




Impact of COVID-19 on Pharmaceutical Care Services and the Role of Community Pharmacists: A Multi-Center Cross-Sectional Study in Ethiopia

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Abstract

Objectives: The current study aimed at assessing the impact of COVID-19 on pharmaceutical care services and the role of community pharmacists.

Methods: A cross-sectional study was conducted from May 1st to June 7, 2020, on community pharmacies in Bahir Dar and Gondar cities, Ethiopia. Descriptive statistics and Chi-square test were conducted. A P-value of less than 0.05 was considered to declare statistical significance at a 95% Confidence interval (CI).

Results: A total of 101 community pharmacies were approached (one pharmacist per pharmacy), and 80 of them had completed the survey. From the total pharmacies, 78.8% of them had encountered a shortage of pharmaceutical products. Chi-square test revealed that there was a significant difference ($P = 0.036$) in the shortage of personal protection equipment between Gondar and Bahir Dar cities. Face mask 55 (77.4%) followed by hand glove 15 (21.1%) were the most commonly reported personal protective equipment's in short supply.

Conclusion: Strategies should be in place to improve the availability and affordability of various essential pharmaceuticals to mitigate the spread of the disease and prevent other complications.

Keywords

pharmaceutical care, community pharmacy, COVID-19, Ethiopia, pandemic

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Introduction

Since its first outbreak in December 2019 in Wuhan, China, the Coronavirus Disease 2019 (COVID-19) has infected more than one million people and around 60,000 people have died globally within three months of the outbreak (Yang et al., 2020; Worldometer, 2020). The rate and trajectory of the transmission have led the World Health Organization (WHO) to declare COVID-19 firstly as a global emergency on February 2020, and then as a pandemic later on March 2020 (Euro surveillance Editorial Team, 2020; WHO, 2020).

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The pandemic has brought the entire world to a standstill and every sector has suffered a huge setback including a double figure decline in the major stock markets (Ali et al., 2020). Due to travel restrictions and the closure of schools, universities, bars, restaurants, and retail shops to mitigate the spread of the virus, COVID-19 had severely affected country's economies (Medicine, 2020). Besides the already abysmal impact on every sector of the society, an increased risk of infection among healthcare workers and the consequent staff absences due to illness or the need to self-isolate will bring the biggest challenge in the provision of healthcare services (Willan et al., 2020). Healthcare systems in the developing countries are especially threatened because of the effect that this pandemic will have on the already weak health systems in these countries (Adam & de Savigny, 2012; Agampodi et al., 2015).

The pharmaceutical sector is one of the victims of this global health crisis (Legido-Quigley et al., 2020). The impact of the pandemic on the pharmaceutical sector can be seen in different perspectives. In one hand, COVID-19 may be regarded as a century's opportunity for the pharmaceutical industry; as it increases the demand for prescription medicines, vaccines and medical devices (Emanuel et al., 2020). On the other hand, it could also bring short-term and long-term detrimental impacts on the pharmaceutical sector in general. Short-term impacts include; fluctuations in demand, supply shortages, panic buying and stocking, regulatory changes and shift of communication and promotions to remote interactions through technology, and research and development process changes (Ayati et al., 2020). Long-term impacts may include; approval delays, moving towards self-sufficiency in pharmaceutical-production supply chain, slow-down in industry growth and possible changes in consumption trend (Ayati et al., 2020).

Community pharmacists are considered to be one of the most accessible health care professionals to the public (Agomo, 2012). There are wide range of roles that pharmacists can make in response to various types of disasters, such as pandemics, across four key phases; prevention, preparedness, response, and recovery (Cadogan & Hughes 2021; Kretchy et al., 2021; Watson et al., 2020). Beyond ensuring the stable supply of key medicines, pharmacists can play a significant role in reducing the spread of the pandemic through the provision of newly updated prevention methods and safety measures to their customers, update information source about the coronavirus infection and new strategies to control the spread (Ung, 2020; Zheng et al., 2020). During the 2009 H1N1 pandemic, community pharmacies were properly placed to provide public health education and assist with vaccination (Miller et al., 2012; Schwerzmann et al., 2017)

The guideline of the International Pharmaceutical Federation (FIP) for pharmacists stated that pharmacists should join the medical team and have to give pharmaceutical care services for COVID-19 patients (International Pharmaceutical Federation, 2020). Moreover, community pharmacists can also give public services like early detection and appropriate referral, as well as in supporting the implementations of government orders (Ung, 2020). Community pharmacists, therefore, should be on full alert and be familiarized with the latest updates on the pandemic and ensure all the necessary products and devices are available in the. The current study aimed to evaluate the impact of COVID-19 on pharmaceutical care services and the role of community pharmacists in health promotion and mitigating the transmission of COVID-19 in Gondar and Bahir Dar cities, Ethiopia.

