Factors Associated With Drug Consumption Without Scientific Evidence in Patients With Mild COVID-19 in Peru

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Objective: This study aimed to evaluate the factors associated with the consumption of drugs without scientific evidence in patients with mild COVID-19 infection in Peru.

Methods: An analytical cross-sectional study was carried out including 372 adult patients with a history of mild COVID-19 disease. Factors associated with drug consumption were evaluated by Poisson regressions with robust variance adjustment using the bootstrapping resampling method.

Results: Seventy-two percent consumed some medication without scientific evidence, with antibiotics (71%) and ivermectin for human use (68%) being the most commonly used. Factors associated with the consumption of drugs to treat mild COVID-19 infection were thinking that the drugs are not effective (adjusted prevalence ratio, 0.48; 95% confidence interval, 0.36–0.65) and not being informed about the efficacy of the drugs (adjusted prevalence ratio, 0.48; 95% confidence interval, 0.36–0.65).

Conclusions: The prevalence of patients who consume drugs without scientific evidence in Peru is high, with antibiotics and ivermectin for human use being the most commonly used. These findings are consistent with previous studies, which report that the factors associated with this practice are sex, high school, and university education, working in the health sector, and less knowledge of self-medication.11,12

Since the beginning of the pandemic, multiple efforts have been made to evaluate specific therapies to treat the infection, evaluating potentially useful drugs.4 Although to date, many of these drugs have not demonstrated efficacy or do not have scientific evidence to support their use,5 there are communities and organizations that still promote them.6

Health organizations worldwide have based their recommendations for the treatment of COVID-19 on the evidence available to date, concluding that the therapy is recommended only in patients with moderate to severe disease.7 However, in some Latin American countries, such as Peru, health authorities have recommended the possibility of pharmacological treatment, at the discretion of the treating physician, for mild cases of COVID-19,8 which may lead to unnecessary adverse effects in the patient.9 A recent systematic review reports that the prevalence of self-medication to prevent or treat COVID-19 ranged from less than 4.0% to 88.3%.10 Some studies report that the factors associated with this practice are sex, high school, and university education, working in the health sector, and less knowledge of self-medication.11,12

This, added to the large amount of misinformation circulating in the press and social networks, the lack of regulation of the purchase and sale of certain drugs,13 and the promotion of using drugs for COVID-19 in the general population by people with political and social power in Peru,14 makes it important to evaluate the overmedication problem in patients who do not merit specific experimental treatments in the Peruvian context. The present study aimed to evaluate the factors associated with the consumption of drugs without scientific evidence in patients with mild COVID-19 infection.

METHODS

Study Design and Population

An analytical cross-sectional study was carried out based on a previously collected database whose objective was to describe the prevention and control practices against COVID-19 disease in the Peruvian population (during September 9–21, 2020) and whose methodology has been described previously.15

For the present study, only patients older than 18 years, with a history of mild COVID-19 (not requiring medical support), and of Peruvian nationality and current residence were included.

Questionnaire

A survey constructed and validated by the authors (Cronbach α = 0.7) was used for data collection, consisting of 3 sections: (1) general data (biological, demographic, epidemiological characteristics), (2) perspectives and prevention practices of persons without a history of COVID-19, and (3) perspectives and control
### TABLE 1. Characteristics of the Peruvian Patients With Mild COVID-19 Infection (N = 372)

