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Original Research

Prescription and self-medication patterns in the general population of Ecuador during the COVID-19 pandemic. A Cross-sectional study

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Abstract

Background: The SARS-CoV-2 pandemic affected over 200 million people worldwide, with Ecuador being one of the hardest-hit countries in the Andean region, reporting approximately 777 thousand cases. Despite treatment strategies for COVID-19, various medication groups not recommended for mild to moderate cases were widely consumed by the population. This study aimed to determine the medication patterns of consumption in the general population of Ecuador during the COVID-19 pandemic. **Methodology:** Cross-sectional study with a sample of 410 participants, calculated with an expected proportion of 36.8% from the Quisphe-Cañari study, a confidence level of 95%, and a precision of 5%. Non-probabilistic sampling was applied, with inclusion criteria as Ecuador residents over 18 years old and exclusion criteria excluding pregnant women. The dependent variable was "medication consumption." Independent variables included age, gender, marital status, educational level, employment status, economic income, self-medication, and type of medication consumed. Exploratory data analysis, descriptive statistics, and frequency tables were applied for each variable. Medication consumption frequency was estimated, considering individuals using any medication as the numerator and the entire surveyed population as the denominator. SPSS26 software was used. **Results:** 410 participants, with an average age of 31.1±10.7 years, 62.9% were women, and 66.6% were single. 54.1% of participants used pharmacological therapy during the pandemic, with 64.4% having a medical prescription and 35.6% engaging in self-medication. In the self-medication group, analgesics was the most consumed (33.8%), followed by Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) (22.9%), antibiotics (14.9%), and antihistamines (13.9%). In the medical prescription group, the most frequent drugs were analgesics (26.3%), NSAIDs (23.2%), antibiotics (18.5%), and antihistamines (16.9%). Regarding other medication groups, the frequency of corticosteroid consumption was 6.3% and antiparasitic agents with 6.5%. Conclusion: In Ecuador, several medication groups without indication for mild to moderate COVID-19, such as corticosteroids, antibiotics, and antiparasitics, were consumed under medical prescription.

Keywords: covid-19"[mesh]; "sars-cov-2"[mesh]; "medication therapy management"[mesh]; "patient compliance"[mesh]; "treatment adherence and compliance"[mesh]; "prevalence" [mesh]

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INTRODUCTION

The pandemic caused by SARS-CoV-2 has affected more than 200 million people worldwide.[1] In Ecuador, the healthcare system collapsed and, therefore, the lack of access to healthcare services were two of the most vulnerable points during the SARS-CoV-2 pandemic, reporting approximately 777 thousand cases,[2] making it one of the most affected countries in the Andean region.

Different societies and National Health Ministries established guidelines for the treatment of non-critical and oxygen-requiring COVID-19.[3] Despite this, several medication groups not recommended for mild to moderate COVID-19 were widely consumed by the population either under a medical prescription or by self-medication.[4]

According to the SARS-CoV-2 Wuhan original variant's basic reproduction number (R_0), which fluctuated between 2-3, the World Health Organization (WHO) established goals for vaccination to achieve herd immunity.[5,6] By June 2022, the WHO expected to reach 70% fully vaccinated population. Since Ecuador accomplished the goal in epidemiological week 28 (July 10-16, 2022),[7] we decided that assessing the prescription and self-medication during the pandemic in the general Ecuadorian

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population was appropriate.

This study aimed to determine the medication patterns in the general population of Ecuador during the COVID-19 pandemic.

METHODS

This cross-sectional study was conducted between August 15 and November 15, 2022, at Zero Biomedical Research, Quito, Ecuador, following the STROBE statement. The inclusion criteria included Ecuador residents over or equal to 18 years old, and pregnancy was considered the exclusion criterion. A non-probabilistic snowball sampling was used, and a total of 357 participants was considered, using the formula for infinite populations considering an expected proportion (p) of 36.8% taken from the study by Quisphe-Cañari et al.,[8] 95% confidence level and precision of 5%, adding a 10% potential loss, resulting in a total of 410 participants. The dependent variable was "medication consumption," based on the request for the use of medications working as a dichotomous variable (Yes/No). As independent variables, age, gender, civil status, educational level, employment status, work activity, economic income, and pattern of medication (dichotomized into medical prescription and self-medication) and type of medication consumed were considered grouping them according to the Anatomical Therapeutic Chemical (ATC) classification system.[9] Self-medication was understood as the consumption of medication other than that prescribed by a physician.

