



Prevalence and Assessment of Self-Medication in COVID-19

Corresponding Author: Name: Dr. Shantanu Chitale

Address: Dr. D. Y. Patil Medical College, Hospital & Research Centre, Pimpri, Pune, 411018

Mobile no.: +91-9762037400

E-mail: chitaleshantanu1@gmail.com

1. Dr. Sarita Mulkalwar:

MBBS, MD

Professor, Department of Pharmacology

Dr. D. Y. Patil Medical College, Hospital & Research Centre, Pimpri, Pune

E-mail: sarita.mulkalwar@dpu.edu.in

2. Tanvi Lijhara

Third year MBBS student

Dr. D. Y. Patil Medical College, Hospital & Research Centre, Pimpri, Pune

E-mail: tanvi.lijhara@hotmail.com

3. Dr. Shantanu Chitale (Corresponding Author)

MBBS, Resident Doctor

Department of Pharmacology

Dr. D. Y. Patil Medical College, Hospital & Research Centre, Pimpri, Pune

E-mail: chitaleshantanu1@gmail.com

4. Dr. Abhi Patel

MBBS, Resident Doctor

Department of Pharmacology

Dr. D. Y. Patil Medical College, Hospital & Research Centre, Pimpri, Pune

E-mail: patelabhi15@gmail.com

5. Kaashvi Gupta

Third year MBBS student

Dr. D. Y. Patil Medical College, Hospital & Research Centre, Pimpri, Pune

E-mail: kaashvi.gupta.2602@gmail.com

6. Dr. Prachi Dandage

Department of Pharmacology

Dr. D. Y. Patil Medical College, Hospital & Research Centre, Pimpri, Pune

E-mail: prachidandage301@gmail.com

Abstract:

This study aimed to assess the prevalence of self-medication to treat and prevent COVID-19.

The study objective was estimation of the extent of self-medication for treatment and prevention of COVID-19 and the factors affecting it. In this descriptive cross-sectional study among the Indian population, all participants filled a Google Form based questionnaire. It consisted of questions related to demographic details and self-medication practices of the participant during the COVID-19 pandemic. To see the extent of self-medication for

prevention of COVID-19, data was collected from all the participants despite their COVID-19 status. The prevalence of self-medication in our study participants (n=413) was 27.4% (131). Self-medication was noted higher in COVID-19 negative participants (28.2%), males (28.8%), age group of >60 years (35.3%) and participants with postgraduation degree (30.4%). Vitamin C was the most commonly self-medicated drug whereas Favipiravir and steroid were taken the least. There is a dire need to regulate the extent of self-medication taken by general population to avoid misuse and abuse of drugs along with incorrect self-diagnosis, drug interactions, masking of infection, drug resistance, incorrect dosage and infrequent but severe adverse drug reactions.

Key Words: Self-medication, Pandemic, Over-the-counter drugs, Vitamin C, COVID- 19

Introduction:

Entire world experienced the wrath of COVID-19 pandemic, which affected millions of people across the globe. India specifically was one of the most severely affected countries, with over four hundred thousand fatalities.

During this period, the nation saw a large rise in the number of people who opted for self-medication, instead of approaching trained health care professionals. The media propagated home isolation and quarantine for all individuals, healthy, unhealthy, or even those showing mild symptoms. A lot of citizens extrapolated these guidelines and avoided visiting medical practitioners as well, unless it was an absolute emergency, leading to self-medication.

The World Health Organization (WHO) defines self-medication as the selection and utilization of medicines to treat self-recognized symptoms or ailments without consulting a physician.^[1]

Self-medication has both positive and negative impacts. It makes people feel empowered, and more in control of their treatment. While it helps the healthcare system by reducing the load

on the doctors, it is beneficial only if all individuals are well informed and aware of what symptoms can be dealt with at home. There are various risks involved with self-medication such as drug interactions, incorrect drug combinations, dosages, or frequency. These ill effects are worse in the case of pediatric, pregnant and geriatric patients.