Study Methods

Study Design and Setting

A cross-sectional study was conducted from May 1st to June 7, 2020 on community pharmacies in Bahir Dar and Gondar cities, Ethiopia. Both cities are found in the Amhara regional state, and Bahir Dar is the capital city of the region. Bahir Dar and Gondar are located 565 km and 750 km away from Addis Ababa, the capital city of Ethiopia. Based on the Ethiopian Central Statistical Agency (CSA) population projection report, the population of Bahir Dar and Gondar is estimated to be around 339,683, and 362,000 in the year 2020 respectively (CSA, 2007). At the time of the study, there were 14 pharmacies, 32 drug stores, and 8 rural drug vendors in Bahir Dar, while there were 19 pharmacies and 33 drug stores in Gondar.

Sample Size Determination and Procedure

The source population of the study was all licensed community pharmacies in Gondar, and Bahir-Dar cities, Ethiopia. From the total licensed pharmacies, 5 of them participated in the pretest which was used for validation of the data collection tool and they were excluded from the final study. Then, from each pharmacy, only one pharmacist was interviewed. A random sampling method was used to recruit the final interviewed pharmacists from each community pharmacy. Pharmacists that were not available at the time of data collection and/or those who do not want to participate in the study were excluded from the study. A final sample size of 101 community pharmacists were invited to participate in the study.

Study Variables

Impact of COVID-19 on pharmaceutical care services and the role of community pharmacists were considered as dependent variables and the independent variables included socio-demographic characteristics of the study participants; sex, age, educational level, residency, and year of work experience of the pharmacists.

Data Collection Tools and Techniques

Data was collected by six well-trained data collectors (3 data collectors from Bahir-Dar and 3 from Gondar) through a self-administered questionnaire. The questionnaire was developed after a careful review of published literatures on similar topics (Atif & Malik 2020; Sheppard & Thomas, 2021; Song et al., 2021; Ung, 2020). The tool was pre-tested on five pharmacies and relevant modifications were made before the commencement of the actual data collection. Completeness and fulfilment of all questions were checked by the principal investigator and data collectors. The questionnaire constituted 35 items that were divided into three main sections. The first section consisted of 7 questions that assess the socio-demographic characteristics of the study participants including age, gender, years of experience, residence, education level, and type of facility. The second and third sections consisted of 12 and 16 questions respectively that assess the impact of COVID-19 on pharmaceutical care, and evaluate the role of community pharmacists in prevention and control of the COVID-19 pandemic.

Data Quality Assurance and Analysis

At the end of each day, the collected data were checked for completeness, accuracy, and consistency before entering to a software for analysis. Statistical Package for the Social Sciences (SPSS) software version 26 was used for analysis. Quantitative data were summarized using descriptive analysis and a chi-square test was used to investigate the presence of association between the dependent and the independent variables. A P-value of less than 0.05 was considered to declare statistical significance at a 95% Confidence interval (CI).

Ethical Consideration

Ethical clearance of the study was obtained from the ethical review board of the School of Pharmacy, the University of Gondar, on a Ref. No. SoP/785/2020, and the study was also performed following the Declaration of Helsinki as revised in 2013. The study participants were well informed about the purpose of the study and confidentiality of the data was also maintained throughout the study. Besides, written informed

consent was provided on the initial page of the survey and verbal consent was collected from each study participant before the commencement of the study. The data was collected anonymously and there was no personally traceable information on the questionnaire.

Results

A total of 101 community pharmacies were approached (one pharmacist per pharmacy), and 80 of them had completed the survey with a response rate of 79.2%. About 45 pharmacists from Gondar and 35 from Bahir Dar city were participated with the majority of them being male respondents 44 (55%). The mean age of the respondents was 30.9 years (SD = 8.292) with the majority of them 46 (57.5%) being within the age range of 26–35 years. The larger share of the study participants 44 (55%) were degree holders followed by diploma holders 32 (40%). The mean year of experience for the respondents was 7.48 years (SD = 5.881) with the majority of the participants 27 (33.8%) having an experience of between 3 to 5 years (Table 1).

