Original

Knowledge, attitudes and preventive practices regarding the second wave of COVID-19, La Libertad-Peru

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ABSTRACT

Objective. To analyze the knowledge, attitudes and preventive practices regarding the second wave of COVID-19 in residents of La Libertad, Peru. **Materials and methods.** A cross-sectional, correlational design was applied; a duly validated questionnaire was used and data were collected using a virtual form from 294 inhabitants of the department of La Libertad, whose sample was found to meet the required statistical parameters. **Results.** The characteristics of the respondents were average age of 28.3±9.9 years and 71.8% women. People with a good level of knowledge and an adequate attitude had characteristics such as married or cohabiting marital status, had children, a higher level of education and had stable work. The variables age and sex are those that were associated with the level of attitude, as well as the fact of knowing the forms of contagion, which was significantly associated with the attitudes and preventive practices of the second wave of COVID-19 Finally, 38.1% of people surveyed indicated that they do not trust the effectiveness of the vaccine **Conclusions.** Residents presented good levels of knowledge, attitudes and preventive practices. However, it was noted that they are not clear about the ways of contagion. Added to the indifference towards vaccines and the economic crisis, this could have contributed to a significant increase in the number of cases.

Keywords: Attitudes; practice; COVID-19 (*Source: MeSH*).

RESUMEN

Objetivo. Analizar los conocimientos, actitudes y prácticas preventivas frente a la segunda ola del COVID-19 en residentes de La Libertad- Perú. **Material y métodos.** Se aplicó un diseño transversal, correlacional; se utilizó un cuestionario debidamente validado y los datos fueron recolectados usando un formulario virtual a 294 residentes del departamento de La Libertad, cuya muestra fue hallada cumpliendo los parámetros estadísticos requeridos. **Resultados.** Las características de los encuestados fueron edad promedio de 28.3±9.9 años y 71.8% mujeres. Las personas con nivel de conocimiento bueno y actitud adecuada tenían características como estado civil casado o conviviente, tenían hijos,

grado de instrucción superior y contaban con trabajo estable. Las variables edad y sexo son las que se asociaron al nivel de actitud, así como el hecho de conocer las formas de contagio se asoció significativamente con las actitudes y practicas preventivas que se tiene frente a la segunda ola del COVID-19, por último, un 38.1% de personas encuestadas indicaron que no confían en la efectividad de la vacuna. **Conclusiones.** Los residentes encuestados del departamento de la Libertad- Perú presentan buenos niveles de conocimiento, actitudes y practicas preventivas, sin embargo, se apreció que no tienen muy claro las formas de contagio y esto sumado a una mala economía, ha llevado al incremento de casos.

Palabras clave: Actitudes; prácticas; COVID-19 (*Fuente: MeSH*).

INTRODUCTION

In March 2020, the first patient with COVID-19 was detected in Peru. A state of emergency was declared by the Peruvian government on March 15. However, despite this, the number of infected patients increased. During the first wave, hospitals collapsed and between July and August there were the highest peaks of deaths.

According to the government, the Peruvian economy has been gradually reactivated; however, since November 2020, due to the decrease in COVID-19 cases, the upcoming Christmas holidays and the approaching summer season in Peru, residents abandoned preventive measures. In February, the second wave began, leading to increased morbidity and mortality, greater collapse of patients with COVID-19 and shortage of medical oxygen in hospital centers (1,2).

Peru represented one of the epicenters of this disease, with approximately 2 million confirmed cases as of May 2021, and reported approximately 70,000 deaths due to COVID-19 (1). La Libertad, a department of Peru located in the north of the country, is one of the most affected by the second wave of infection. A case fatality rate of 5.49% has been recorded, the second highest of all Peruvian departments (3).

A significant proportion of patients had bilateral pneumonia, which in many cases resulted in the need for respiratory support. It is estimated that 30 % of patients with this disease require hospital admission, and 5 to 10 % require intensive care. Furthermore, it is estimated that lethality due to COVID-19 varies from 2 % to more than 10 % in some countries of the world, with older adults with comorbidities being the most affected (4).

As a natural phenomenon, viruses reproduce by producing copies of themselves with the participation of their own enzymes expressed by their genome and the host cell (5). The mutations of greatest scientific concern are the modifications that occur in the spike protein, specifically the one known as E484K with a higher binding affinity to human cells found in the South African (B1351), Brazilian (P1) and British (B117) variants, which allows an interest in knowing whether mutations in the spike glycoprotein mediate to escape host antibodies and compromise vaccine efficacy, because this protein is the main viral antigen in vaccines developed so far, as it could also increase transmissibility in new waves of infection (6).

