



SELF-MEDICATION PRACTICES DURING THE COVID-19 PANDEMIC: A CROSS-SECTIONAL STUDY

Clinical Research

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ABSTRACT

Background and Objectives: The COVID-19 pandemic caused by SARS-CoV-2 virus has transformed the living style of people around the world. The access to medical services and medicines has also been challenge which has led to encouraged the self-medication (SM) behaviours. The most frequently drugs for self-medications are analgesics, antipyretics, antitussives, antidiarrheal, calcium and vitamin supplements, anabolic steroids, sedatives, certain antibiotics, and many herbal and homeopathic remedies. **Methods:** An anonymous web-based survey invited all the participants to answer a google web-based questionnaire. Basic information on study was given to obtain a consent for participation. The total 30 questions covered self-medication experience and issues related to it. We sought the participant asked the researchers to report their self-medication experiences. This was captured by their response to a multiple choice questionnaire. The study design and the questionnaire was approved by the institutional ethics committee. **Conclusions:** SM was mostly responsible aiming at self-care, promote health, prevention and treatment of ailments. It aided to lower economic burden along with providing basic healthcare during pandemic. However, inappropriate and unnecessary SM due to incorrect diagnosis, related adverse effects, drug interactions, antibiotic resistance should not be overlooked. In some cases it added to expenses. It is safer to take medication under telemedicine guidance from registered medical practitioner.

KEYWORDS

INTRODUCTION

The COVID-19 pandemic caused by SARS-CoV-2 virus has transformed the living style of people around the world. From December 2019 till date millions of people got infected with this virus across different countries.¹ As a containment measure to control the pandemic, some several measure mandated social distancing, the identification and isolation of infected people, and the quarantining of people travelled from high risk zone and were close proximity to COVID-19 patients. The access to medical services and medicines has also been challenging which has led to encourage the self-medication (SM) behaviours.

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.² It also involves the utilization or re-usage of prior prescribed or unused drugs, direct buying of prescription drugs without physician advice and over-the-counter (OTC) drugs.³ Self-medication is a common practice globally, found in both developed and developing countries with a prevalence of 32.5–81.5% worldwide.^{4,5,6} It is usually observed in the case of chronic diseases, recurring diseases, or symptoms or minor ailments.⁶ The most frequently used drugs for self-medications are analgesics, antipyretics, antitussives, antidiarrheal, calcium and vitamin supplements, anabolic steroids, sedatives, certain antibiotics, and many herbal and homeopathic remedies.⁵

Like most of the countries, the COVID-19 pandemic triggered a general lock-down in India as well. In such situation the recourse which the general people has is to self-help, self-care and self-medicate.⁷ The situation gets worsened with the surge in fake news and misinformation that accompanied the COVID-19 pandemic. Even any news related to the publications on news any scientific study (*in vitro*, pre-clinical or clinical) which focused on possible preventive or treatment option tempted people to try it out.^{8,9,10} This led to even self-medication of various prescription drugs that have no confirmed clinical efficacy against SARS-CoV-2.¹¹ These drugs included the antimalaria drug hydroxychloroquine, the antibiotic azithromycin, the non-steroidal anti-inflammatory drug (NSAID) ibuprofen and the antiretroviral lopinavir and ritonavir. Because of the lack of regulatory mechanism to monitor SM this resulted in a shortage of these drugs for patients that need them for approved conditions.¹² It impacted in the price of these drugs and black marketing and jeopardize people health due to their known adverse events.^{7,13}

During the initial few months of COVID-19 pandemic, with no definitive treatments or vaccines are available to treat or prevent this

viral infection resulted in public confusion and panic and increased use of SM, including home remedies, without established safety and efficacy.¹ This was further fuelled by social media regarding misinformation about medications. Social media was loaded with all kinds of remedies and suggestions that people may repurpose certain marketed drugs with potential to be effective for COVID-19 treatments or preventives.^{11,14} Although self-medication is an important element of self-care, it can be dangerous as it may lead to side effects, fatalities, or shortages of medicine for actual needy patients.¹⁴ This study was carried out to understand the factors responsible for self-medication and what steps require to mitigate the risk of SM.

