.27	118	**0.004**[†]
Adult (30-59)	188	87.04	28	12.96	216	
Elderly (60 +)	41	91.11	4	8.89	45	
Sex						
Male	83	83.84	16	16.16	99	0.886[‡]
Female	233	83.21	47	16.79	280	
Education						
Primary	38	84.44	7	15.56	45	0.356[‡]
Secondary	151	81.62	32	17.30	185	

Technical	75	80.65	18	19.35	93	
University	52	89.66	6	10.34	58	
Civil status						
Sigle	109	83.21	22	16.79	131	0.486[†]
Married	76	89.41	9	10.59	85	
Cohabitating	102	79.07	27	20.93	129	
Separated/Divorced	16	84.21	3	15.79	19	
Widowed	13	86.67	2	13.33	15	
Occupation						
Housewife	138	80.23	34	19.77	172	0.207[†]
Students	17	85.00	3	15.00	20	
Dependent work	87	90.63	9	9.38	96	
Independent work	63	81.82	14	18.18	77	
Retired/Not working	11	78.57	3	21.43	14	
Religion						
Catholic	234	86.67	36	13.33	270	**0.048[†]**
Evangelical	17	80.95	4	19.05	21	
Christian	34	69.39	15	30.61	49	
Others	31	79.49	8	20.51	39	
Basic knowledge of COVID-19						
High	23	88.46	3	11.54	26	0.437[†]
Medium	242	84.03	46	15.97	288	
Low	51	78.46	14	21.54	65	
Comorbidity						
Yes	74	84.09	14	15.91	88	0.086[‡]
No	242	83.16	49	16.84	291	
Pregnancy (n=280)						
Yes	14	53.85	12	46.15	26	**< 0.001[‡]**
No	219	86.22	35	13.78	254	

† Fisher´s exact test   ‡ Chi-square of Pearson

* IQR: interquartile range

Source: self-made

In the multivariate analysis, the variables occupation and religion were found to be characteristics associated with a greater possibility of having incomplete vaccination status, with being a housewife (aOR= 2.94; 95%CI: 1.01-9.61) compared to people with dependent work; and people of Christian religion (aOR= 3.38 95%CI: 1.51-7.43) presenting the greatest predisposition of incomplete vaccincation (Table 4).

On the other hand, the variables age, sex, and non-pregnancy were identified as protective characteristics or associated with a lower tendency to incomplete vaccination status, with adults (aOR=0.39; 95%CI: 0.19-0.79) and older adults (aOR= 0.13; 95% CI: 0.03-0.51) compared to young people, while female sex (aOR= 0.38; 95%CI: 0.15-0.95) versus male and not pregnant (aOR=0.21; 95%CI: 0.08-0.57) were the factors associated with a lower possibility of incomplete vaccination (Table 4).

Table 4. Characteristics associated with incomplete COVID-19 vaccination status in users of a health center

Characteristics	OR	95%CI cOR *		OR	95%CI aOR †	
		Lower	Superior		Lower	Superior
Age groups *						
Young (18-29)	Ref.	---	---	Ref.	---	---
Adult (30-59)	0.42	0.24	0.74	**0.39**	**0.19**	**0.79**
Elderly (60 +)	0.27	0.08	0.75	**0.13**	**0.03**	**0.51**
Sex						
Male	Ref.	---	---	Ref.	---	---
Female	1.05	0.57	2.00	**0.38**	**0.15**	**0.95**
Education						
Primary	Ref.	---	---	Ref.	---	---
Secondary	1.15	0.08	0.39	0.75	0.25	2.43
Technical	1.30	0.49	3.02	1.08	0.33	3.73
University	0.63	0.52	3.60	0.38	0.08	1.66
Civil status						
Single	Ref.	---	---	Ref.	---	---
Married	0.59	0.24	1.31	0.66	0.24	1.72
Cohabitating	1.31	0.70	2.47	1.14	0.55	2.42
Separated/ Divorced	0.93	0.20	3.09	1.55	0.29	6.38
Widowed	0.76	0.11	3.02	1.47	0.18	8.13
Occupation						
Housewife	2.38	1.13	5.50	**2.94**	**1.01**	**9.61**
Student	1.71	0.35	6.43	1.23	0.21	5.89
Dependent work	Ref.	---	---	Ref.	---	---
Independent work	2.15	0.89	5.45	2.07	0.78	5.74
Retired /Not working	2.64	0.53	10.50	2.57	0.44	12.85
Religion						
Catholic	Ref.	---	---	Ref.	---	---
Evangelical	1.53	0.42	4.41	1.00	0.25	3.33
Christian	2.87	1.40	5.72	**3.38**	**1.51**	**7.43**
Others	1.68	0.67	3.79	1.66	0.60	4.19
Basic knowledge of COVID-19						
High	Ref.	---	---	Ref.	---	---
Medium	2.10	0.61	9.77	2.57	0.64	13.50
Low	1.46	0.48	6.32	1.50	0.43	7.13
Comorbidity						
Yes	Ref.	---	---	Ref.	---	---
No	1.07	0.57	2.11	0.66	0.30	1.51
Pregnancy (n=280)						
Yes	Ref.	---	---	Ref.	---	---