Data collection

The participants were contacted through national online news media and social networks (WhatsApp, Facebook). They were asked to answer the 15-item, Spanish-language electronic survey autonomously online after accepting (electronically marking) the consent form. The questionnaire consisted of two sections: i) Demographic characteristics, where information about age, marital status, educational level, work status, and economic income was assessed; ii) Medication assessment, where the patterns of medication consumption (use of medication, self-medication or prescribed by a physician, used for treatment or prevention) and the characteristics of the drugs (pharmacological group of the drugs consumed) were analyzed. Finally, participants were acknowledged for their participation without any financial compensation.

We evaluated the questionnaire's validity by assessing the opinion of three experts, including a family physician, an expert in Public Health, and a general practitioner, who utilized established criteria to evaluate the instrument. Following this process, a pilot study was conducted with 25 participants who found the instrument's content understandable and unambiguous. The instrument's reliability was then evaluated using Cronbach's Alpha, which yielded a coefficient of 0.60, indicating an acceptable level of consistency in its performance.

Statistics

An exploratory data analysis was conducted, after which descriptive statistics were applied, with measures of central tendency and dispersion according to each variable. Then, frequency tables were generated for qualitative variables. The frequency of medication consumption was estimated, considering the people who consumed any medication as the numerator and the entire population surveyed as the denominator. SPSS Version 26® Software was used in the study.

Ethical principles

The ethical guidelines for research defined by the Declaration of Helsinki.[10] were considered, preceded by written acceptance of participation through informed consent. The identities of all participants were kept hidden. The Ethics Committee of the Hospital IESS San Francisco de Quito approved the study with code CEISH-HGSF-2022-025 on July 14, 2022.

RESULTS

410 responses were considered valid. Of the total of participants, 62.9% were female. The average age was 31.1±10.7 years. 63.4% were under 30 years old, and 66.6% were single. In terms of educational level, most subjects had university-level education (63.7%). More than half of the subjects were working (56.1%), with 32% not specifying their economic activity and with income greater than 520 dollars in 52% of the population (Table 1).

222 participants (54.1%) used pharmacological therapy during the COVID-19 pandemic, where 64.4% had a medical prescription and 35.6% were considered self-medication. Of the 222 participants, 45 (20.3%) reported that they took

Table 1. Sociodemographic characteristics of the participants

		n (%)
Overall		410 (100.0)
Gender	Female	258 (62.9)
	Male	152 (37.1)
Age	< 30 years old	260 (63.4)
	≥ 30 years old	150 (36.6)
Marital Status	Single	273 (66.6)
	Married	99 (24.2)
	Other	38 (9.2)
Educational Level	≤ High School	84 (20.5)
	University	261 (63.7)
	Master's Degree / Graduate	65 (15.8)
Employment Status	Currently working	230 (56.1)
	Not currently working	180 (43.9)
Economic Activity	Not specified	131 (32.0)
	Health	121 (29.5)
	Education	35 (8.5)
	Commerce	27 (6.6)
	Other	96 (23.4)
Economic Income	< 520 dollars	196 (47.8)
	≥ 520 dollars	214 (52.0)

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medication for preventive purposes, and the remaining 177 (79.7%) for COVID-19 related symptoms (n=139, 78.5%) or laboratory test-confirmed COVID-19 diagnosis (n=38, 21.5%).

The population consumed 692 drugs, and the median number of medications administered per participant was 3 drugs. In the self-medication group, Analgesics lead in its use with 33.8%, followed by Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) (22.9%), antibiotics (14.9%), and antihistamines (13.9%).

Among the group that received a medical prescription, from the total consumption of medication (n=491), the most consumed groups were analgesics (26.3%), NSAIDs (23.2%), antibiotics (18.5%), and antihistamines (16.9%) (see Table 2). Regarding other medication groups, the frequency of consumption of corticosteroids was 6.3% and 2.5% in prescription and self-medication groups, respectively, and antiparasitic agents 6.5% and 5.5%. Consumption frequencies are listed in Table 2.

