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Prevalence and Influencing Factors of Self-Medication during the COVID-19 Pandemic: A Case Study of academic personals from Lahore

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Abstract
Healthcare systems were significantly impacted by the COVID-19 pandemic, which encouraged extensive use of self-medication techniques. Self-medication is the use of medicines to treat self-recognized illness or symptoms without the doctor's prescription. The goal of this study was to fill up the knowledge gap and to determine the prevalence and influencing aspects of self-medication during the COVID-19 and offer suggestions to encourage safe and responsible medication practices, the sorts of drugs that are often used, and the motivations for self-medication during the pandemic in Lahore. 100 respondents in Lahore including students and faculties from different universities with different academic backgrounds were surveyed through simple random sampling using a structured questionnaire which was shared via social media. Using the right statistical techniques, qualitative data gathered from the surveys was examined. Descriptive statistics and inferential techniques, such as chi-square tests, were used to evaluate the data. The findings showed that bodily aches/pains and fever were the most often self-medicated symptoms. The most popular medications for self-medication were painkillers. The main factors that led people to choose self-medication were the accessibility of healthcare services and fear of contracting COVID-19 in healthcare settings. Although the internet and social media were often used to research options for self-medication. Some responders reported negative side effects and consequences from self-medication. In conclusion, this study advances our knowledge of Lahore's COVID-19 pandemic's self-medication practices. The results also highlight the significance of encouraging appropriate self-medication behaviors and making sure that people have access to trustworthy information to protect the public's health in times of medical crisis. These findings may be used by policymakers, healthcare professionals, and public health authorities to create specialized treatments and educational programs that will encourage community members to self-medicate safely and intelligently.
Keywords: COVID-19, Self-medication, Practices

1. Introduction

In December 2019, an outbreak of a virus was reported in Wuhan, Hubei Province, China. The cases reported due to virus was linked to the Huanan Seafood Wholesale Market. WHO declared it a pandemic on 12 March 2020 due to the spread of virus and the thousands of deaths caused by COVID-19. Global healthcare systems have been significantly impacted by the COVID-19 pandemic, which was brought on by the new coronavirus SARS-CoV-2 (World Health Organization, n.d., COVID-19 Dashboard). People are exploring alternative medical practices, such as self-medication, as a result of the virus's fast spread and the pressure it has placed on hospital resources. Self-medication is the term for using over-the-counter drugs or therapies without a doctor's prescription.

Self-medication practices have significantly increased, according to several researches carried out during the COVID-19 epidemic. For instance, Salman et al. (2020) study in Lahore discovered that 65% of respondents admitted to using self-medication during the epidemic. Around the world, similar tendencies have been seen. Indian researchers, Singh et al.,(2020) found that 71.5% of participants self-medicated during the epidemic. Heshmatifar et al., (2021) conducted a study and discovered that 61.7% of Iranian participants self-medicated for COVID-19 symptoms.

Different medications as Analgesics (like paracetamol), antipyretics, antitussives, and vitamins are often used during the COVID-19 pandemic for self-medication. Many people take these drugs to treat COVID-19-related symptoms as fever, coughing, and body pains. It has also been reported that over-the-counter drugs, herbal treatments, and conventional pharmaceuticals have been utilized for self-medication during COVID-19.

Different factors are involved that lead people for self-medication during covid-19. Fear and worry about the virus and its possible side effects have encouraged people to take charge of their health by using self-care techniques. People have been induced to self-medicate by false information about remedies that could work, preventative measures, and the effectiveness of certain drugs.

The adoption of self-medication as a method of symptom management has also been influenced by limited access to reputable healthcare services. Many people believe that self-medicating is a more affordable and practical option than going to a doctor. People might choose self- medication to save money on doctor visits and prescriptions because over-the-counter drugs and natural cures are widely accessible. Self-medication is more likely to be continued throughout the pandemic by people who have previously used it. They may believe they have the expertise and information needed to correctly self-diagnosis and cure their problems. With self-medication during the COVID-19 epidemic, a number of socio-demographic characteristics have been linked. Access to healthcare may be impacted by several variables.