| Variable                                      | Medication Consumption |          |          |          |
|-----------------------------------------------|------------------------|----------|----------|----------|
|                                               |                        | No       | Yes      | P*       |
|                                               | n (%)                  | 106 (28.49%), n (%) | 266 (71.50%), n (%) |          |
| Sex                                           |                        |          |          |          |
| Female                                        | 223 (59.95)            | 54 (50.94) | 169 (63.53) | 0.025    |
| Male                                          | 149 (40.05)            | 52 (49.06) | 97 (36.47)  |          |
| Age                                           |                        |          |          |          |
| Young (18–29 y)                               | 279 (75)               | 82 (77.36) | 197 (74.06) | 0.507    |
| Adult and older adult (>29 y)                 | 93 (25)                | 24 (22.64) | 69 (25.94)  |          |
| Marital status                                |                        |          |          |          |
| Single                                        | 290 (77.96)            | 88 (83.02) | 202 (75.94) | 0.137    |
| Married or cohabiting                         | 82 (22.04)             | 21 (19.81) | 61 (22.93)  |          |
| Education level                               |                        |          |          |          |
| High school or less                           | 82 (22.04)             | 27 (25.47) | 67 (25.19)  |          |
| Superior (technical or university)            | 290 (77.96)            | 85 (80.19) | 205 (77.07) |          |
| Employment status                             |                        |          |          |          |
| Not working                                    | 232 (62.37)            | 65 (61.32) | 167 (62.78) | 0.793    |
| Working                                       | 140 (37.63)            | 41 (38.68) | 99 (37.22)  |          |
| Health insurance                              |                        |          |          |          |
| None                                          | 95 (25.54)             | 28 (26.42) | 67 (25.19)  | 0.991    |
| SIS                                           | 124 (33.33)            | 35 (33.02) | 89 (33.46)  |          |
| EsSalud                                       | 94 (25.27)             | 27 (25.47) | 67 (25.19)  |          |
| Others                                        | 59 (15.86)             | 16 (15.09) | 43 (16.17)  |          |
| Region of residence                           |                        |          |          |          |
| Coast                                         | 174 (46.77)            | 42 (39.62) | 132 (49.62) | 0.006    |
| Highland                                      | 126 (33.87)            | 49 (46.23) | 77 (28.95)  |          |
| Jungle                                        | 72 (19.35)             | 15 (14.15) | 57 (21.43)  |          |
| Area of residence                             |                        |          |          |          |
| Urban                                         | 309 (83.06)            | 88 (83.02) | 221 (83.08) | 0.988    |
| Rural                                         | 63 (16.94)             | 18 (16.98) | 45 (16.92)  |          |
| Social class                                  |                        |          |          |          |
| Medium-High                                   | 281 (75.54)            | 85 (80.19) | 196 (73.68) | 0.188    |
| Lower                                         | 91 (24.46)             | 21 (19.81) | 70 (26.32)  |          |
| Health professional within the family unit     |                        |          |          |          |
| No                                            | 129 (34.68)            | 42 (39.62) | 87 (32.71)  | 0.449    |
| Student of health sciences                     | 72 (19.35)             | 19 (17.92) | 53 (19.92)  |          |
| Health professional                           | 171 (45.97)            | 45 (42.45) | 126 (47.37) |          |
| Source where you obtain information about COVID-19 medication | |          |          |          |
| Other media                                   | 267 (71.77)            | 72 (67.92) | 195 (73.31) | 0.298    |
| Medical information                           | 105 (28.23)            | 34 (32.08) | 71 (26.69)  |          |
| Comorbidities for COVID-19                    |                        |          |          |          |
| No                                            | 295 (79.30)            | 92 (86.79) | 203 (76.32) | 0.024    |
| Yes                                           | 77 (20.70)             | 14 (13.21) | 63 (23.68)  |          |
| Family member with comorbidity for COVID-19   |                        |          |          | <0.001   |
| No                                            | 170 (45.70)            | 67 (63.21) | 103 (38.72) |          |
| Yes                                           | 202 (54.30)            | 39 (36.79) | 163 (61.28) |          |
| Family member with COVID-19 diagnosis         |                        |          |          | 0.006    |
| No                                            | 35 (9.41)              | 17 (16.04) | 18 (6.77)   |          |
| Yes                                           | 337 (90.59)            | 89 (83.96) | 248 (93.23) |          |
| Family member deceased by COVID-19            |                        |          |          | 0.223    |
| No                                            | 349 (93.82)            | 102 (96.23) | 247 (92.86) |          |
| Yes                                           | 23 (6.18)              | 4 (3.77)   | 19 (7.14)   |          |
| Do you consider COVID-19 to be a dangerous and deadly disease? | |          |          | 0.020    |
| Nothing or little                             | 89 (23.92)             | 34 (32.08) | 55 (20.68)  |          |
| Much                                          | 283 (76.08)            | 72 (67.92) | 211 (79.32) |          |

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practices during COVID-19 infection period of persons with a history of COVID-19 (including the use of drugs as treatment during the course of the disease). The variables included within the first and third sections of the questionnaire were used for the present study. The questionnaire is available in the Supplementary Material 1, http://links.lww.com/JPS/A496.