Taking medicines without the prescription of a doctor can be harmful or dangerous in many ways. Even if it is a non-prescription drug (over the counter), there can be consequences. It may not be effective against the disease and may lead to worsening of the condition. It could also interact with some other medications that the patient is taking for another ailment. In the case of self-medication with antimicrobials, it can lead to resistance, which will render the drug ineffective in the future. In a nutshell, self-medication can lead to worsening of a patient's condition, adverse effects, drug interactions, drug dependence, and antimicrobial resistance. Hence there is a need to control and regulate drug distribution and educate the general population about the consequences.^[2]

Various drugs like Paracetamol (PCM), vitamins and minerals such as Vitamin C, Vitamin D, and Zinc, antimicrobials including Azithromycin, Ivermectin, Doxycycline and Hydroxychloroquine (HCQ), antihistamines such as Fexofenadine, antivirals like Favipiravir and steroids such as Methylprednisolone were used for self-medication during the pandemic.^[3]

Case studies have shown severe adverse effects with steroid abuse. Overuse of steroids also showed severe disease progression or even fatalities in some conditions when taken during the first few days of this novel virus infection.^[4]

Another drug commonly misused was Azithromycin. Using this drug without prescription or without need can make it ineffective when actually needed. With certain other antimicrobials such as Doxycycline, supplementary drugs like Pantoprazole and Probiotics were also prescribed without which the patient experiences abdominal discomfort.^[5]

A lot of ill advice circulated during the pandemic either through content creators on media platforms like YouTube, Facebook and Instagram or pharmacists in the local pharmacy shops. India documented the use of HCQ without a prescription to prevent COVID-19.^[6] This self-medication trend witnessed an increase worldwide based on the number of Google searches since the pandemic started.^[7]

Some people also consumed medicines based on recommendations from friends and family. The practice of using old prescriptions from previously affected relatives or repetition of their own old prescriptions to procure medications for similar symptoms was also done by some patients. Self-medication may or may not always lead to severe consequences but it is important to remember that there is definitely a possibility of conditions ranging from minor allergic reactions to life threatening flare-ups of the pre-existing ailments that should be avoided.

Therefore, this study was undertaken to find out the prevalence of self-medication among people with COVID 19.

Methodology

STUDY DESIGN:

A descriptive cross-sectional study was conducted among the Indian population above 18 years of age and who understand English. The study participants were asked to fill a Google Form based questionnaire. The questionnaire was pre-validated by the clinicians and pharmacologists. It consisted of questions related to practices about self-medication during the COVID-19 pandemic. Demographic data was collected to assess the effect of demographic characteristics on the practice of self-medication.

To see the extent of self-medication for the prevention of COVID-19, data were collected from all the participants despite their COVID-19 status. A different set of questions was asked to COVID-19 positive patients to know the effect of self-medication on the duration, progression and severity of the disease. The form was circulated via various social media

platforms such as WhatsApp, Facebook, etc. The study was approved by the Institutional Ethics Committee.

STUDY DURATION:

The study was conducted from February 2022 to June 2022.

SAMPLE SIZE:

As the COVID-19 pandemic was going on the sample size was duration-based. In our study, any participant who has taken one or more medications without a physician's prescription was noted as a single case of self-medication. Drugs taken into consideration were Paracetamol, Vitamin C, Vitamin D, Zinc, Fexofenadine, Azithromycin, Doxycycline, Ivermectin, Hydroxychloroquine (HCQ), Favipiravir and steroids. COVID-19 positive status was noted on the basis of RTPCR test result.

ELIGIBILITY CRITERIA:

Inclusion Criteria:

- Age > 18 years
- Understand basic English language
- Willing to participate in the study

Exclusion Criteria:

- A person residing outside India

STATISTICAL ANALYSIS:

The qualitative data is presented in the form of numbers and percentages using EpiInfo™ and Microsoft Excel.

Results:

A total of 417 responses were recorded, we have excluded 4 participants who filled up the form but did not reside in India making the study population of 413 participants.