The COVID-19 pandemic had a substantial influence on healthcare systems and self-medication practices were widely adopted. As a result, research is needed to fill this gap in knowledge with the aims and objectives of this study that are to find out how often

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self-medication was in Lahore during the COVID-19 epidemic, to pinpoint the typical medical symptoms that people in Lahore self-medicate for during the COVID-19, to investigate the influencing elements that led people to choose self-medication, to research the sorts of drugs typically utilized for self-medication, to assess the possible dangers and negative consequences related to self-medication, to comprehend how healthcare providers affected people's self-medication habits during the COVID-19 epidemic, to offer suggestions for public health policies and initiatives meant to encourage safe and responsible medication practices during the COVID-19 pandemic in Lahore.

This study also has a greater significance as it is essential for public health to comprehend the frequency and variables affecting self-medication practices throughout the epidemic. Healthcare systems can concentrate their efforts on more serious COVID-19 patients by lowering the burden of mild illnesses through effective self-medication. The study can also provide as a starting point for further investigation into self-medication in pandemics and other medical situations.

Self-medication is an act of selecting and using medications to address ailments and symptoms that have been self-diagnosed without seeking medical advice (Baracaldo et al., 2022). Additionally, self-medication is linked to the wrong dose, the wrong method of administration, prolonged usage, poor storage, drug interactions, polypharmacy, and the possibility of dependency and misuse, making it a severe public health issue globally (Aitafo et al., 2022; Alsaad et al., 2022).

Self-medication has both advantages and disadvantages that was proved in COVID-19 era when the world was in lockdown and at that time self-medication was the only resource considered to diagnose and treat corona virus (Quispe-Cañari et al., 2021). Self-medication practices have high prevalence in developing countries as compared to developed countries as the different researches have found that its rate is 84% in Pakistan and 78% in Saudi Arabia (Raza et al., 2022).

With the beginning of COVID-19, WHO provided guidelines to people to prevent themselves from its effects. The guidelines were maintain social distance, use of masks while going outside, use of sanitizers regularly and self-quarantine while feeling even minor symptoms (Rafiq et al., 2021). With the passage of time, as the COVID-19 was increasing badly, many health care professionals and research centres started to make vaccine of this virus to prevent the world from its adverse effects and bring back the world to normal life.

There was a considerable percentage of families who used self-medication, which indicates a high prevalence of the practice. Key variables included things like having easy access to pharmaceuticals, having used self-medication in the past, and being afraid to go to a hospital because of the epidemic (Al Mutair A., et al., 2020). Different research studies conducted earlier show the adoption of self-medication during COVID-19 pandemic.

The study conducted in Kenya showed a significant rate of self-medication among urban dwellers that they were more likely to engage in self-medication practices when they had access to medications at home, had previously self-medicated, and had reported mild COVID-19 symptoms (Mutua et al., 2021).

The results of the study conducted in Brazil showed a significant incidence of self-medication behaviors. Factors linked with a higher chance of self-medication included having a chronic illness, recognizing COVID-19 symptoms, and being afraid to visit medical facilities during the pandemic (Pitta et al., 2021).

The cross-sectional study carried out in the United Arab Emirates, looked at the incidence of self-medication during the COVID-19 epidemic as well as the contributing variables. The findings indicated a significant frequency of self-medication behaviors, with male gender, prior self-medication experience, and perception of COVID-19 symptoms all being related with a higher risk of self-medication (Sarfraz et al., 2021).

The South African research investigated the incidence of self-medication during the COVID-19 epidemic. The results showed a significant incidence of self-medication behaviors, with individuals often utilizing over-the-counter drugs and conventional treatments. The study revealed characteristics that influence self-medication, including reported COVID-19 symptoms, concern about catching the virus in healthcare facilities, and restricted access to healthcare services (Ismail et al., 2021).

Self-medication behavior during the COVID-19 pandemic was explored in this online cross-sectional survey carried out in China to determine its frequency and correlates. The study found a significant increase in the use of self-medication, with characteristics including having chronic illnesses, recognizing COVID-19 signs, and mistrust of the healthcare system being linked to a higher risk of self-medication. The study highlighted how critical it is to raise public awareness and encourage sensible medication use (Hu et al., 2022).

Different research studies show the significant rate of self-medication along with the factors involved among individuals during COVID-19. Self-treatment begins with self-diagnosis, which increases the likelihood that it will be inaccurate so it is important to note that self-medication is not recommended for serious health issues, diseases and viruses that requires professional medical advice and treatment (Chaudhry et al., 2022).