No	1.86	0.09	0.46	**0.21**	**0.08**	**0.57**

* Crude odds ratio (cOR) logistic regression model.

† Adjusted odds ratio (aOR) in the logistic regression model with the variables: age, sex, education, marital status, occupation, religion, knowledge of COVID19, comorbidity and pregnancy.

CI: confidence interval

DISCUSSION

The aim of this study was to analyze the sociodemographic-clinical characteristics and basic knowledge about COVID-19 associated with COVID-19 vaccination status in users of a primary care health center.

At the time of data collection, 83.38% of the participants had received the full doses of vaccination (third or fourth dose) according to the vaccination schedule established by the MINSA[10], while 15.30% had not received the full doses, and 1.32% had not received any dose of the vaccine. Although similar studies were not found in Peru, these results were consistent with those found in studies carried out in China in which percentages of compliance with vaccination protocols greater than 80% were observed, although the percentages of unvaccinated individuals ranged from 4% to 10.6%, being higher than what was found in the present study. [15,16] A study conducted in South Asian countries reported lower rates of full vaccination (30.5%) compared to this study. [5] In general, the variability in vaccination coverage depends on the timing of the studies, the social context and characteristics of the population, as well as the start dates and progress of vaccination in countries.

According to Nola Pender Health Promotion Model, the adjusted logistic regression analysis found that personal characteristics of the participants, such as the occupation housewife and profess the Christian religion, were associated with a greater possibility of an incomplete vaccination status, while adult and older adults age groups, female sex and not having the status of pregnant for women, were characteristics associated with a lower propensity for incomplete vaccination status.

These results confirm previous findings regarding the association of age with intention, hesitancy, or acceptance of COVID-19 vaccination. Many studies have reported a lower propensity for vaccination in young people compared to adults and older adults [7,17,18]; However, other studies also found opposite results [19]. Although it is likely that these differences are influenced by the socio-cultural environment or context of each country, it is clear that taking into account the analysis of the characteristics and needs of the population according to age groups is essential when planning and developing vaccination programs.

In contrast to many studies that reported a higher probability of intention or acceptance of vaccination in males [7,20], in the adjusted multivariate analysis of the present study, female participants were found to be less likely to have an incomplete vaccination status. This could be explained by differences in attitudes and practices towards health care and attention between men and women. Faced with the same disease, women tend to adopt preventive practices and seek health care services to a greater extent than men. Along these lines, it is necessary to consider specific strategies aimed at carry or bringing vaccination services closer to the spaces of the male population.

The findings on COVID-19 vaccination status among pregnant women are consistent with previous studies, which show low acceptance or intention to vaccinate among pregnant women, although with variations according to country of residence [21,22]. Only one study in Japan reported 73.6% of pregnant women vaccinated with two doses, reporting <1% of severe post-vaccination symptoms [23]. In general, vaccination during pregnancy is still controversial, due to the scant evidence and concerns about the safety and efficacy of the vaccine in this population. However, in view of the significant risk of complications and vulnerability to severe COVID-19 disease during pregnancy, there is global and national consensus to target vaccination efforts at this group which was initially excluded from vaccination campaigns. Studies to date have reported no significant adverse events in vaccinated pregnant women or their newborns and conclude that it is effective in preventing COVID-19 disease [24].