Prevalence of self-medication:

Out of the total 413 participants, 68.7% (284) tested negative for COVID-19 while 31.3% (129) tested positive. Self-medication was noted in 27.4% (113) participants of the study population [Figure 1]. In COVID-19 positive and negative participants self-medication was noted in 25.6% and 28.2% of participants respectively. Prevalence of self-medication was slightly higher in male participants (28.8%) compared to female participants (25.3%). One person in the study identified as non-binary gender was COVID positive and also took self-medication. In different age groups, the highest self-medication was seen in participants with age more than 60 years (35.3%), followed by 41-60 years (29.9%), and almost the same in participants of age 18-20 years and 21-40 years which was 25.0% and 24.8% respectively. In different educational groups of participants who were 12th pass, undergraduate and postgraduate, the prevalence was noted at 26.2%, 24.4% and 30.4% respectively. [Table 1]

Self-medication drug(s) taken by participants who tested positive for COVID-19:

In 31.23% (129) participants who tested positive for COVID-19, it was observed that 12.41% (16) respondents resorted to self-medication for various drugs, 13.95% (18) reportedly consumed Paracetamol, 17.05% (22) consumed Vitamin C, 13.95% (18) consumed Vitamin D, 13.95% (18) consumed Zinc, 8.53% (11) consumed Azithromycin. Fexofenadine and Ivermectin were consumed by 5.43% (7) of the participants each while 3.88% (5) took Doxycycline. The prevalence of self-medication for HCQ, steroids, and Favipiravir was 3.10% (4) each [Figure 2; Table 2]. It should be noted that the same respondent could have used more than one drug at a time.

Self-medication drug(s) have been taken by participants who tested negative for COVID-19:

About 68.7% (284) respondents tested negative for COVID-19, and it was observed that 23.2% (66) respondents had consumed Vitamin C during lockdown by reading about its benefits on the internet and hearing about it on the news. While 12.7% (36) consumed Vitamin D,

15.1% (43) Zinc, 6.0% (17) Azithromycin, 3.9% (11) Ivermectin, 2.5% (7) used HCQ while 1.1% (3) had consumed Doxycycline for the same reason [Figure 2; Table 3]. These drugs were also prescribed for preventive or treatment purposes by various doctors. It should be noted that the same respondent may have used more than one drug at a time.

Drugs used for self-medication:

Most common drugs consumed as self-medication were the drugs known to be an immunity booster in this pandemic by laypersons like Vitamin C, Vitamin D and Zinc. Out of 113 participants who took self-medication, 98 (86.7%) had taken one or more medication out of these three medications from which Vitamin C was the highest used drug by 88 (77.8%) participants followed by Zinc 61 (53.9%) and Vitamin D 54 (47.7%). Around 31 (27.4%) self-medicated participants had taken one or other kinds of antibiotics medication like Azithromycin 28 (24.7%) or Doxycycline 8 (7%). Few COVID-19 positive participants 19 (14.7%) had taken symptomatic self-medication including drugs like Paracetamol 18 (94.7%) and antihistamines like Fexofenadine 7 (36.8%). The least common drugs consumed as self-medication were steroids 4 (21%) and Favipiravir 4 (21%) in COVID-19 positive participants.

Source of information regarding drugs:

Out of all respondents who tested positive for COVID-19, 87.6% (113) of them had consulted a doctor either in person or via teleconsultation. While only 0.8% (1) got medicine as suggested by a pharmacist, 4.6% (6) took advice from their relatives, 1.5% (2) saw information on social media about medicines and 5.4% (7) participants did not consult anyone at all. Out of 33 self-medicated participants in the COVID-19 positive group consult, 32 (97%) respondents reported that their symptoms were cured despite self-medication while 3% (1) experienced worsening symptoms after self-medication of various drugs.

Discussion:

Self-medication may be viewed as a large component of self-care by a few since it relies

mostly on the expertise and experience of the consumer. However, it is associated with various risks.