2. Methodology and Data Collection

This case study used a cross-sectional design with a questionnaire-based method to collect data on the prevalence and influencing factors of self-medication during the COVID-19 pandemic in Lahore. The study was qualitative and involved 100 respondents. Data has been gathered, transformed into a qualitative format, and the results have been statistically examined and reviewed. Based on prior research and literature reviews, a questionnaire was designed using Google Forms and distributed online through social media. Clear directions were given to participants on how to fill out the survey.

2.1. Questionnaire Development

To collect pertinent data on self-medication habits, demographic traits, educational attainment, access to healthcare facilities, and other variables impacting self-medication behavior, a structured questionnaire was devised. It was designed based on the goals of

the research, available literature, expert comments. The design of the questionnaire was modified form of a research questionnaire (Abdelwahed et al., 2023). So there was no need to perform pilot testing to check its reliability.
The final version of the questionnaire consisted of Five sections. The first section discussed information related to demographics. The second section assessed the Prevalence of Self-Medication. The third section is about Factors Influencing Self-Medication. The fourth section assessed General Health and Awareness among the participants. In the fifth section, we obtained Suggestions and Feedback from the respondents. The question "Have you ever taken any medication/drug without consulting a specialist doctor during the novel Coronavirus pandemic (COVID-19)?" with answers of "never which was considered NO, and coded as 0", and "once, seldom (2-3 times a year), sometimes (once every few months), often (once every few weeks), always which were all considered YES for Self Medication and coded as 1).

2.3. Sampling

The participants were drawn from various parts of Lahore using simple random sampling. By using Yamane formula with precision level 10% we selected sample size 100 (Determining Sample Size, n.d.). To improve the sample's representativeness, an effort was made to include people from a variety of backgrounds.
The people from different universities in Lahore, Pakistan, were the research's target audience. The students and faculty at these universities come from a variety of academic fields and educational backgrounds, representing a wide cross-section of the city's population. The study aims to gather a variety of opinions and experiences related to self-medication during the COVID-19 epidemic by involving respondents from several universities.

3. Data Analysis and Interpretation

Using the right statistical techniques, qualitative data gathered from the surveys was analysed. The prevalence of self-medication and demographic data were summarized using descriptive statistics, such as frequencies and percentages. To investigate association between different variables like demographic characteristics and self-medication behaviors, inferential methods like chi-square tests were used.
The results obtained from the data analysis were interpreted in light of the research objectives and existing literature. The findings were discussed in terms of their implications and compared to relevant studies to identify similarities, differences, or novel insights.

4. Results and Discussion

To collect data of our case study, 100 respondents in Lahore were surveyed using a structured questionnaire. Variables were gender, age, occupation, previous experience with self-medication before pandemic. Among 100 respondents 63% were females and 37% males with different age groups. Other results are shown in the table below.

Table 1: Frequency and Percentage of variables

Gender		
	Frequency	Percent
Male	37	37
Female	63	63
Total	100	100
Age		
18-30	78	78
31-45	17	17
46-54	4	4
55 and above	1	1
Total	100	100
Occupation		
Employed	37	37
Self-employed	12	12
Unemployed	10	10
Student	41	41
Total	100	100
Previous experience with self-medication before pandemic		
Yes	53	53
No	47	47
Total	100	100

4.1. Prevalence of Self-medication

The Section 2 of the questionnaire was related to prevalence of self-medication. 31% respondents never took any medication without consulting a specialist doctor during COVID-19. While 3% always, 6% often (once every few weeks), 19% once, 14% Seldom (2-3 times a year), 27% sometimes (once every few months) took medication during COVID-19.

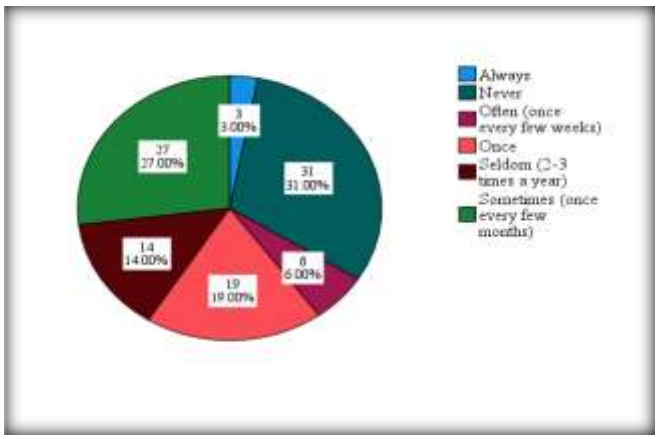

Figure 1: Pie chart shows the percentage of respondents who ever taken any medication without consulting a specialist doctor during COVID-19

Different types of medications were used for self-medication during covid-19 were Painkillers 53.6%, Fever-relieving medications (Antipyretic) 13.0%, Drugs for cough 11.6%, Anti-allergy medications 5.8%, Antibiotics 5.8%, Sedatives (to reduce irritability or anxiety) 1.4%, All of the above 8.7%. The use of painkillers is greater than the other types of medications during COVID-19.