**Dependent Variable: Consumption of Drugs Without Scientific Evidence**

The dependent variable was assessed by the question “What medications have you used against COVID-19?” with a multiple-choice response. Consumption of drugs without scientific evidence was defined as having consumed any of the following drugs: ivermectin for human use, ivermectin for veterinary use, hydroxychloroquine, antibiotics (azithromycin, clarithromycin, etc.), corticosteroids (dexamethasone, prednisone, etc.), anticoagulants (heparin, warfarin, etc.), and other drugs used as specific treatment of the disease. Drugs for symptomatic treatment of the disease such as paracetamol or nonsteroidal anti-inflammatory drugs were not considered for the conformation of the outcome variable.

**Other Variables**

Other variables such as sex (female, male), age (young, adult, or elderly), health insurance (none, comprehensive health insurance [SIS {Seguro Integral de Salud}], EsSalud [Seguro Social de Salud], and others [like private insurance or other]), region (coast, highlands, jungle), rurality (urban and rural), socioeconomic level (low and medium-high; following the Graffar-Méndez stratification16), health professional within the family unit (no, student of health sciences, and health professional), the source where you acquire information about COVID-19 (social networks, press media, medical information, and others), comorbidities for COVID-19 (no or yes), perception of COVID-19 as dangerous and deadly disease (not at all or little and a lot), and opinion of medications for the treatment of COVID-19 (effective, not effective, and I am not informed) were evaluated.

**Statistical Analysis**

A descriptive analysis was performed using absolute and relative frequencies, likewise, the χ² test was used for the comparison of proportions between groups. For the evaluation of the factors associated with drug consumption, Poisson regression with robust variances was used, using the bootstrapping resampling method, thus obtaining prevalence ratios (PRs) with their respective 95% confidence intervals (95% CIs).

**TABLE 1.** (Continued)

| Opinion of drugs for the treatment of COVID-19 | Medication Consumption | P* |
|---------------------------------------------|------------------------|----|
| It is effective                              | 254 (68.28)            | 216 (81.20) | <0.001 |
| It is not effective                          | 59 (15.86)             | 26 (9.77)   |
| I am not informed of the subject             | 59 (15.86)             | 24 (9.02)   |

*Data in bold indicate statistically significant P values (P < 0.05) using the χ² test.

**Ethical Aspects**

The primary study was evaluated and approved by the institutional ethics committee of the Universidad Peruana Unión (Certificate of Approval: 2020-CEU/PeU-00020). Informed consent was obtained from each participant for data collection.

**RESULTS**

The primary study evaluated 3630 individuals, of which 3231 were excluded from the present study because they did not report having COVID-19 infection and 27 because they reported moderate or severe infection severity. A final sample of 372 individuals with mild COVID-19 was analyzed (Supplementary Material 2, http://links.lww.com/JPS/A496).

Of the total number of participants, 60.0% were female, 75.0% were young, 78.0% were single, 78.0% had a higher education, and 63.4% were not working at the time of the survey. Likewise, 79.3% had comorbidities for COVID-19; 90.6% had a family member diagnosed with COVID-19; 93.8% did not have a family member who died from the disease, and 76.1% highly regarded COVID-19 as a dangerous and fatal disease (Table 1).

