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Self-medication in medical students during COVID-19 pandemic

Automedicación en estudiantes de medicina en época de pandemia por COVID-19

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ABSTRACT

Introduction: Self-medication is one of the most common health maintenance practices in the world, and has been observed more frequently after the emergence of the Covid-19 pandemic. In this context, responsible self-medication is very important to ensure public health and to alleviate health systems. Medical students are referents in society in terms of medication knowledge and therefore are promoters of medication use behaviors. **Objective:** evaluate self-medication practices among medical students in the context of non-specific symptoms associated or not with SARS-COV-2 infection at a university in Barranquilla, Colombia. **Methods:** Cross-sectional study conducted in a population of 2285 medical students. A sample of 350 randomly selected students was taken, and a self-administered survey was applied to inquire about aspects related to self-medication practices. **Results:** The prevalence of self-medication was 100%, and non-responsible self-medication practices were identified in 70.1% of the participants. The academic level of clinical sciences was associated with a high level of knowledge of medication (OR: 1.91; 95%CI: 1.1-3.6); however, these variables did not show an association with responsible self-medication practices. Additionally, 48% indicated that they would be willing to self-medicate without seeking medical assistance in case of symptoms probably related to COVID-19. **Conclusions:** A high frequency of non-responsible self-medication was found. Further studies are needed to facilitate effective interventions.

Keywords: Health knowledge; Attitudes; Practice; Self-medication; Medical student; COVID-19.

RESUMEN

Introduction: La automedicación es una práctica común para el mantenimiento de la salud, y se ha observado con mayor frecuencia durante la pandemia por COVID-19. En este contexto, la automedicación responsable cobra importancia para garantizar la salud y aliviar los sistemas sanitarios. Los estudiantes de medicina son referentes respecto al conocimientos sobre la medicación y por tanto son promotores de conductas sobre el uso de medicamentos. **Objetivo:** evaluar las prácticas de automedicación en estudiantes de medicina en época de pandemia por Covid-19. **Método:** Se realizó un estudio transversal en una población de 2285 estudiantes de medicina. Se tomó una muestra aleatoria de 350 estudiantes, y se aplicó una encuesta autoadministrada para indagar sobre prácticas de automedicación. **Resultados:** Se determinó una prevalencia de automedicación del 100%, y se identificaron prácticas no responsables de automedicación en el 70,1% de los participantes. Cursar nivel académico del ciclo de ciencias clínicas se asoció con alto nivel de conocimiento en medicación (OR: 1,91; IC95%: 1,1-3,6), sin embargo, estas variables no mostraron asociación con prácticas responsables de automedicación. Adicionalmente, el 48% indicó que estaría dispuesto a automedicarse sin solicitar asistencia médica en caso de presentar síntomas probablemente relacionados con COVID-19. **Conclusiones:** Se halló una alta frecuencia de automedicación no responsable. Se requieren estudios adicionales que faciliten intervenciones efectivas.

Palabras clave: Conocimientos; actitudes y práctica en salud; automedicación; estudiantes de medicina; COVID-19.

INTRODUCTION

Self-medication is using medications without a prescription or medical guidance to treat disorders or diseases. Self-medication is one of the most common practices in the world for health maintenance[1]. Although self-medication could bring benefits to health systems as an initial measure of primary care, it also poses health risks if not carried out appropriately. It has been shown that a high proportion of the population that self-medicates frequently makes errors in the use of medications related to the indication, dose, frequency of administration, treatment period, and omission of recommendations for safe use. The inappropriate practice of self-medication can thus lead to negative effects that include adverse drug reactions, masking of progressive diseases, overdose, microbial resistance, and drug dependence, among others[2,3].

Self-medication is a practice that is growing due to the evolution of the environment[4,5]. Especially in the context of the current COVID-19 pandemic, caused by the SARS-CoV-2 virus, an increase in the trend of self-medication has been observed[6]. In this scenario, the health risks derived from self-medication could be more significant concerning both diseases, such as COVID-19, whose clinical characteristics partly overlap with those of other common infectious diseases, resulting in more incredible difficulty in diagnosing and controlling the disease[7–9]. This suggests a more significant potential for adverse effects on global health associated with poor self-medication practices. Therefore, it is necessary to know the current situation regarding population trends in self-medication to guide measures that minimize the risks and maximize the benefits of this practice.