The most important dangers of self-medication are-

- a. Multiple drug use and risk of interactions
- b. Misdiagnosis and incorrect choice of therapy
- c. Over the counter (OTC) drug abuse^[8]

This shows that the risks of self-medication outweigh its advantages and establishes the importance of this study, especially in the COVID-19 era, where the complications could have been life-threatening.^[9]

Self-medication is more commonly observed in developing nations, where it has both social and economic implications. In India, it was observed to be 53.57%, and familiarity with the medicines was a common cause.^[10] M. Parulekar et al., says that lack of finances and infrastructure along with various cultural-cognitive beliefs were some of the common reasons to practice self-medication in a developing country.^[11] In another study conducted by Lal, Vivek et al., lack of time and finances were found to be common intentions.^[12] In our study self-medication was observed in 27.4 % (113) participants, compared to a study conducted by Joseph N in which self-medication practice was seen in 34.2% (77) participants.^[13]

Self-medication has a multitude of hazards such as failure to recognize pharmaceutical risks, rare but severe adverse effects, failure to recognize and report adverse effects, inadequate or excessive usage, incorrect route of administration, and improper storage of the medicines.^[14] In our study, out of all the participants who tested positive for COVID-19, 3.10% (1) reported that their symptoms worsened after opting for self-medication and hence required professional medical intervention. If this data is extrapolated to the total number of confirmed cases in India affected (43,010,971 as of 22nd March 2022),^[15] approximately 1.333 million individuals would have suffered worsening of their health because they did not seek medical advice before self-medicating and their disease progressed. A huge number

such as this indicates that there are a variety of factors, ranging from lack of awareness regarding the need for professional medical advice to the actual lack of medical advice.

In our study, the most common drugs used for self-medication purposes are referred to as immunity boosters by a layperson like Vitamin C, D and Zinc. Out of all self-medicated participants in our study 98 (86.7%) had consumed at least one of these drugs. The most commonly abused drug was Vitamin C, consumed by a total of 88 (21.3%) participants for self-medication in our study. A study conducted in Togo showcased 27.6% of their study subjects took Vitamin C as self-medication.^[16] Various health care reports have shown that consuming more than 6g of this medicine can cause migraine. It also acidifies urine which increases the risk of kidney stones.^[17] Despite such adverse effects, this drug is consumed without proper prescription. Vitamin D was also consumed in high doses based on various studies available online.^[18] In our study, we found that 54 (13.1%) participants have taken Vitamin D as self-medication. While Vitamin D deficiencies have been found in 80-90% of Indians,^[19] such high doses can prove to be harmful in the long run, this will only be confirmed once more data is available on the effects of intake of long-term high dose vitamins during COVID-19. Initially, Zinc supplementation was also recommended for COVID-19 treatment and prevention, despite the dearth of sufficient evidence. Our study shows that 61 (14.8%) participants have taken Zinc without any medical supervision. However, it was recommended only within the normal dietary requirements. Overconsumption of this supplement can be attributed to the lack of awareness in the general public. Excess Zinc over an extended period of time can lead to reduced Copper levels, reduced immunity, and low levels of high-density lipoproteins (good cholesterol).^[20]

A common OTC drug, Paracetamol (PCM) was consumed without prescription by 13.95% (tested positive) in our study. The prevalence of self-directed PCM consumption has always been high, especially among adolescents^[21] and the pattern has continued during the pandemic. A study done by Joseph N noted that 87% (67) of participants in their study had taken

PCM.^[13] According to a study conducted in the United Kingdom, patients with unintentional PCM overdose had organ failure at the time of admission with a very poor prognosis leading to either transplant or end-of-life care. ^[22]PCM is commonly abused owing to its easy accessibility and the misconception of it being a very safe drug. PCM is capable of causing dangerous skin reactions, Stevens-Johnson syndrome and toxic epidermal necrolysis, these conditions are painful and can lead to blindness and even death in severe cases. ^[23] Another common OTC drug used without medical opinion was Azithromycin by 28 (6.8%) participants, compared to a study done by Arnold J. that noted 1.2% of their study subjects consumed Azithromycin as self-medication. ^[16] Azithromycin has significant adverse effects such as QT prolongation and hence shouldn't be taken without medical supervision, especially if an individual is a known cardiac patient. ^[21] HCQ despite being a prescription drug was sold OTC by pharmacists regardless of its contraindications for diabetic patients and risks of inducing retinopathy on prolonged use. It was used by 11 (2.7%) participants in our study without medical supervision. This portrays that pharmacists play an active role in communicating misinformation about medications due to the lack of enough formal education. ^[24] About 7 (1.7%) of the study participants took Fexofenadine without prescription by. It is important to note that this medicine should be avoided with consumption of grapefruit juice and apple juice due to evidence of interaction. ^[25]