A total of 68.3% believed that drugs for the treatment of COVID-19 are effective, while 71.5% reported having consumed one or more drugs without scientific evidence for the treatment of COVID-19. In the latter group, the main drugs consumed were antibiotics (macrolides, fluoroquinolones, etc., 75.2%), ivermectin for human use (68.4%), and corticosteroids (29.0%). To a lesser extent, veterinary ivermectin (16.9%), hydroxychloroquine (8.3%), and anticoagulants (6.0%) were consumed. The main source of information for drug consumption was medical (83.1%; Table 1).

Most of those who consumed drugs without scientific evidence were female (63.5%, P = 0.025), from the coastal region (49.6%, P = 0.006), without comorbidities for COVID-19 (76.3%, P = 0.024), with a family member with comorbidity for COVID-19 (61.3%, P < 0.001), with a relative with a diagnosis of COVID-19 (93.2%, P = 0.006), considered COVID-19 to be a dangerous and fatal disease (79.3%, P = 0.02), and believed that treatment for COVID-19 is effective (81.2%, P < 0.001; Table 1).

In the multiple analysis, it was found that the factors associated with the consumption of drugs without scientific evidence were: thinking that the drugs are not effective (adjusted prevalence ratio [aPR], 0.55; 95% CI, 0.41–0.74) and not being informed of their efficacy (aPR, 0.48; 95% CI, 0.36–0.65). Likewise, when assessing the consumption of the most frequently used drugs, it was found that thinking that the drugs are not effective (aPR, 0.43; 95% CI, 0.27–0.68), not being informed of their efficacy (aPR, 0.59; 95% CI, 0.37–0.77), and belonging to the low social class (aPR, 1.39; 95% CI, 1.14–1.39) were associated with antibiotic consumption, and thinking that the drugs are not effective (aPR, 0.42; 95% CI,
0.29–0.62), not being informed of their efficacy (aPR, 0.30; 95% CI, 0.18–0.49), and being from the jungle region (aPR, 1.22; 95% CI, 1.01–1.47) were associated with ivermectin consumption (Tables 2, 3).

**DISCUSSION**

From the patients with COVID-19, 80% present the asymptomatic or mild disease, where the treatment is based on reducing the symptoms of the infection.17 Prestigious international institutions recommend expectant management in this group.18 Although some drugs, such as dexamethasone, have been shown to reduce mortality and unnecessary adverse effects.9

**TABLE 2.** Factors Associated With Drug Consumption Without Scientific Evidence as a Treatment for Mild COVID-19 in Peru (N = 372)

| Variable                                      | Bivariate Analysis | Multivariate Analysis |
|-----------------------------------------------|--------------------|-----------------------|
|                                               | cPR 95% CI         | aPR 95% CI            |
| Sex                                           |                    |                      |
| Female                                        | 0.86 0.75–0.98     | 0.94 0.82–1.08       |
| Male                                          | Reference          | Reference             |
| Age                                           |                    |                      |
| Young (18–29 y)                               | 1.05 0.92–1.20     | 0.98 0.83–1.15       |
| Adult and older adult (>29 y)                 | Reference          | Reference             |
| Health                                        |                    |                      |
| None                                          | Reference          | Reference             |
| SIS                                           | 1.02 0.86–1.20     | 1.03 0.88–1.21       |
| EsSalud                                       | 1.01 0.85–1.21     | 1.00 0.82–1.22       |
| Others                                        | 1.03 0.84–1.27     | 0.99 0.80–1.23       |
| Region of residence                           |                    |                      |
| Coast                                         | Reference          | Reference             |
| Highland                                      | 0.81 0.69–0.94     | 0.90 0.78–1.05       |
| Jungle                                        | 1.04 0.91–1.19     | 1.01 0.88–1.15       |
| Area of residence                             |                    |                      |
| Urban                                         | Reference          | Reference             |
| Rural                                         | 1.00 0.84–1.18     | 0.99 0.84–1.16       |
| Social class                                  |                    |                      |
| Medium-high                                   | Reference          | Reference             |
| Lower                                         | 1.10 0.96–1.27     | 1.14 0.99–1.31       |
| Health professional within the family unit    |                    |                      |
| No                                            | Reference          | Reference             |
| Student of health sciences                    | 1.09 0.90–1.32     | 1.08 0.89–1.30       |
| Health professional                           | 1.09 0.94–1.28     | 1.14 0.97–1.33       |
| Source where you obtain information about COVID-19 medication |          |                      |
| Other media                                   | Reference          | Reference             |
| Medical information                           | 0.93 0.80–1.07     | 0.97 0.85–1.10       |
| Comorbidities for COVID-19                    |                    |                      |
| No                                            | Reference          | Reference             |
| Yes                                           | 1.19 1.05–1.35     | 1.11 0.98–1.25       |
| Do you consider COVID-19 a dangerous and deadly disease? |    |                      |
| Nothing or little                             | Reference          | Reference             |
| Much                                          | 1.21 1.00–1.45     | 1.13 0.96–1.33       |
| Opinion of drugs for the treatment of COVID-19 |                    |                      |
| It is effective                               | Reference          | Reference             |
| It is not effective                           | 0.52 0.39–0.69     | 0.55 0.41–0.74       |
| I am not informed of the subject              | 0.48 0.35–0.65     | 0.48 0.36–0.65       |