Methods

We conducted an anonymous web-based survey among medical students and doctors during between the months of February and June 2020. We invited medical students and doctors faculty, at Pacific institute of Medical sciences, Udaipur, India by e-mail to answer a google web-based validated questionnaire in Google surveys that was sent via WhatsApp, Messenger, and Facebook. The participants were informed about the study through an open invitation. They consented to their participation by answering the questionnaire.

Participants had to respond to 30 questions on their self-medication experience and issues. The study design and the questionnaire were approved by the institutional ethics committee.

RESULTS

In our study the questionnaire was sent to 500 students and staff members working at Pacific Institute of Medical Sciences, Udaipur, and Rajasthan, India. There were 164 participants who responded to the questionnaire. Maximum responders were in the age group 18 to 30 years, followed by 41-50 years (15.4%), 31-40 years (13.3%) and 51-60 years (13.3%). Among the participants 19.6% were doctors, 47.8% were medical students, 7.2% were paramedical staff and 24.4% non-medical staff. In terms of level of education, participants were undergraduate (46.2%), graduate (24.1%), and postgraduate (26.2%) and others (3.4%). Most of the responders were unemployed followed by employed employees (31.0% and self-employed (16.2%). All the questions were not answered by everyone. It was observed that 51.6% of participants have taken self-medication during lock down due to Covid-19 pandemic. Below 18 years responders were (35%) and least responders were in 61-70 years age group. The gastrointestinal (22.6%) and respiratory disease (15.0%) were the common indications for taking self-medication. Among the symptoms for which the self-medications are taken for headache (32.6%), fever (25%), cough (18.5%), body ache (8.7%), pain in abdomen (7.6%), diarrhoea

(3.3%), vomiting (2.2%) and joint pain (2.2%) Figure 1.

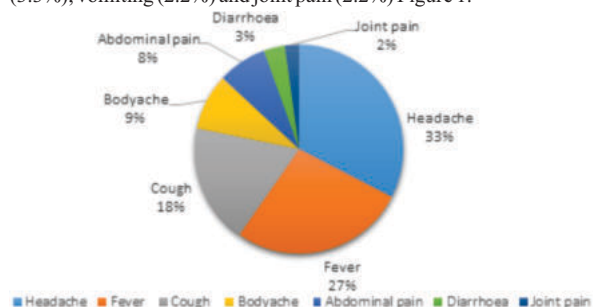


Figure 1: Common Symptoms Treated With Self-medications

Majority of the participants (70.4%) took self-medication as they did not feel the need to consult a doctor. Almost 55.2% were taking self-medication even before lockdown. It was noted that 13.3% of participant took self-medication due to non-availability of doctor while 16.3% participant could not reach the doctor during the lockdown.

The common medications consumed as self-medication were paracetamol, analgesics, Vitamin C, multivitamins, antacids, anti-histamines, antibiotics and antitussives. The uncommon medication was the medicines for migraine, diabetes and asthma.

Almost 53.5% of participant even offered self-medication to their family members. About 87.1% of the participants were aware of the side effects of self-medication.

Majority of the participant procured the medication from local chemist (69.2%), where others consumed unused medicine available at home 15%. Few participants (4.2%) procured medication by online purchase and small percent (3%) borrowed medicines from friends or neighbours while (9.2%) don't remember the source the medication.

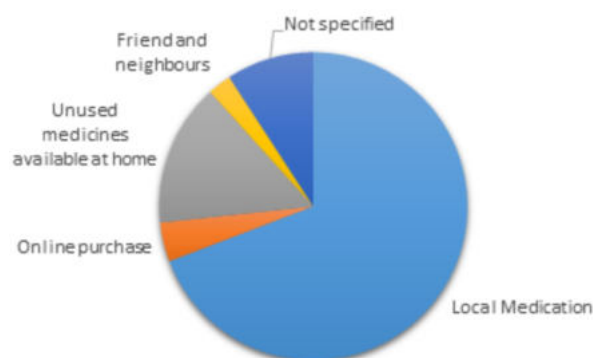


Figure 3: Sources Of Medicines For Self-medication

There was improvement in symptoms for 87.1% of participants. Almost 95% did not experience any adverse effects with self-medication. Among those who experienced adverse effects, only 25% consulted a doctor.

During the first wave of COVID-19 72% of the participants took self-medication for prevention of Covid-19. The most common medicines consumed by participants for prevention of COVID-19 were Azithromycin, Arsenic alb, HCQ, Paracetamol, Vitamin C, Ayurveda product. About 57.4% perceived this self-medication for prevention of Covid-19 useful while 22% experienced some adverse effects. They learned about the self-medication for prevention of Covid-19 from social media, friends and colleagues.