On February 7, 2021, the first shipment of vaccine arrived in Peru, initiating the immunization process against COVID-19. However, as in the rest of the world, in Peru there is a certain rejection of the vaccine by part of the population, mainly due to fear of the adverse effects it may produce (7).

The compliance with the restrictions set forth by the Peruvian government is essential; however, the informal economy and poverty are factors that affect this compliance. In addition, young people continue being indifferent, as evidenced by the many police operations in which residents were found to be in violation of government regulations (1,3).

The dissemination of measures to decrease the transmission of this disease considers low social interaction and adoption of preventive behaviors such as hand washing and proper use of masks. Previous research affirms that maintaining physical distance is strongly associated with protection against coronavirus; and especially with the appearance of mutations, ocular protection or the use of face masks may offer additional protective benefits (8,9).

Based on the aforementioned, we are interested in the development of a new research, with the general objective of analyzing the knowledge, attitudes and preventive practices against the second wave of COVID-19 in residents of La Libertad, Peru. The specific objectives are to determine if there is relation between characteristics such as age, sex, marital status, level of education, having children and a stable job with knowledge, attitudes and preventive practices regarding the second wave of COVID-19, to determine if there is relation between levels of knowledge and its dimensions with attitudes and preventive practices regarding the second wave of COVID-19 and to identify the most common attitudes and preventive practices in residents of La Libertad-Peru.

MATERIAL AND METHODS

Type of research, population and sample. This research has a quantitative approach, basic type, and cross-sectional correlational design (10).

The population was composed of all residents between 18 and 70 years old in the department of La Libertad who have internet access; surveys were conducted online due to the sanitary emergency. Data were collected between March 15 and April 30. Given this context, due to accessibility, convenience sampling (non-probabilistic) was used, obtaining a sample of 294 residents of the department of La Libertad. For the calculation of this sample, 95% reliability, 5% adjusted error and a prevalence of 73.5% were considered, which corresponds to the percentage obtained for a good level of knowledge of COVID-19 in the participants of a previous study (10,11).

Data collection techniques. A survey was the technique and a questionnaire was the instrument used to collect data. This questionnaire was elaborated using Google Forms and was applied online to the selected sample; the questionnaire was diffused through social networks (WhatsApp, Facebook) and e-mail. This questionnaire was taken from a research made in 2020 in Trujillo, department of La Libertad, Peru (10,11).

Some modifications to the questionnaire were made considering that some discoveries have been made regarding the COVID-19 disease during the past months, therefore it was re-validated by five professionals: 4 health professionals (2 physicians, 1 microbiologist, 1 biologist) and a methodologist, obtaining a 99 % validation with the V-Aiken statistic for the knowledge questionnaire, 100 % for the attitude questionnaire and 100 % for practices.

The questionnaire includes questions about respondent characteristics such as age, sex, marital status, parenthood, level of education, employment stability and place of residence. The questionnaire has 67 questions; 33 of these questions measure general knowledge divided into dimensions, where 10 questions measure knowledge of symptoms, 8 questions measure ways of contagion, 8 measure actions to take and 7 measure knowledge of the disease; 10 questions were used to measure preventive attitudes and 18 questions were used to measure preventive practices (11).

To measure knowledge, a dichotomous scale was used, considering a good response with a score of 1 and a bad response with 0, giving a score of bad when it was obtained from 0 to 11 points, regular from 12 to 24 points and good from 25 to 34 points. For the questionnaire about attitudes a Likert scale was used, with scores ranging from 5: completely agree, 4: agree, 3: do not know, no opinion, 2: disagree and 1: completely disagree, with 3 questions on an inverse scale; obtaining a final score of inadequate from 9 to 33 points and adequate from 34 to 45 points.

Finally, on the questionnaire about preventive practices, a Likert scale was also used, with a score of 5: always, 4: frequently, 3: occasionally, 2: rarely and 1: never; a practice being considered inadequate from 18 to 65 points and adequate from 66 to 91 points. Adequate attitude is considered when the person adopts a disposition to prevent the risk of COVID-19 infection, having favorable postures, and adequate practice is manifested with the behaviors performed to avoid contagion and spread of the virus (11).