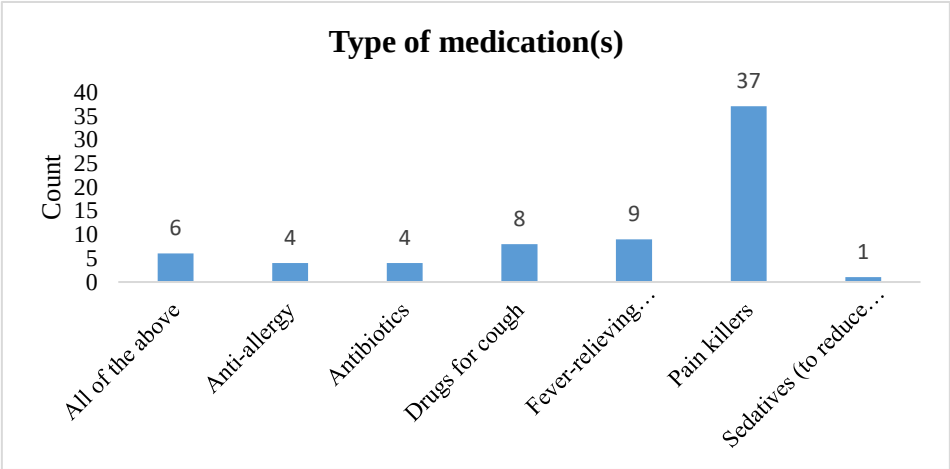

Figure 2: Types of medication(s) used during COVID-19

Responses show that the main reason for not seeking professional medical advice was difficulty in accessing healthcare facilities as it is showing 22(31.9%) respondents ratio that is greater than other reasons percentages, 23.2% faced lack of trust in healthcare system, 24.64% respondents faced all the reasons for not seeking professional medical advice.
Mostly respondents felt body aches/pains that led them to self-medication and its percentage is 40.6% while 17.4% felt fever and 20.3% participants experienced all the reasons.

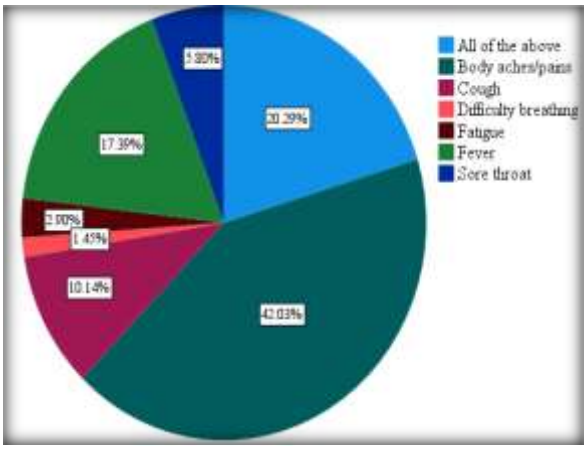

Figure 3: Type of health conditions or symptoms led to self-medicate

4.2. Factors Influencing Self-Medication

The Section 3 related to the factors and reasons of self-medication that led people to adopt self-medication during covid-19 epidemic. It includes different factors like difficulty in accessing healthcare facilities with 12%, Financial constraints 2%, Lack of availability of healthcare professionals 5% and fear of contracting COVID-19 in healthcare settings with higher percentage of 17%. Some people also showed multiple and all reasons for opting for self-medication.