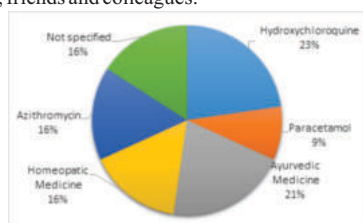


Figure 2: Common Medicines Used For Self-medication.

Only 15% of participants got their RTPCR done of which 22% tested positive. These tests were carried out at government laboratories (68%) which remaining was carried at private laboratories.

Table 1: Response To Different Question On Self-medication And Tele-consultation

Parameters	Response (%)	
	Yes	No
Self-Medication during	51.6	48.4
Take self-medication before lockdown	55.2	44.8
Self-medication to family members	53.5	46.5
Awareness of side effects	87.1	12.9
Improvement in symptoms	87.1	12.9
Adverse effect experience	05.0	95.0
Consultation of doctor for adverse effect management	75.0	25.0
Self-medication for prevention of Covid-19	72.0	28.0
Benefited from self-medication for prevention of Covid-19	57.4	42.6
Adverse effects with self-medication for prevention of Covid-19	22.0	78.0
Tested for Covid-19	15.0	85.0
RT PCR for Covid-19 positive	22.0	78.0
Benefited from self-medication to cure Covid-19	69.0	31.0
Adverse effect with self-medication for Covid-19 treatment	08.0	92.0
Aware of tele-consultation	74.0	26.0
Consulted a known doctor for tele-consultation	91.0	09.0
Satisfied with tele-consultation	81.7	18.3

The symptoms that were experienced by Covid-19 participants were headache 8.3%, Fever 30.6%, Cough 8.3%, body ache 13.9%, pain in abdomen 7.6%, chest pain 2.8%, sore throat 2.8% and weakness 2.8%. About 69% of the participants perceived that they were benefited from self-medication to cure Covid-19, of which only 0.8% experienced adverse effects.

About 74% participants were aware of tele-consultation. The most popular media tele-consultation was audio call 32%, followed by video-call 18% and social media 29%. About 91% of participant consulted a known doctor for tele-consultation. From those who used tele-consultation 81.7% were satisfied.

DISCUSSION

It is intriguing that self-medication related behaviours were observed among people who had never prior experience with self-medication during lockdown because of the first wave of COVID-19 pandemic. It was found that almost 50% of the participant took SM and large number of subjects abstained from consulting a doctor despite having worrying symptoms. This behaviour can be because of fear getting infected with SARS Cov-2, restricted access to the doctors. Similar finding were also found in other parts of the world.¹⁵

In our study almost 33% people responded to the questionnaire was sent. In concurrence with some of the other study data no effects of gender was observed in our study.¹⁵ However, the literature on self-medication is inconsistent as to whether gender affects SM behaviour.¹⁶

Almost half the participants in this study had taken self-medication during lockdown due to Covid-19 pandemic of which maximum self-medication was observed in the age group 18 to 30 years. However, many studies indicate that self-medication increases with age as this group of subjects in more prone to morbidity.¹⁶ In our study the finding may be attributable to the possibility that the responders in the cohort are more active on the Internet and hence higher response rate.

In terms of level of education, majority of participants in our study were undergraduate students. Graduates and postgraduate constituted the 50% of responders. Earlier research data on self-medication is unconvincing and does not support the citation of level of education as a helpful variable regarding drug usage. Few data suggest that self-medication increases with level of education. People with higher education may be more certain about the correctness of their self-diagnoses, having greater autonomy, and having better knowledge of medicinal drugs.^{17,18} However, other studies show that self-medication tendencies are greater with low levels of education as seen in our

study.^{19,20} This could be reasoned out by the fact with education people tend to become more critic and sceptic resulting in lesser tendency to believe that there is a pill for every condition. Even the aggressive pharmaceutical marketing could affect the self-medication behaviour.²¹ In our study most of the responders were unemployed followed by employed employees and self-employed which is contrasting to trends were observed in earlier studies.^{22,23} The relatively higher prevalence of SM among unemployed population maybe because of lack of time and resources.