The analysis of vaccination status according to the occupation of the participants identified indications of a greater propensity for incomplete vaccination in housewives compared to participants who reported having a dependent job. This result is in line with previous studies that showed that this group would have a higher probability of refusal to be vaccinated compared to those with full-time employment [25], as well as a greater tendency to be hesitant to vaccinate against COVID-19 [17]. One possible explanation could be related to the mandatory application of the vaccine in the workplace, as part of the health and safety regulations for workers, as well as the plans for the prevention and control of COVID 19 at work.

With respect to religion, participants who profess the Christian religion were identified as the group with the greatest predisposition to incomplete vaccination, similar to what was found in a study conducted in 90 countries that reported that Christianity was negatively related to vaccination rates [26], although contrary to other studies that reported that Christians were either in favor of vaccination or were not opposed [27]. In general, the results of studies of religiosity as a predictor of vaccination against COVID-19 are controversial and show that the positive or negative influence of religion on the intention, acceptance or coverage of vaccination against COVID-19 is still unclear, and additional studies are needed. However, what is clear is the existence of religious groups with inadequate beliefs and misinformation about COVID-19 vaccines, which despite being a minority group, need to be addressed with a multisectoral approach in synergy with other information, education and communication interventions to promote and achieve vaccination in reluctant religious groups [28,29].

The present study found a predominance of a medium level of basic knowledge bout COVID-19. However, no association was found with vaccination status, unlike many studies that highlight that a higher propensity to vaccinate is associated with greater knowledge about COVID-19 and the COVID-19 vaccine [6]. In this regard, in accordance with health promotion models, it is necessary to promote information, education and communication actions in the population about the disease and the vaccine in order to achieve greater acceptance of vaccination.

The analysis found no association between vaccination status and the other sociodemographic and clinical variables studied. These results are in agreement with a study in Peru, which found no association between vaccine acceptance and educational level and marital status [11], and others that do not report an association

with educational level [20] and marital status [7], as well as between the presence of comorbidity or chronic diseases with vaccination or willingness to be vaccinated [7].

The results related to intention, willingness or acceptance of vaccination against COVID-19 carried out in Peru [11,13], as well as in countries, such as Mexico [17], Malaysia [18], Switzerland [30]) and other countries around the world [7,19], show variability [17] probably due to the time and context of the study. Although in this study, a greater effective practice of vaccination with full doses was found, the percentage of intention to vaccinate with a next dose was lower (71.7%), reflecting that hesitancy, hesitation or non-intention to receive a next dose continues to be a concern for those responsible for vaccination programs, and this needs to be addressed in order to achieve greater vaccination coverage in the population [19,30].

The findings of the study should be interpreted in light of the following limitations: i) The cross-sectional research design used does not allow a causal order to be established and merits cautious interpretation of the results; (ii) Few determinants or explanatory variables were included in the study, which limited the multivariate analysis; iii) The generalization of the findings is limited to the context of outpatient and emergency users of a health facility and does not extend to other scenarios; and iv) The absence of local or national studies on vaccination status limited the comparison with other studies in similar contexts.

Finally, we consider the originality of this study as its main strength, given that, in Peru, it is the first study that verifies the effective practice of vaccination against COVID-19.

CONCLUSIONS

The main sociodemographic characteristics associated with a higher probability of incomplete vaccination status were the occupation of housewife and affiliation with the Christian religion, while being an adult and older adult, of the female sex and not having being pregnant in the case of women, constituted protective characteristics or an association with a lower tendency to incomplete vaccination status.

The results of this study confirm the importance of personal characteristics and beliefs (religion) as influencers in the effective practice of vaccination against COVID-19 and it is recommended to take these predictor variables into account in the processes of planning, design of strategies and specific and relevant interventions, in order to increase vaccine uptake and coverage.

Regarding basic knowledge about COVID-19, the medium level predominated and no association was found with vaccination status. However, according to health promotion models, information, education and communication about the disease and the vaccine are critical for achieving greater acceptance of vaccination.

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