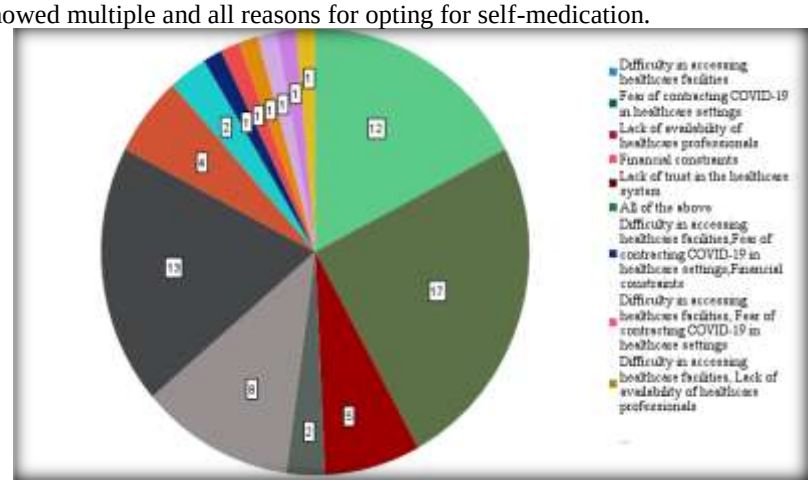

Figure 4: Pie chart shows reasons for opting for self-medication during the COVID-19 pandemic

To get the information for self-medication decisions 61% respondents sometimes relied on information from internet or social media for self-medication decisions and 8% always relied on the information they got from internet and 24% respondents primarily consulted from medical websites or blogs for self-medication and 21% relied on all of the sources like online forums and communities, social media platforms e.g. facebook, twitter, medical websites or blogs. 31% of respondents were not confident at all in the accuracy and reliability of the information obtained from online sources, 16% were moderately confident, 43% were slightly confident that means respondents were not much confident on the accuracy of the information they acquired from online sources.

14% respondents always experiencing adverse effects or complications from self-medication, 55% said they sometimes experienced adverse effects or complications. Most of the respondents faced digestive issues (e.g., stomach ache, nausea, vomiting) and their percentage is 31(44.9%).

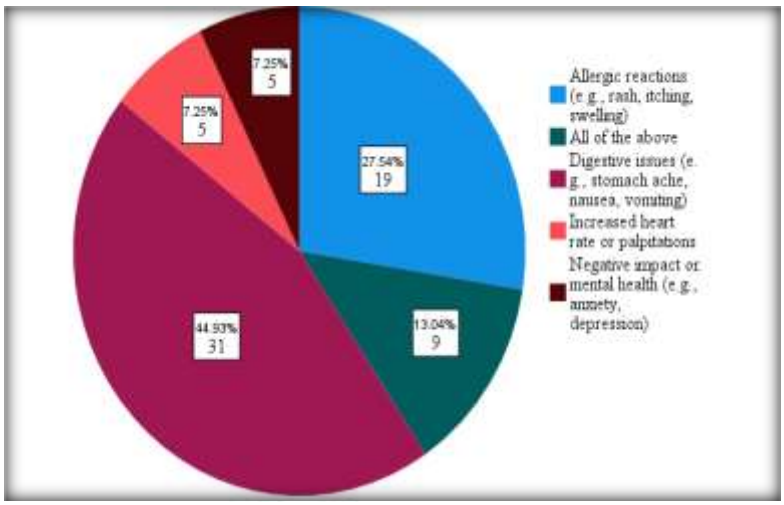

Figure 5: Adverse effects or complications experienced

4.3. General Health and Awareness

Some respondents had pre-existing health conditions during the covid-19 pandemic. 11% of respondents had hypertension (high blood pressure), 2% had chronic pain or musculoskeletal disorders, 13% had mental health conditions such as anxiety or depression, 17% had allergies. Mostly respondents had not any type of pre-existing health conditions during COVID-19 pandemic. Most individuals i.e. 69% actively sought information on safe self-medication practices and the findings show that 34.8% of respondents relied on healthcare professionals as their primary source of information, 15.9% relied on official government guidelines, 13% relied on reliable online sources and 36.2% relied on all of the above sources. Mostly respondents had used all the given primary sources of information.

4.4. Suggestions and Feedback

At the end, suggestions were collected from respondents based on their experience to minimize the prevalence of self-medication, to raise public knowledge of the possible hazards of self-medication during pandemics. Respondents advised tighter controls on over-the-counter drugs, increased public awareness campaigns, better access to healthcare facilities, and more regular contact from healthcare authorities to reduce the occurrence of self-medication. To ensure safe healthcare practices during health emergencies, it is crucial to promote responsible pharmaceutical practices, raise public knowledge of possible hazards, and improve access to healthcare facilities. The results of this study can help healthcare administrators put into practice sensible measures to lessen the hazards associated with self-medication and improve public health readiness for potential health crises.