Majority of the participants who took self-medication as they did not feel the need to consult a doctor and almost more than half were taking self-medication even before lockdown. They even offered self-medication to their family members. It is important to understand the difference between so-called responsible self-medication and inappropriate self-medication. Generally the responsible self-medication involves the use of over-the-counter (OTC) drugs in per package instructions or use of prescribed drugs approved by the physician.

The symptoms that were experienced by Covid-19 participants were headache, fever, cough body ache, pain in abdomen, chest pain, sore throat and weakness. About 69% of the participants perceived that they were benefited from self-medication to cure Covid-19, of which only 0.8% experienced adverse effects. Responsible self-medication enables more efficient use of resources and the time of doctors and pharmacists. It also empower patients by involving them in their treatment.^{24,25} These advantages are helpful a time when healthcare systems are overburdened with COVID-19 cases.

Inappropriate self-medication applies to use self-medication in an irresponsible manner.²⁶ It involves procuring prescription drugs without a prescription, consumption of old medicines prescribed for other illness, sharing medications with friends/family, and using drugs that have crossed expiry date.¹⁶ In this study majority of the participants procured the medication from local chemist (69.2%) without prescription, while other consumed unused medicine available at home 15%. Having supplies of prescription drugs at home can lead to their inappropriate use as observed in our study people offering them with other family members especially children.²⁷ Some of them (4.2%) procured medication by online purchase and small percent (3%) borrowed medicines from friends or neighbours while (9.2%) don't remember the source the medication. This practice could have untoward implications.²⁸

Although the inappropriate use of OTC drugs is known behaviour, the inappropriate use of prescription drugs has received more attention during the COVID-19 pandemic.^{29,30,31,15} In this study during the first wave of COVID-19, almost 72% of the participants took self-medication for prevention of Covid-19. The most common medicine consumed by participants for prevention of COVID-19 were azithromycin, ivermectin, hydroxychloroquine, arsenic alb, paracetamol, vitamin C, Ayurveda product. The use of antimicrobials is a serious concern as it can promote antibiotic resistance.^{32,33} Evidence even show that people even consume antibiotics for viral infections.³⁴

In this study more than half the participants perceived SM for prevention of Covid-19 useful and among them few experienced some adverse effects. They learned about the SM for prevention of Covid-19 from social media, friends and colleagues. During the early first wave of COVID-19 pandemic, the use of SM with hydroxychloroquine, chloroquine and dexamethasone without a prescription to prevent COVID-19 in India has been documented which were later considered as unsafe.^{35,1} Covid-19 pandemic increased the influence of social media regarding misinformation about medications, leading to public confusion and panic and increased use of SM, including home remedies, without established safety and efficacy.¹

In this study the common medication consumed for SM were antipyretic, analgesics, vitamin C, multivitamins, antacids, antihistaminic, antibiotics and antitussives. WHO has issued several warnings with respect to irrational use of antibiotics, herbal remedies, and other OTC treat COVID-19.¹ In many countries like China, India, Pakistan and may more, several herbal product SM are used to treat COVID-19, which can be easily procured without a prescription. Their use in COVID-19 lacks evidence-based support which can be very risky.³⁶ In China, three patented herbal medications (Lianhuaqingwen capsules

and JinhuaQinggan granules for mild conditions, and Xuebijing for severe conditions) were used to treat COVID-19 without effectiveness and safety based on randomized controlled clinical trials.³⁶ Similarly, In Pakistan SannaMakki, a herbal plant was used as SM in treating COVID-19 symptoms.¹

In our study SM among medical students was highest matching with the global trends. It is important to educate the students on the risks of SM. The student should be encouraged to take medication on doctors' advice and access of medicine should be restricted to reduce SM.³⁷ Continuous education programmes and sensitization is required to reduce SM behaviour among healthcare workers.³⁸

Inappropriate self-medication is associated with high risks such as incorrect self-diagnosis and inappropriate choice of therapy. It can result in delay in seeking of medical advice and treatment. Serious adverse effects due to incorrect medications can occur.²⁴ Even only 0.1% of inappropriate self-medication related complications can result in significant burden to healthcare system struggling to COVID-19 pandemic.¹¹