Self-medication patterns are variable; factors such as sex, age, characteristics of the social context, and medical knowledge may intervene in this behavior[10,11]. It has been observed that students and qualified professionals in the health area have a greater tendency to self-medicate compared to the rest of the general population. In medical students specifically, prevalences of self-medication between 50 and 99% have been reported. In this same population, non-responsible self-medication practices have been documented in proportions ranging between approximately 40 and 65%[4,10,12–14]. The study of self-medication in medical students is of particular interest given that, from their beginnings in the studies of the career, they are referents in society in terms of knowledge about disease treatment. In addition, they are future prescribers and promoters of self-care habits, so their current knowledge and behaviors could also influence their professional practice[15,16].

It is of great interest to permanently explore self-medication trends in medical students. This situation becomes more relevant in the current health context in which self-medication has become one of the main alternatives to treat health conditions, assuming an increase in the potential risk associated with using medications. The availability of this information could guide measures to promote a fair and responsible practice of self-medication[4,17].

The objective of the present study was to evaluate the self-medication practices of students of a university in Barranquilla, Colombia, for the treatment of mild symptoms similar to those of COVID-19 and other health problems in the context of the pandemic.

METHOD

Kind of investigation

A descriptive cross-sectional study was conducted in a Higher Education Institution in Barranquilla, Colombia, between August and October 2021.

Participants

The study population considered all the medical students (2,285) enrolled in the second academic period of 2021 at a Higher Education Institution in Barranquilla. The sample size was calculated with the Epidat 4.2 statistical software taking into account heterogeneity of 50%, a confidence level of 95%, and a margin of error of 5%. The calculated sample size was 330 individuals, and 350 participants were randomly selected.

Procedure and Instruments

An anonymous and self-administered survey was applied. The survey was sent to the institutional mail of the students with the support of teachers as intermediaries to promote the voluntary participation of the students selected for the sample in the different semesters.

The survey included four sections:

Section 1 (Sociodemographic variables): integrated sex, age, socioeconomic status, health regime, and academic semester.

Section 2 (medication knowledge): integrated a scale to assess knowledge about self-medication reported by previous studies[18,19]. The scale consists of 6 statements about the proper use of medications, each with three response options: agree, disagree, and don't know. For the evaluation of the results, it was considered that each correct question would contribute one point (1), and each incorrect answer would subtract one point (-1). The answer "don't know" would contribute zero (0) points. The total sum of the score was as follows: 0 points, poor knowledge of self-medication; between one and three points, moderate knowledge; and four or more points, high knowledge about medicines.

Section 3 (responsible self-medication practices): This was assessed using five previously reported closed questions[18–20]. Each question has two possible answers: "Yes" and "No." It was considered that an individual carried out a reasonable practice of self-medication if they answered "no" to all the questions. Conversely, those who answered "yes" to at least one question were considered to be carrying out an irrational practice of self-medication.

Section 4 (Self-medication practices): The health conditions that motivated self-medication and the medications used through this practice were inquired. In addition, they inquired about the measures they would adopt in the hypothetical case of presenting symptoms similar to those of COVID-19, such as cough, sore throat, fever, or tiredness.

Statistic analysis

The SPSS software (Statistical Package for Social Studies, version 25.0) is used for data analysis. Absolute and relative frequencies represent the results. The *Odds Ratio (OR)* calculation and its respective confidence interval (95%CI) were applied to establish an association between categorical variables and non-responsible self-medication practices.

Declaration on ethical aspects

This research has the approval of the Ethics Committee of the Universidad Metropolitana, Colombia, Act No. 516 of June 29, 2021, guaranteeing compliance with the provisions of the Declaration of Helsinki of 1975 and Resolution 8430 of 1993 of the Ministry of Health of Colombia for research with human beings. The information was collected anonymously upon presentation of informed consent to protect the identity and rights of the participants.

RESULTS

In the distribution by sociodemographic variables of the sample, a higher frequency of females (66.6%) and ages under 25 years (97.7%, mean 20.1 ± 2.1 years) were observed. Table 1 describes the distribution of study subjects according to sociodemographic variables.

Table 1. Characteristics of study subjects based on Responsible and Non-Responsible self-medication practices.