Table 2: Suggestions and Feedback from respondents

Suggestions to minimized prevalence of self-medication		
	Frequency	Percent
Improved access to healthcare facilities	24	24
Enhanced public awareness campaigns	25	25
Stricter regulations on over-the-counter medications	5	5
More frequent communication from healthcare authorities	7	7
All of the above	39	39
Total	100	100
Suggestions to increase public awareness		
Educational campaigns in schools and colleges	20	20
Television and radio advertisements	10	10
Social media campaigns	14	14
Collaboration with healthcare professionals for information dissemination	9	9
All of the above	47	47
Total	100	100

To check the correlation between different variables, chi-square tests were used. The relationship between self-medication and gender is an important result, with females showing a greater response percentage in self-medication activities. Healthcare authorities may be able to customize treatments to particular demographic groups using this gender-related variance. The survey also showed that younger people were more inclined to turn to the internet and social media for information when making self-medication decisions. This emphasizes the need of concentrating public health awareness initiatives on younger demographics and delivering correct information on drug usage through digital channels. However, there was no connection between self-medication and either employment or age.

Table 3: Association between different variables

		Gender	Age	Occupation	What type of health conditions or symptoms led you to self-medicate
Self-medication Status	Pearson Chi-square	4.007[a]	2.410[a]	5.827[a]	100.000[a]
	df	1	3	3	7
	Asymp. Sig. (2-sided)	0.045	0.492	0.120	<.001
Did you rely on information from the internet or social media for self-medication decisions	Pearson Chi-square		14.16[a]		
	df		6		
	Asymp. Sig. (2-sided)		0.028		

As p-value of chi square test is 0.045 that is less than the significance level ($\alpha = 0.05$) it shows that there is significant association between self-medication and gender. Also the p-value of chi-square test is 0.028 that is less than level of significance ($\alpha=0.05$) conclude that there is an association between age and use of social media and internet to obtain information for self-medication decisions. The p-value of chi-square statistic is less than .001 that is very much less than $\alpha=0.05$ (level of significance), which shows that there is an association between self-medication status and health symptoms. It interprets that when individuals felt mentioned health conditions or symptoms then they adopt self-medication.

The conclusions drawn from this study ultimately serve as a foundation for additional research on self-medication practices and public health responses in times of health emergency. We can all work together to protect the public's health and well-being during trying times by putting a priority on safe and knowledgeable healthcare practices.

5. Conclusion

Self-medication behaviors are only one area where the COVID-19 pandemic has had a profound influence on healthcare and public health. The purpose of this study was to examine the incidence of self-medication during the COVID-19 epidemic in Lahore as well as its affecting variables. Through the use of a questionnaire-based approach, we were able to gain insightful feedback from 100 participants, giving light on the trends and consequences of self-medication during an unheard-of health crisis.

The study found a number of variables that affected people's decisions to self-medicate, with concern for contracting COVID-19 in hospital settings and lack of access to facilities appearing as key influences.Painkillers were the most often utilized pharmaceuticals during self-medication, highlighting the need of comprehending the particular sorts of drugs people frequently depend on without seeking medical advice. Moreover, a sizable proportion of respondents mentioned having unpleasant side effects or difficulties from self-medication, highlighting the necessity of spreading awareness about safe and responsible medication practices.

The relationship between self-medication and gender is an important result, with females showing a greater response percentage in self-medication activities.The survey also showed that younger people were more inclined to turn to the internet and social media for information when making self-medication decisions. This emphasizes the need of concentrating public health awareness initiatives on younger demographics and delivering correct information on drug usage through digital channels.

According to the comments given by respondents, it is obvious that expanding access to healthcare facilities, stepping up public awareness efforts, and tightening rules on over-the-counter pharmaceuticals are viable steps to reduce the occurrence of self-medication during medical emergencies. To improve public health outcomes and lower the possible hazards related to self-medication, healthcare authorities and policymakers should take these recommendations into consideration.

The conclusions drawn from this study ultimately serve as a foundation for additional research on self-medication practices and public health responses in times of health emergency. We can all work together to protect the public's health and well-being during trying times by putting a priority on safe and knowledgeable healthcare practices.

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