**TABLE 3.** Factors Associated With the Consumption of Antibiotics and Ivermectin for Treatment of Mild COVID-19 in Peru (N = 372)

| Variable                                      | Antibiotics | Ivermectin* |
|-----------------------------------------------|-------------|-------------|
|                                               | aPR 95% CI  | aPR 95% CI  |
| Sex                                           |             |             |
| Female                                        | Reference   | Reference   |
| Male                                          | 0.97 0.80–1.18 | 1.00 0.84–1.20 |
| Age                                           |             |             |
| Young (18–29 y)                               | Reference   | Reference   |
| Adult and older adult (>29 y)                 | 1.15 0.89–1.47 | 0.83 0.65–1.05 |
| Health insurance                              |             |             |
| None                                          | Reference   | Reference   |
| SIS                                           | 0.90 0.69–1.17 | 1.11 0.91–1.37 |
| EsSalud                                       | 0.89 0.64–1.22 | 1.12 0.86–1.45 |
| Other                                         | 1.02 0.76–1.38 | 1.06 0.81–1.40 |
| Region of residence                           |             |             |
| Coast                                         | Reference   | Reference   |
| Highland                                      | 0.91 0.73–1.13 | 1.11 0.90–1.36 |
| Jungle                                        | 1.03 0.81–1.32 | 1.22 1.01–1.47 |
| Area of residence                             |             |             |
| Urban                                         | Reference   | Reference   |
| Rural                                         | 0.88 0.66–1.17 | 0.88 0.69–1.13 |
| Social class                                  |             |             |
| Medium-high                                   | Reference   | Reference   |
| Lower                                         | 1.39 1.14–1.69 | 1.03 0.83–1.27 |
| Professional de salud dentro de la unidad familiar | |             |
| No                                            | Reference   | Reference   |
| Student of health sciences                    | 1.08 0.83–1.40 | 0.91 0.68–1.23 |
| Health professional                           | 1.14 0.91–1.42 | 1.11 0.90–1.36 |
| Fuente donde adquiere información sobre la medicación COVID-19 | |             |
| Other media                                   | Reference   | Reference   |
| Medical information                           | 1.05 0.87–1.31 | 0.95 0.78–1.16 |
| Comorbidities for COVID-19                    |             |             |
| No                                            | Reference   | Reference   |
| Yes                                           | 1.20 0.99–1.46 | 1.14 0.95–1.37 |
| Do you consider COVID-19 to be a dangerous and deadly disease? | |             |
| Nothing or little                             | Reference   | Reference   |
| Much                                          | 1.19 0.93–1.53 | 1.07 0.88–1.30 |
| Opinion of drugs for the treatment of COVID-19 |             |             |
| It is effective                               | Reference   | Reference   |
| It is not effective                           | 0.43 0.27–0.68 | 0.42 0.29–0.62 |
| I am not informed of the subject              | 0.59 0.37–0.77 | 0.30 0.18–0.49 |

*Ivermectin for human and veterinary use.