The common body systems affected by ailments were gastrointestinal and respiratory for which SM was taken. Among the symptoms for which the SM were taken were headache, fever, cough, body ache, pain in abdomen, diarrhoea, vomiting and joint pain. These symptoms were similar to that of COVID-19 by self-medication, the screening and diagnosis can be missed. Inappropriate self-medication is associated with high risks such as incorrect self-diagnosis and inappropriate choice of therapy. Only 15% of participants got their RTPCR done of which 22% tested positive. These tests were carried out at Government laboratories (68%) while remaining were carried at private laboratories. Delay in diagnosis of covid-19 can result in delay in seeking of medical advice and treatment. Serious adverse effects due to incorrect medications can occur.²⁴ Even only 0.1% of inappropriate self-medication related complications can result in significant burden to healthcare system struggling to COVID-19 pandemic.¹¹

It was noted that many participant took SM due to non-availability of doctor while other could not reach the doctor during the lockdown. At times it becomes necessary to take SM because reaching a doctor can be inconvenient and not feasible.³² Moreover the healthcare systems in so overburdened with COVID-19 cases that patients with other conditions may not get access to doctor.³⁹ Some patients perceive physical visits to a clinical or hospital premises may be highly dangerous as doctors and nurses being seen as potential sources of infection.

As per the WHO guidelines on SM, people should be aware about the efficacy, adverse effects, method of use of the medication.¹ Among those who experienced adverse effects only one-fourth consulted a doctor. Majority of participants were aware of the side effects of self-medication. But this would not be the case in general population as the participants in this study were associated with a medical institute. The practice of SM should be monitored appropriately, especially in resources constrained countries, which are facing an economic, with low education levels and insufficient healthcare facilities, especially during COVID-19.⁴⁰ It can worsen the current situation of a health crisis with additional burden on health care system.⁴ A pragmatic approach should be evolved to address the issues of SM through improved public awareness and education. The healthcare professionals, nurses and community pharmacists should be adequately trained to impart training to general public. Strict pharmaceutical marketing regulations are required on public advertising and drug promotion.

Measure to prevent the potential risk of SM and reduce the stockpiling of drugs during this pandemic should be taken by Government health agencies.⁴¹ The healthcare agencies should develop proper strategies and guidelines for drug usage for SM. Effort should be made to provide cost effective and proper consultation with healthcare providers to discourage SM practices.⁴¹ General public awareness and education programs regarding the appropriate use of medicines and possible risks regarding SM should be carried out through mass media and social media.⁴²

Large number of patients has opted for tele-consultation during the Covid-19 pandemic so as to avoid in-person visits and face-to-face contact with doctors and patients. In our study majority of participants

were aware of tele-consultation. They consulted a known doctor for tele-consultation and were satisfied with is mode of consultation. Telemedicine and virtual care can play a significant role in successful management several mild to moderate ailments.⁴³ In the current COVID-19, tele-medicine has proved to be highly successful in meeting the needs of person with possible COVID-19 and those with positive COVID-19 test results. It has been widely accepted by patients and doctors representing an important tool for providing timely and safe health care in this pandemic situation.⁴⁴ Integrating telemedicine and virtual care into the healthcare system would help in optimizing the efficiency of healthcare delivery.⁴⁵

Our study has certain limitations and strengths. Firstly, the data were collected via online survey using Google Form. There could be variability in internet usage based on age, gender and accessibility, thus impacting possibility of expressing their views. Second, response to SM behaviour is also subject to recall bias. Third, our study involved participants from a medical institute who were doctors, medical students and paramedical staff and their behaviour and attributes (e.g., in terms of skills/knowledge/financial needs) can differ from the general population of the country. Fourth, the sample size was small. On the other hand, the merit of our study is that, it was conducted at an appropriate point in time i.e., during the lockdown period. The study has identified various reasons for SM which could help in designing strategies to prevent the adverse impact of SM and develop countermeasures to control the pandemic.

CONCLUSIONS

SM when carried out in a responsible manner can be considered as a part of the more broader self-care activity to promote health improvement, prevention and treatment of ailments.⁽⁴⁶⁾ It aids in lowering the economic burden on patients and the healthcare system especially in pandemic situation.⁽⁴⁷⁾ However, the drawbacks of inappropriate SM should not be ignored. There is need for generate public awareness and education about the safe and rational use of drugs during the COVID-19 pandemic.

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Conflict Of Interest

There is no conflict of interest. None of the authors have received any honorarium, grants, membership, employment or ownership of stock from any agencies.

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