DISCUSSION

Different pharmacological options were proposed as potential treatments for COVID-19 during the early phase of the pandemic. Antimalarial Hydroxychloroquine, with well-established anti-inflammatory and antiviral effects,[11] was one of the first COVID-19 treatments to be studied after promising in-vitro results,[12,13] in 2020. However, concerns about its use were immediately raised because of the high frequency of moderate and severe adverse reactions, such as QT prolongation, AV blockade, cardiomyopathy, and heart failure.[14] Furthermore, the results of randomized clinical trials showed a lack of efficacy and even greater mortality rates than the standard of care.[15,16] Consequently, the WHO encouraged against the use of hydroxychloroquine to treat COVID-19 in the middle of 2020.[17]

Another antiparasitic drug with potential immunomodulatory capacities,[18] Ivermectin, was proposed in 2021 for the treatment of COVID-19 after promising in-silico and in-vitro studies;[19,20] however, the evidence from different clinical trials showed no efficacy of ivermectin in outpatients with mild to moderate COVID-19 and a lack of evidence to prevent mortality in moderate to severe inpatients.[21] For these reasons, ivermectin was not approved for treating the disease, and the WHO recommended against its use in COVID-19.[22]

Among antibiotics, azithromycin has been the most studied and used antimicrobial agent since the pandemic's early phase, assuming that its immunomodulatory effects might reduce the consequences of the inflammatory storm produced by the disease.[23] Although randomized clinical trials comparing azithromycin versus the standard of care identified no effects of the drug in terms of mortality reduction and severity of the disease,[24,25] and an extensive Cochrane Systematic review and meta-analysis showed the lack of benefit of the use of azithromycin in mild, moderate, and severe COVID-19 in terms of all-cause mortality, worsening of clinical status, improvement of clinical status, quality of life, and adverse events.[26] For this reason, azithromycin and other antimicrobial agents are contraindicated in the treatment of any severity of COVID-19 unless evidence of confirmed or highly suspected bacterial coinfection.[3]

Regarding corticosteroids, the RECOVERY clinical trial demonstrated the benefits of the use of dexamethasone in COVID-19 inpatients. Participants were grouped by their respiratory support, and the benefits were observed only in the groups requiring oxygen support, with a 28-day all-cause mortality risk ratio of 0.64 (0.51-0.81) in the group under invasive mechanical ventilation, 0.82 (0.72-0.94) in the group receiving oxygen only, and 1.19 (0.92-1.55) in the group without oxygen requirements.[27] These results provided evidence to recommend the use of intravenous dexamethasone only in patients with oxygen necessities in moderate to severe COVID-19.[3] However, a Cochrane Systematic Review and meta-analysis concluded that the use of corticosteroids in oxygen-requiring COVID-19 patients failed to demonstrate superiority compared to the standard of care in terms of mortality reduction.[28]

Despite this evidence, our study found that pharmacological groups with contraindications in mild-to-moderate COVID-19 were clearly more used by people who received a medical prescription than the self-medicated population, revealing the necessity for continuing education programs for healthcare providers and more robust drug regulation programs in Ecuador.

Table 2. Frequency of use of pharmacological groups

ATC	Drugs group	Total n (%)	Consumption frequence	
			Prescription group n (%)	Self-medication group n (%)
Overall		692 (100.0)	491 (71.0)	201 (29.0)
H02	Corticosteroids	36 (5.2)	31 (6.3)	5 (2.5)
J01	Antibiotics	121 (17.5)	91 (18.5)	30 (14.9)
M01	NSAIDs	160 (23.1)	114 (23.2)	47 (22.9)
N02	Analgesics	197 (28.5)	129 (26.3)	68 (33.8)
P01	Antiparasitic agents	43 (6.2)	32 (6.5)	11 (5.5)
R06	Antihistamines	111 (16.0)	83 (16.9)	28 (13.9)
V	Others	24 (3.5)	11 (2.2)	13 (6.5)

ATC: Anatomical Therapeutic Chemical
NSAIDs: Nonsteroidal Anti-Inflammatory Drugs

Limitations: Among the study's limitations, we can mention the lack of addressing certain interesting variables, such as the severity of the COVID-19 infection and a more comprehensive and province-representative population.

CONCLUSION

In Ecuador, several drug groups without indication for mild to moderate COVID-19, such as corticosteroids, antibiotics, and antiparasitic drugs, were consumed under medical prescription, and the self-medicated population used primary symptom relief-associated drugs.

It is recommended that continuing education programs be conducted for healthcare providers to keep their knowledge updated regarding clinical practice guidelines and good prescribing practices, as well as qualitative studies to determine the main reasons for self-medication in the general population.

Finally, the Ministries of Health must develop more robust pharmacovigilance programs to follow prescription patterns and restricted drug use, especially in developing countries.

CONFLICTS OF INTEREST STATEMENT: The authors report no conflicts of interest in the development of the study.

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