The reliability of the instrument was measured again, obtaining in the level of general knowledge a Kuder Richardson reliability of 0.77 which indicates a very acceptable level, and analyzing the dimensions for knowledge of symptoms it was 0.79 which is a very acceptable reliability, for forms of contagion it was 0.71, for knowledge of the disease it was 0.71 also, indicating an acceptable reliability and for actions to take it was 0.77, showing an acceptable reliability.

The following part of the instrument tested preventive attitudes in the second wave of

COVID-19, which were evaluated by Cronbach's alpha, obtaining an acceptable level of 0.74. The last part of the questionnaire measured preventive practices in the second wave of COVID-19; the reliability of these questions was 0.97, which corresponds to an excellent level (12).

Statistical analysis. Excel was first used to prepare the database, which was then exported and transferred to SPSS version 27. A descriptive analysis and the Chi-square statistical test were applied to determine which of the characteristics analyzed were associated with knowledge, attitudes and preventive practices regarding the second wave of COVID-19. The application of Chi-square requires an important condition in the table (of the expected values of the cells, at least 80% must be greater than 5), when this condition was not met, Kendal's Tau B was used, which represents a measure of association for qualitative variables, and in the case of the sex factor, the calculation of the OR was added to measure risk (13,14).

Ethical aspects. This study was approved by the ethics committee of the Universidad César Vallejo (Report 006-CE-FCS-UCV-21), and each participant provided an informed consent before the application of the questionnaire.

RESULTS

The average age of the 294 residents was 28.3±9.9 years, 71.8% were women, 74.8% were single, 68.7% had no children, 92.2% had higher education, and 64.3% of the participants did not have a stable job (Table 1).

An analysis was carried out with percentages taken by row. Participants aged between 30 years old and over, female, married or unmarried couple, with children, with a higher level of education and with a stable job have a higher level of good knowledge and adequate attitude regarding COVID-19. In addition, age and sex variables are associated with the level of knowledge and attitude ($p<0.05$). In the case of age, it could be affirmed that the association is positive and the fact of being older leads to having good adequate attitude. We can deduce that men are at greater risk for having an average knowledge and inadequate attitudes (See Tables 2 and 3).

Table 1. Characteristics of the surveyed residents of La Libertad.

Characteristics		Frequency	Percentage
Age (Media / Standard Desv.)		28.3±9.9 years old	
Sex	Male	83	28.2%
	Female	211	71.8%
Marital Status	Single	220	74.8%
	Married or unmarried couples	74	25.2%
Parenthood	No	202	68.7%
	Yes	92	31.3%
Level of education	Elementary or High school	23	7.8%
	Higher education	271	92.2%
Employment stability	No	189	64.3%
	Yes	105	35.7%
Total		294	100.0%

Table 2. Characteristics associated with the level of knowledge in the second wave of COVID-19 in residents of La Libertad.

Characteristics		Average	%	Good	%	Chi Square	Sig.
Age	18 - 29 years old	47	24.2%	147	75.8%	0.10[a]	0.06
	30 - 59 years old	14	14.6%	82	85.4%		
	60 a más years old	1	25.0%	3	75.0%		
Sex	Male	24	28.9%	59	71.1%	4.26[b]	0.04
	Female	38	18.0%	173	82.0%		
Marital Status	Single	50	22.7%	170	77.3%	1.41	0.24
	Married or unmarried couples	12	16.2%	62	83.8%		
Parenthood	No	46	22.8%	156	77.2%	1.10	0.29
	Yes	16	17.4%	76	82.6%		
Level of education	Elementary or High school	6	26.1%	17	73.9%	0.37	0.54
	Superior	56	20.7%	215	79.3%		
Employment Stability	No	44	23.3%	145	76.7%	1.53	1.22
	Yes	18	17.1%	87	82.9%		

Note: (a) Kendall's Tau B was used, (b): OR: 2(I.C.95%: 1.03-3.34)

Table 3. Characteristics associated with attitudes in the second wave of COVID-19 in residents of La Libertad.

Characteristics		ATTITUDE				Chi Square	Sig.
		Inappropriate	%	Appropriate	%		
Age	18 - 29 years old	21	10.8%	173	89.2%	0.12ᵃ	0.02
	30 - 59 years old	4	4.2%	92	95.8%		
	60 years old and over	0	0.0%	4	100.0%		
Sex	Male	12	14.5%	71	85.5%	5.27ᵇ	0.022
	Female	13	6.2%	198	93.8%		
Marital Status	Single	19	8.6%	201	91.4%	0.02	0.88
	Married or unmarried couples	6	8.1%	68	91.9%		
Parenthood	No	18	8.9%	184	91.1%	0.14	0.71
	Yes	7	7.6%	85	92.4%		
Level of education	Elementary or High school	3	13.0%	20	87.0%	0.18	0.67
	Superior	22	8.1%	249	91.9%		
Employment Stability	No	17	9.0%	172	91.0%	0.16	0.69
	Yes	8	7.6%	97	92.4%		