Ivermectin was used for both treatment and prevention of COVID-19 in 18 (4.4%) participants, studies have shown that this medicine is most effective for treatment when taken early in the clinical course by reducing the chances of progression to severe disease. ^[26] However, there is no reliable data to prove the efficacy of Ivermectin for treatment or prevention of COVID-19 ^[27] and hence has not received FDA approval for COVID-19. ^[28] Similar situations have been reported for Doxycycline which was consumed by 8 (1.9%) study participants. Consumption of steroids comes with its drawbacks such as incorrect or excess dose and even consumption at an incorrect phase of the illness. We have found 4 (1%)

participants in our study using it without any kind of advice from their doctors. Using these drugs during the first few days of the infection led to more severe disease progression, which in some cases led to death.^[6] In a systematic review by Quincho-Lopez et al., data was recorded from a letter to the editor claiming that corticosteroid use without prescription was 17% in their study population.^[29]

Antivirals such as Favipiravir were also consumed without a prescription. Keeping in mind that these medicines cause raised liver enzymes, and QT prolongation,^[30] therefore should be taken only if prescribed by the doctor, especially if the patient has any pre-existing condition or is pregnant.

One of the biggest concerns in this whole scenario seems to be the availability of prescription medicines without a prescription. Pharmacists practiced reckless and unethical selling of drugs by defying the law^[31] during the pandemic and continue to do so. This needs some urgent attention from the concerned authorities.

Limitations:

Since all of the data collection was done online and anonymously, there was no way of following up with the study participants. We did not take into consideration the dose and duration for which participants have taken medicines. Follow up with these patients would have been beneficial to assess if their preventiv medicinal regimen showed the desired results or not. This also made it difficult to comment on progression or worsening of disease due to self-medication.

Conclusion:

Self-medication is a major health concern in India, and the prevalence has increased during the pandemic. A holistic approach should be taken to curb this problem, which could include spreading awareness about the risks of self-medication, and increasing strictness regarding the retail of medicines without prescription and the following of essential guidelines. Sensitizing

everyone about the unfavorable outcomes of self-medication, even in the absence of a pandemic is vital. In the coming age of social media, it is also very essential to restrict the spread of false information by adding warnings about self-medication whenever such content is posted online. Mass media should be used for the benefit by carefully spreading awareness and disseminate information about the pros and cons of self-medication, thereby making it a real boon for the medical fraternity.