Ref, reference group.

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In patients with COVID-19, the indiscriminate use of these drugs in those for whom there is no indication (no oxygen requirement) may have contrary effects that may even lead to an increase in mortality and unnecessary adverse effects.9

Peru is one of the countries with the highest mortality rates in the world due to COVID-19,19 where the indiscriminate use of drugs for the infection has been promoted, regardless of the severity of the disease.20 Our study reported a frequency of consumption of drugs without scientific evidence of approximately 72%. This prevalence is much higher than were reported in another study in Peru, where self-medication of drugs without scientific evidence for COVID-19 did not exceed 13%.21 Likewise, the observed
prevalence was much higher than that found in other countries, such as Nigeria\textsuperscript{12} and Kenya,\textsuperscript{22} where 41% and 60% of patients with mild COVID-19 self-medicating, respectively. In both cases, it is important to consider that the definition of self-medication does not include medical prescription, which may underestimate the consumption of unnecessary drugs without scientific evidence by not considering those that were indicated by health professionals.

This is probably the situation in our study because 83% of the respondents reported that their source of information for the consumption of drugs was provided by physicians. This is evidence of a problem in the country regarding the misinterpretation of the available scientific evidence by clinicians, which could lead to an increase in the prescription of unnecessary drugs for the patient and, consequently, a greater risk of adverse effects.\textsuperscript{25}

Among the drugs used, more than 50% of the people evaluated reported using antibiotics (azithromycin, clarithromycin, etc.) as a treatment for mild COVID-19. These figures are high compared with previous studies in other countries, such as Nigeria\textsuperscript{12} or Bangladesh,\textsuperscript{24} where they reported antibiotic consumption frequencies for COVID-19 of less than 50%. This difference could be because the Peruvian population tends to consume antimicrobials without a medical prescription,\textsuperscript{23} this is in addition to the fact that patients themselves often demand that these drugs are prescribed for them\textsuperscript{26} and many physicians even prescribe them as part of an empirical therapy,\textsuperscript{27} and frequent consumption of antibiotics is to be expected, especially in the context of a pandemic that has led to fear of the complications of the disease. However, a study in Peru reported a prevalence of self-medication with azithromycin for COVID-19 symptoms of 12.6%\textsuperscript{21}. This difference could be since they only evaluated the consumption of azithromycin and no other antibiotics. Although it has been postulated that azithromycin could have beneficial effects in COVID-19 disease, due to its in vitro efficacy and its immunomodulatory effect,\textsuperscript{28} to date, the available evidence for its use is limited and has not shown beneficial effects;\textsuperscript{29} it has even been reported that in combination with hydroxychloroquine, it leads to increased mortality, need for intensive care, and oxygen requirement.\textsuperscript{30} Similarly, there is no evidence to support a benefit in the use of other types of antibiotics, because the probability of presenting a bacterial infection in addition to COVID-19 is quite low in patients with mild or asymptomatic symptoms.\textsuperscript{31} The indiscriminate use of antibiotics in patients with COVID-19 could not only affect the individual patient’s health but also presents a public health risk due to increased bacterial resistance.

Likewise, our study also identified that more than 50% of the participants reported consuming ivermectin. This high prevalence of consumption is a product of the massive dissemination of the drug in the Peruvian media, which have promoted and concluded that it is the best option to treat COVID-19\textsuperscript{14}; strategies adopted by health agencies in the distribution of “COVID kits” for the treatment of mild disease (which include drugs such as ivermectin, etc.)\textsuperscript{32}; national supreme decrees based on consensus (which leave its use to medical criteria)\textsuperscript{6}; and by the promotion of use by medical figures with public outreach in Peru.\textsuperscript{33} It should be taken into account that although it was previously reported that this drug had in vitro efficacy against SARS-CoV-2,\textsuperscript{34} the estimated dose for a favorable in vivo result would be neurotoxic,\textsuperscript{15} so its use should be given with caution, or even not recommended, as referred to by international organizations.\textsuperscript{36} In addition, it did not show significant results in the recovery of patients in a mild state of the disease.\textsuperscript{37}