Note: (a) Kendall's Tau B was used, (b): OR: 3 (I.C.95%: 1.12-5.90)

As in the analyses of the previous tables, the characteristics of the participants with the highest percentage of adequate practices were the group over 60 years of age, married or unmarried couple, with children, with higher education and with a stable job; however, in this case, none of the variables analyzed were associated with adequate preventive practices (Table 4).

To determine the knowledge and the dimensions associated with the attitudes and preventive practices of the participants regarding the second wave of the coronavirus, Kendal's Tau B statistic was used, obtaining that knowledge about the ways of contagion is the only one that is significantly associated with the attitudes and preventive practices regarding the second wave of COVID-19 (p<0.05). However, we also observe that the level of association is very low. Furthermore, in the dimension about ways of contagion, most of the people show a regular knowledge and despite the fact that in the other dimensions they have a good knowledge, there is no evidence that this is associated with their attitudes, which are also mostly adequate (Tables 5 and 6).

Table 4. Characteristics associated with preventive practices against the second wave of Covid-19 in residents of La Libertad.

Characteristics		PREVENTIVE PRACTICES				Chi Square	Sig.
		Inappropriate	%	Appropriate	%		
Age	18 - 29 years old	10	5.2%	184	94.8%	0.07	0.13
	30 - 59 years old	2	2.1%	94	97.9%		
	60 years old and over	0	0.0%	4	100.0%		
Sex	Male	3	3.6%	80	96.4%	0.064	0.8
	Female	9	4.3%	202	95.7%		
Marital Status	Single	11	5.0%	209	95.0%	1.88	0.17
	Married or unmarried couples	1	1.4%	73	98.6%		
Parenthood	No	9	4.5%	193	95.5%	0.23	0.63
	Yes	3	3.3%	89	96.7%		
Level of education	Elementary or High school	2	8.7%	21	91.3%	0.38	0.54
	Superior	10	3.7%	261	96.3%		
Employment Stability	No	9	4.8%	180	95.2%	0.63	0.43
	Yes	3	2.9%	102	97.1%		

Table 5. |Knowledge and the dimensions associated with attitudes regarding the second wave of COVID-19 in residents of La Libertad.

Knowledge and dimensions		Attitude regarding Coronavirus						Kendall's Tau B	Sig.
		Inapprop.	%	Approp.	%	Total	%		
Knowledge of symptoms of Coronavirus infection	Bad	4	1.4%	30	10.2%	34	12%		
	Regular	6	2.0%	68	23.1%	74	25%	0.03	0.65
	Good	15	5.1%	171	58.2%	186	63%		
Knowledge of ways of contagion	Bad	1	0.3%	6	2.0%	7	2%		
	Regular	20	6.8%	171	58.2%	191	65%	0.11	0.04
	Good	4	1.4%	92	31.3%	96	33%		
Knowledge about the disease	Bad	1	0.3%	0	0.0%	1	0%		
	Regular	9	3.1%	106	36.1%	115	39%	0.01	0.84
	Good	15	5.1%	163	55.4%	178	61%		
Knowledge of actions to be taken in case of infection	Bad	1	0.3%	2	0.7%	3	1%		
	Regular	11	3.7%	92	31.3%	103	35%	0.081	0.2
	Good	13	4.4%	175	59.5%	188	64%		
General knowledge	Regular	8	2.7%	54	18.4%	62	21.1%		
	Good	17	5.8%	215	73.1%	232	78.9%	1.96	0.16
Total		25	8.5%	269	91.5%	294	100.0%		

Table 6. Knowledge and the dimensions associated with apreventive practices regarding the second wave of COVID-19 in residents of La Libertad.