Variable	Practices Not Responsible (n=248)		Responsible Practices (n=102)		Total	OR (95% CI)
	No.	%	No.	%		
Sex						
Male	87	35,1	30	29,4	117	1,30
Female	161	64,9	72	70,6	233	(0,78 - 2,14)
Age (years)						
15-19	104	41,9	41	40,1	145	1,07
≥20	144	58	61	59,8	197	(0,67 - 1,72)
Social stratum						
Low (1 and 2)	112	45,2	44	43,1	156	1,08
Medium (3 and 4)/high (5 and 6)	136	54,9	58	56,8	194	(0,68 - 1,73)
Health system affiliation regime						
Contributory	184	74,2	73	71,6	257	1,14
Subsidized	64	25,8	29	28,4	93	(0,68 - 1,91)
Semester Category						
Basic Science Cycle	132	53,2	55	53,9	187	0,97
Clinical Sciences Cycle	116	46,8	47	46,1	163	(0,61 - 1,54)
Knowledge about medication						
Poor	38	15,3	17	16,7	55	0,90
Moderate/High	210	84,7	85	83,3	295	(0,48 - 1,69)

Additionally, all the participants agreed to have self-medicated at some time in the last 18 months (time elapsed since the detection of the first case of COVID-19 in Colombia), and it was established that 70.1% of the study subjects carried out non-responsible practices of self-medication.

In the bivariate analysis, none of the study variables, including knowledge, semester category, and sociodemographic variables, showed a statistically significant association with non-responsible self-medication practices since the distributions according to the categories of the variables in question were very similar between the group with responsible practices and that of non-responsible self-medication practices (Table 1). On the other hand, a statistically significant association was found between taking semesters of clinical sciences and having a high knowledge of medication (OR=1.91, 95%CI 1.1-3.6).

The principal reasons for self-medication in the study subjects included headaches, flu/common cold symptoms, and fever. Other frequent reasons for self-medication are also described in Table 2. Likewise, the most commonly used medications were analgesics/antipyretics, antiallergics, and decongestants (Table 3).

Finally, when inquiring about conduct in the event of a symptomatic presentation of cough, fever, and tiredness (symptoms associated with COVID-19 infection), 48% of those surveyed indicated that they would prefer to self-medicate without resorting to medical assistance, 12 .6% would initially self-medicate while accessing medical services and 39.4% would prefer medical assistance and would avoid self-medicating. Of the total number of subjects who considered self-medication (212 individuals), the majority would treat the symptoms with analgesics/antipyretics (43.8%), decongestants (33.4%), and home/natural treatments (21.4%) alone or in combination with other therapeutic products. A smaller proportion indicated they would use antibiotics (9.9%) and antivirals (9.4%). Table 4 shows the distribution of these proportions between the group that would choose exclusive self-medication and the group that, in addition to self-medication, would request medical attention.

Table 2. Frequency of self-medication according to health problems/conditions.

Health problem/condition	No.	%
Headaches	316	90,3
Flu symptoms/common cold	279	79,7
Fever	229	65,4
Menstrual colic	194	55,4
Muscle pains	187	53,4
Allergies	150	42,9
Diarrhea	144	41,1
Constipation	69	19,7
Pregnancy prevention	65	18,6
Nausea/vomiting	59	16,9
Fatigue/tiredness	39	11,1
Skin/mucosal infections	36	10,3
Overweight/obesity	26	7,4
Anxiety/Insomnia	25	7,1

Table 3. Frequency of self-medication according to the therapeutic category of drugs/products with active ingredients

Therapeutic category	No.	%
Analgesics/antipyretics	288	82,3
Anti-allergy	176	50,3
Decongestants	163	46,6
Vitamins/minerals	160	45,7
Laxatives	113	32,3
Antibiotics	107	30,6
Antidiarrheals	101	28,9
Energy drinks	72	20,6
Medicines to treat gastric ulcer/heartburn	70	20,0
Contraceptives	65	18,6
Medications to increase muscle mass	30	8,6
Weight loss medications	26	7,4
Sedatives/anxiolytics	18	5,1

Table 4. Treatments that respondents would use to treat symptoms associated with COVID-19 infection.

Therapeutic category	Exclusive self-medication		Self-medication + medical assistance	
	n	%	n	%
Analgesics/antipyretics	82	38,5	17	8,0
Decongestants	55	25,9	16	7,5
Home/natural treatments	36	17,2	9	4,2
Vitamins/minerals	25	11,8	8	3,8
Antibiotics	17	8,0	4	1,9
Antivirals	14	6,6	6	2,8

DISCUSSION

Among the findings, the high tendency to self-medication stands out, and essential proportions of subjects with insufficient knowledge and non-responsible practices of self-medication. All the study subjects acknowledged having self-medicated at some time during the time that the COVID-19 pandemic had elapsed in Colombia. Previous studies on medical students from Colombian universities report high prevalences of self-medication, although in proportions below 100%. Lopez-Cabra *et al*. [14] found a prevalence of self-medication of 79.3% in medical students at the Universidad del Rosario in Bogotá. Another investigation by González -Muñoz

et al.[21] reported that 89.8% of the medical students surveyed at the University of Córdoba, Colombia, stated that they self-medicate. Unlike this study, the referenced investigations were carried out in periods prior to the start of the COVID-19 pandemic. There is evidence of the increase in self-medication tendencies in the general population promoted by the pandemic situation[6].