Factors Associated With Drug Consumption

When evaluating the factors associated with antibiotic consumption, we observed that belonging to the lower social class was associated with higher antibiotic consumption. A previous systematic review reported that one of the factors associated with self-medication with antibiotics was middle socioeconomic status, but not low socioeconomic status, which differs from the present study.\textsuperscript{16} This result could be explained by the distribution of the abovementioned “COVID kits,” which included azithromycin, to the regions most affected by the pandemic, which could be mainly the lower class.\textsuperscript{33} Likewise, it is important to take into account that the low-income population has been the most affected by the economic crisis in Peru,\textsuperscript{40} so we would expect that this group would be more susceptible to consume these drugs offering an idea of hope to have a faster and more favorable recovery to continue working to maintain their economic livelihood.

Regarding ivermectin, residing in the jungle region was associated with higher consumption of ivermectin. This result could be explained by the fact that in this region, during the first wave of COVID-19 in Peru, hospitals collapsed and the situation became uncontrollable, causing many deaths.\textsuperscript{31} This prompted treatment campaigns for COVID-19 with a series of drugs based on clinical experience, including ivermectin\textsuperscript{42} and consequently the incorporation of the drug as a standard treatment regimen.

Finally, when evaluating the factors associated with the general consumption of drugs, we found that thinking that drugs are ineffective and not being informed about their efficacy was associated with a lower prevalence of consumption of drugs without scientific evidence. The association was maintained even when evaluated by type of medication. This finding is in agreement with a previous study that found that greater knowledge of self-medication was associated with less self-medication practice.\textsuperscript{12} This modifiable factor highlights the importance of educating the population, because if a person knows about the lack of effectiveness of drugs according to reliable sources of information, he/she will greatly reduce their consumption.\textsuperscript{13} and it would even help make better decisions for the benefit of the patient.\textsuperscript{43} However, it is important to take into account that the focus of education to be able to determine which sources offer quality information should include not only the general population but also the health personnel because they can prescribe medications and to educate and influence their patients’ decision making.\textsuperscript{44}

Our study reflects a problematic reality in Peru, which merits the regulation of false information transmitted by the media, restructuring of the current national recommendations for the treatment of mild COVID-19, and the strengthening of knowledge about evidence-based medicine in health personnel to increase the population’s knowledge about the lack of effectiveness of these drugs and therefore reduce their consumption. It is important to consider certain limitations that arose. First, by analyzing a nonprobabilistic sample, the results may not be extrapolated to the entire population, although it could be a starting point for building hypotheses for future studies. Second, the survey was distributed online, so it was not possible to correct the complete data of the population. However, we consider that the questions were simple and validated for self-application, reducing the possibility of information bias. In addition, it was possible that 2 or more people from the same household had completed the survey, but we consider that this would not lead to the data being correlated because the influence of family or friends on the consumption of some medications in adults is usually minor.\textsuperscript{43} Third, the authors distributed the survey, a fact that could explain the high proportion of the young population, with higher education, upper middle class and from the urban sector, variables that could have influenced the prevalence of the use of drugs without scientific evidence.

Future studies should investigate in more detail the consumption of drugs without scientific evidence stratified according to educational level and rurality and include studies with a larger sample size to corroborate our results. It is important to raise awareness
among the population about the possible harm caused by drugs and their lack of effectiveness, to prevent serious consequences.

CONCLUSIONS

We found that more than 70% of our population reported consuming drugs without scientific evidence for mild COVID-19, with antibiotics and ivermectin being the most frequent. Thinking that the drugs are not effective and being uninformned on the subject were associated with a lower prevalence of consumption of drugs without scientific evidence. Likewise, being of a low social class and residing in the jungle region were associated with antibiotic and ivermectin consumption, respectively. The implementation of a control system for obtaining medicines is necessary for the country, as well as raising awareness of the irrational use of medicines, both for the general population and for health professionals.

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