Knowledge and dimensions		Preventive practices regarding of Covid-19						Kendall's Tau B	Sig.
		Inapprop.	%	Approp.	%	Total	%		
Knowledge of symptoms of Coronavirus infection	Bad	1	0.3%	33	11.2%	34	11.6%		
	Regular	5	1.7%	69	23.5%	74	25.2%	0.04	0.45
	Good	6	2.0%	180	61.2%	186	63.3%		
Knowledge of ways of contagion	Bad	1	0.3%	6	2.0%	7	2.4%		
	Regular	10	3.4%	181	61.6%	191	65.0%	0.12	0.03
	Good	1	0.3%	95	32.3%	96	32.7%		
Knowledge about the disease	Bad	0	0.0%	1	0.3%	1	0.3%		
	Regular	4	1.4%	111	37.8%	115	39.1%	-0.03	0.64
	Good	8	2.7%	170	57.8%	178	60.5%		
Knowledge of actions to be taken in case of infection	Bad	0	0.0%	3	1.0%	3	1.0%		
	Regular	6	2.0%	97	33.0%	103	35.0%	0.06	0.35
	Good	6	2.0%	182	61.9%	188	63.9%		
General knowledge	Regular	4	1.4%	58	19.7%	62	21.1%		
	Good	8	2.7%	224	76.2%	232	78.9%	0.49	0.48
Total		12	4.1%	282	95.9%	294	100.0%		

We observe that most people have a good level of knowledge of COVID-19. Among its dimensions, knowledge of actions to take in case of infection (63.9%) is rated as the one with the best level (Figure 1).

Most of the people, i.e. 97.6% are concerned about the possibility of a family member being infected by this disease, 96.3% explain to their family how to prevent infection of the disease, however, a very small proportion, i.e. 61.9%, are people who are confident in the effectiveness of vaccines (Figure 2).
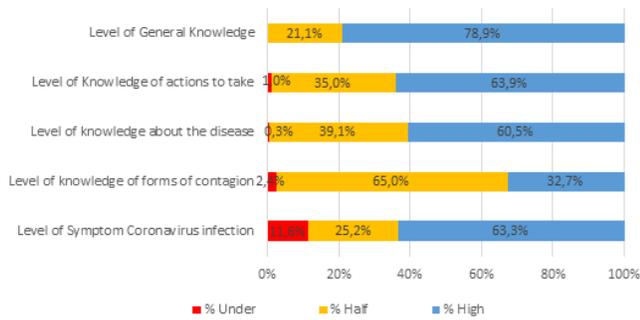
Figure 1. Level of knowledge of COVID 19, according dimensions in residents of La Libertad.

Most of the people, i.e. 98.6%, have adequate practices regarding alcohol hand sanitization, hand washing and mask use; however, there are also 76.5% of people who consume junk food (Figure 3).
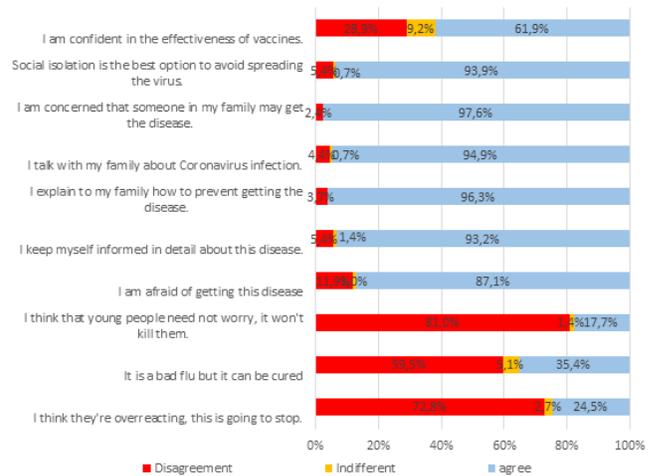

Figure 2. Attitudes regarding the second wave of COVID-19 in residents of La Libertad.
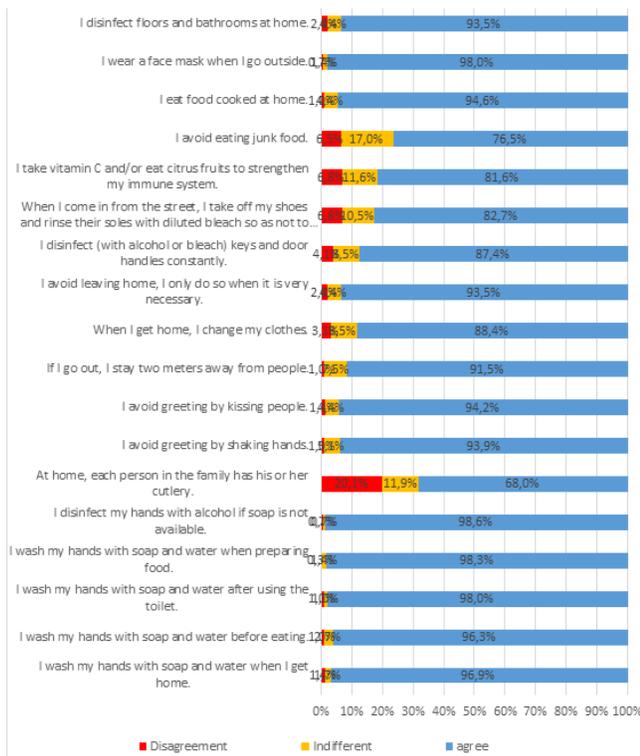

Figure 3. Preventive practices regarding the second wave of COVID-19 in residents of La Libertad.