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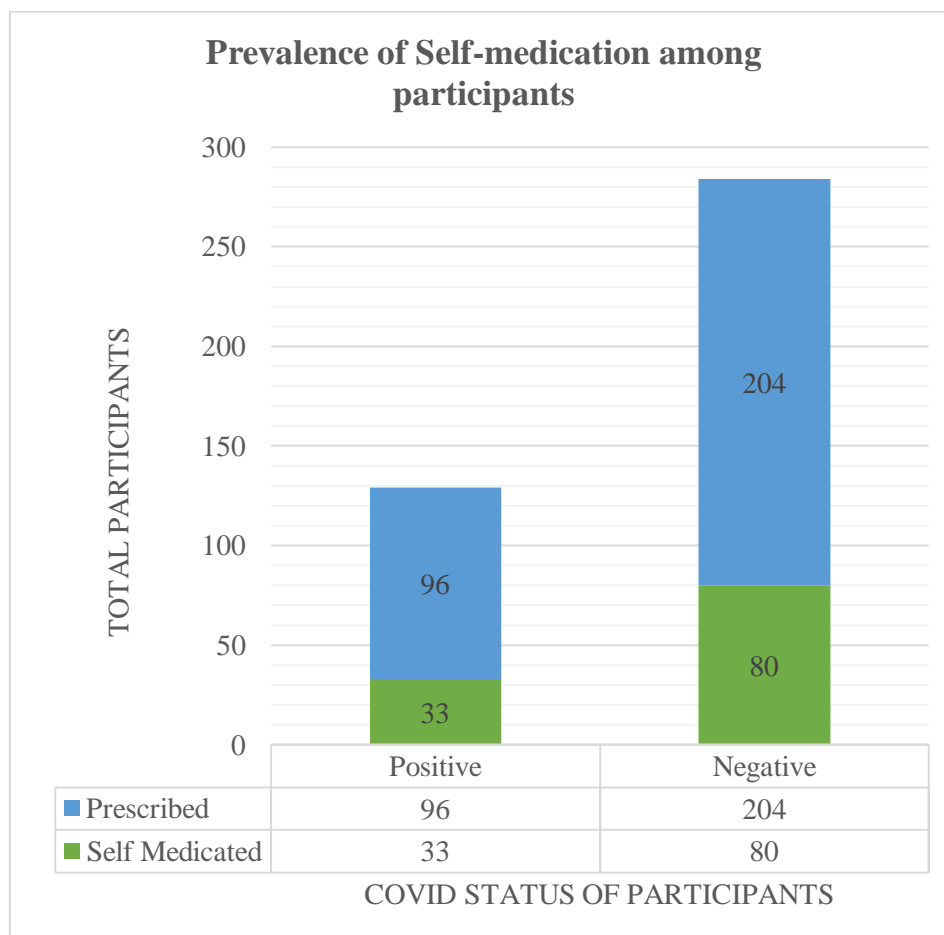


Figure 1: Prevalence of Self-medication among participants.