Interestingly, it was observed that most students have a high or moderate level of knowledge about medication. However, more than 70% practice self-medication in a non-responsible way. Consistently, in the bivariate analysis, no association was found between these two variables, and no differences were found in self-medication practices between semesters of the clinical cycle compared to those of the basic cycle. Other studies also agree that more than adequate knowledge about medication is needed to guarantee correct practice[14,22]. In this sense, intervention strategies aimed at modifying the way self-formulated medications are used should focus on raising real awareness about the risks of non-responsible self-medication practices and ensure the understanding and application of the minimum criteria for self-medication. responsible[23,24].

Regarding the reasons for self-medication, the participants indicated health conditions associated with pain more frequently. Consequently, the most used therapeutic category was analgesics/antipyretics. These results coincide with a large number of prevalence studies on self-medication[12,14,18,25,26]. This general trend could be explained by considering that pain is the symptom most frequently associated with numerous common health problems. In addition, extensive arsenals of analgesic drugs are over-the-counter and widely accessible due to availability and low cost. Although this is a group of drugs with a good safety profile, the indiscriminate use of analgesics could lead to the development or complication of cardiovascular, gastrointestinal, and renal disorders. Therefore, to minimize health risks, it is advisable to promote the rational use of this type of medication[27].

On the other hand, it is also interesting that more than 60% of the participants indicated that they would opt for self-medication, either exclusively or provisionally, in case of presenting common symptoms associated with COVID-19, such as cough, sore throat, fever, or tiredness. Since these are manifestations that have also been related to the clinical expression of other endemic infectious diseases in the Colombian Caribbean, the natural consequence of this behavior is underdiagnosis, underreporting, or risk of complications in the event of a possible SARS-CoV-2 virus infection or other pathogens[28–30].

Among the therapeutic options that the participants indicated to treat symptoms related to COVID-19, the use of home/natural treatments and antibiotics is of particular interest. Many home/natural treatments lack scientific evidence of their safety and efficacy[31]. Likewise, the use of antibiotics would not only result in therapeutic failure in the case of non-bacterial infections but also contribute to the problem of antibiotic resistance due to their irrational use[32]. Taken as a whole, the preceding constitutes hot spots susceptible to intervention again through training in responsible self-medication referred to above.

On the other hand, regarding the strengths of the study, it is worth noting that the problem of self-medication in medical students was addressed, this time in the context of the health emergency caused by COVID-19. Another notable aspect is the application of randomization in sample selection as a strategy to control selection bias, typical in cross-sectional studies33. With this, it was sought to ensure the sample's representativeness to prevent the affectation on the investigation's conclusions. On the other hand, within the limitations of the research, it is considered that the results cannot be extrapolated to the community of medical students from other institutions, and, finally, the lack of information on the prevalence of self-medication in the study population prior to the period of the COVID-19 pandemic.

This study provides relevant information on trends in self-medication among medical students during the pandemic era in Colombia. The results suggest the need to develop complementary research that allows broadening the knowledge about the general situation of self-medication in medical students and that facilitates the design of effective interventions to significantly reduce the practice of non-responsible self-medication in this academic community. The effects of these interventions have great potential to positively impact the health outcomes derived from the practice of self-medication in the rest of the population during and after the COVID-19 pandemic.

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DECLARATION ON CONFLICT OF INTEREST

The authors declare to have no conflict of interest.

AUTHORS' CONTRIBUTION

Walter Ángel Martínez De La Rosa: Conception of the research idea, study design, survey design, interpretation of the results, writing, and approval of the final manuscript.

Alexander Rodríguez Sanjuán: Study design, survey design, review, correction, and approval of the final manuscript.

Mareyis Judith Peláez Cerpa: Logistics management in data collection, draft writing, review, and approval of the final manuscript.

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Yoleydis Elena Collazos Lara: Monitoring of project execution, administrative procedures, and logistics in data collection, review, and final approval of the manuscript.

Xilene Mendoza Sánchez: Study design, statistical analysis, writing of the results, review, and approval of the final manuscript.

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