DISCUSSION

Our results show that the level of knowledge about COVID-19 by residents is good at 78.9%, attitudes and practices are appropriate at 91.5% and 95.9% respectively. However, only age and

sex are found to be associated with the level of attitude. In comparison, with another study conducted in Trujillo and at the national level in 2020, the results in the Libertad sample differ in these three variables, finding that male sex is a risk characteristic for having an inappropriate attitude; likewise, the age of 18 to 21 years is associated with an inappropriate attitude. This is confirmed by the fact that there are still attitudes such as thinking that it is only a strong flu (35.4%), that the situation is being exaggerated (24.5%) and that young people will not die from this disease (17.7%) (11,15).

Knowledge regarding ways of contagion was the dimension that was significantly associated with the preventive attitude regarding COVID-19 (p<0.05), this coincides with the study conducted in Huánuco, Peru, where the perception of lack of knowledge of the disease was associated with negative attitudes facing COVID-19 (16).

Internationally, studies of this type have also been performed, such as in Venezuela, where the findings showed that participants had a high level of knowledge about COVID-19; however, younger people with less education had lower levels of knowledge, and these groups, as well as men, were generally less likely to adopt preventive practices, which is similar to our results in Peru, characteristic of poor societies and informal labor in Latin American countries (17).

In Ecuador, men, people aged 18 to 29 years, single and unemployed people showed the riskiest behaviors; the results indicate that

knowledge about COVID-19 is insufficient to promote a change in behavior among people in Ecuador, so knowledge, similar to our research, did not have a significant association with practices. Thus, we observe good levels of knowledge among our respondents, but there are practices that continue to be inappropriate, for example, consuming junk food (23.5%) and not separating cutlery per person at home (32%), which makes it easier to catch the disease and transmit it to other members of the family (18).

In the study carried out in Paraguay, the average age of the participants was 29.55 ± 10.7 years, similar to our research where the average age of the participants was 28.3 ± 9.9. This means that young people are usually the ones who have access to develop this type of questionnaire, and similar results have been found such as acceptable knowledge, favorable attitudes and mostly appropriate practices, as well as the fact that the male gender constitutes a higher risk of inappropriate practices (19), in contrast to the study conducted in Cameroon where women had lower practice ratings compared to men (20).

The findings in our study indicate that people are aware about preventive practices such as mask use and hand disinfection, similar to the study conducted in Indonesia and Bangladesh. (21,22). In Pakistan and Malaysia, most of the respondents believe that to prevent infection with COVID-19, people should avoid attending crowded places and practice proper hand hygiene (23,24). However, in our country, not having a good knowledge of the ways of contagion and the fact that we are in election season has influenced people not to comply with these preventive practices, not respecting social distancing, attending rallies, protests against a candidacy, leading to an increase in the number of contagion (25).

Another important point to mention is that in attitudes, 38.1% of people surveyed in the department of La Libertad are indifferent and do not trust the effectiveness of the vaccine. In Peru, as of May 2021, only health personnel and senior citizens have been vaccinated. However, many of them have decided not to be vaccinated due to bad journalistic information regarding the safety and efficacy of vaccines in different information resources (26).

To sum up, the surveyed residents of the department of La Libertad in Peru have good levels of knowledge, attitudes and preventive practices regarding COVID-19; however, in one of the dimensions analyzed for knowledge, it was found that they lacked a clear understanding of the ways in which they are infected. Age and sex were the only variables associated with the level of knowledge and attitudes; and only the dimension of ways of contagion was associated with attitudes and practices. There are still some inappropriate attitudes and practices among the residents of La Libertad, and this, together with a deficient economy, has led to an increase in the number of cases.

We hope this study will facilitate the implementation of effective policies by our authorities, so that the population of La Libertad can become aware and improve the weak points of their knowledge, attitudes and practices, avoiding the further spread of this pandemic.

Conflict of interest

No conflict of interest has arisen during the preparation of this paper by the authors.

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