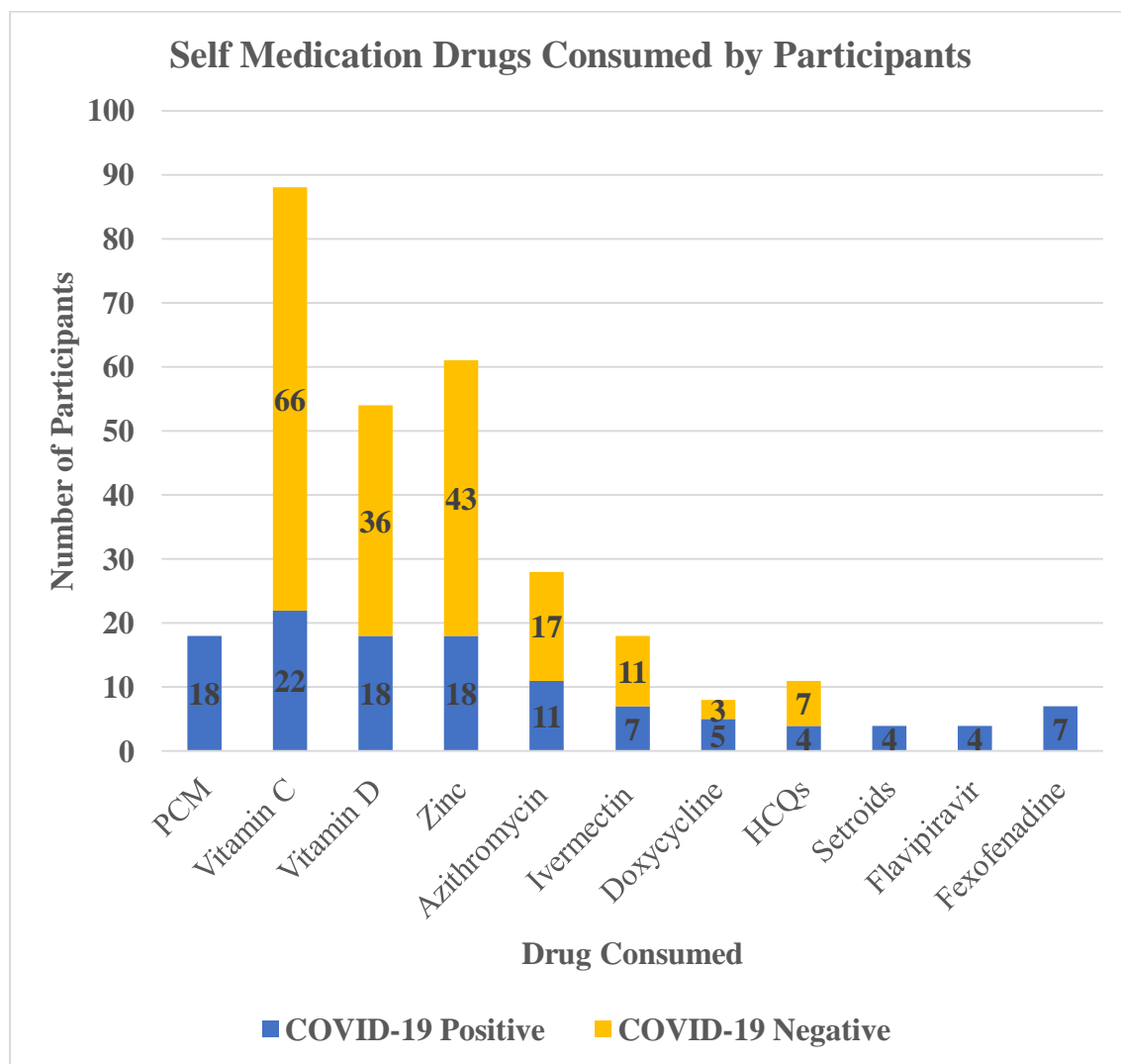


Figure 2: Self-Medication drugs consumed by participants.

Prevalence of Self-Medication in Different Groups.			
	Participants tested Positive for COVID- 19 (n=33)	Participants tested Negative for COVID- 19 (n=80)	TOTAL (113)
Gender			
Male (n=222)	21 (27.3%)	43 (29.7%)	64 (28.8%)
Female (n=190)	11 (21.6%)	37 (26.6%)	48 (25.3%)
Other (n=01)	01 (100.0%)	00 (00.0%)	01 (100.0%)
Age(years)			
18-20 (n=108)	09 (33.3%)	18 (22.2%)	27 (25.0%)
21-40 (n=121)	10 (30.3%)	20 (22.7%)	30 (24.8%)
41-60 (n=167)	12 (19.4%)	38 (36.2%)	50 (29.9%)
Over60 (n=17)	02 (28.6%)	04 (40.0%)	06 (35.3%)
Level of education			
12th pass (n=61)	06 (35.3%)	10 (22.7%)	16 (26.2%)
Under graduate (n=168)	11 (22.4%)	30 (25.2%)	41 (24.4%)
Post graduate (n=184)	16 (25.4%)	40 (33.1%)	56 (30.4%)

Table. 1: Prevalence of Self-Medication in Different Groups.

Drugs Consumed by Participants who tested Positive for COVID -19

Drugs consumed	Self-Medicating	Prescribed	Did not take
PCM	18	99	12
Vitamin C	22	102	5
Vitamin D	18	73	38
Zinc	18	100	11
Azithromycin	11	69	49
Ivermectin	7	65	57
Doxycycline	5	48	76
HCQs	4	13	112
Steroids	4	27	98
Favipiravir	4	29	96
Fexofenadine	7	27	95

Table.2: Drugs consumed by participants who tested positive for COVID -19

Drugs Consumed by Participants who tested Negative for COVID -19			
Drugs consumed	Self-Medicating	Prescribed	Did not take
Vitamin C	66	104	114
Vitamin D	36	103	145
Zinc	43	81	160
Azithromycin	17	38	229
Ivermectin	11	16	257
Doxycycline	3	12	269
HCQs	7	14	263

Table. 3: Drugs consumed by participants who tested negative for COVID -19