Impact of COVID-19 on Pharmaceutical Care

All of the study participants but one 79 (98.8%) responded that COVID-19 had brought an impact on the pharmaceutical care services in which 63 (78.8%)

Table 1. Sociodemographic Characteristics of the Study Participants; N = 80.

Characteristics	Frequency	Percentage (%)
Sex		
Male	44	55
Female	36	45
Age		
18–25	17	21.3
26–35	46	57.5
36–45	14	17.5
>45	3	3.8
Educational level		
Diploma	32	40
Degree	44	55
Masters	4	5
Years of experience		
<2 years	12	15
3–5 years	27	33.8
6–10 years	23	28.8
>10 years	18	22.5
City of residence		
Gondar	45	56.3
Bahir Dar	35	43.8
Type of facility		
Drug store	36	45.0
Pharmacy	44	55.0
Tertiary hospital	22	21.0

reported that it has decreased the patient flow rate to community pharmacies to seek for pharmaceutical services. More than three fourth of the respondents 63 (78.8%) reported that they have encountered a shortage of pharmaceutical products because of the pandemic and about 70 (87.5%) of them also reported that they have experienced a change in the cost of pharmaceutical products too. Concerning the city of residency, a greater percentage of respondents from Bahir Dar city (97.1%) reported a change in the cost of pharmaceutical products as compared to their counterparts in Gondar (80%). The difference was also statistically significant ($P = 0.037$) (Table 2).

About 71 (88.8%) and 75 (93.8%) of the study participants respectively reported that; they have encountered a shortage in supply and a change in the cost of personal protective equipments (PPE's) after the outbreak of the COVID-19 pandemic. A greater number of pharmacists from Bahir Dar city 97.1%, as compared to Gondar 82.2%, reported a shortage of PPE's. Chi-square test also revealed that the difference was statistically significant ($P = 0.036$).

When asked about the type of pharmaceuticals in short of supply, the majority of the participants reported both imported and locally manufactured pharmaceuticals 85.7%, while the remaining 14.3% reported only imported pharmaceuticals were in short of supply.

Drugs for chronic diseases were the most frequently reported group of medications in short supply 35 (55.6%) (Figure 1).

Face mask 55 (77.4%) followed by hand glove 15 (21.1%) were the most commonly reported PPE's in short supply. Shortage of personal hygiene products was also reported by the majority of the respondents 70 (87.5%), with hand rub (sanitizer) 51 (68%) followed by alcohol 22 (29.3%) being the most common products in short supply. Drugs for chronic diseases were also the most highly consumed types of medications since the outbreak of the pandemic 36 (46.7%) (Figure 2).

Role of Community Pharmacists During the COVID-19 Pandemic

The majority of the study participants 45 (56.3%) reported that they have installed personal hygiene products at their premises. When asked about whether they educate all their customers/patients about hand hygiene, infection prevention and control strategies, 55 (68.8%) responded they always educate their patients while 25 (31.2%) of them reported that they sometimes provide the education. Chi-square results also showed a significant difference among the respondents concerning years of experience ($P = 0.028$). When asked about their source of the formula/guideline for the preparation, 20 (87%)

Table 2. Respondents Answers Towards the Impact of COVID-19 on Pharmaceutical Care; N = 80.

Frequency (%) Statement	All respondents (N = 80)		Gondar (N = 45)		Bahir Dar (N = 35)		Chi-square
	Yes	No	Yes	No	Yes	No	
Do you think COVID-19 had brought an impact on the pharmaceutical care service?	79 (98.8%)	1 (1.3%)	44 (97.8%)	1 (2.2%)	35 (100%)	0	0.562
Do you think COVID-19 has decreased the patient flow rate to seek pharmaceutical care?	63 (78.8%)	17 (21.3%)	32 (71.1%)	13 (28.9%)	31 (88.6%)	4 (11.4%)	0.058
Did you encounter any shortage of pharmaceutical products because of the pandemic?	63 (78.8%)	17 (21.3%)	33 (73.3%)	12 (26.7%)	30 (85.7%)	5 (14.3%)	0.179
Did you encounter any change in the cost of pharmaceutical products because of the pandemic?	70 (87.5%)	10 (12.5%)	36 (80%)	9 (20%)	34 (97.1%)	1 (2.9%)	0.037
Did you encounter any shortage of personal protective equipment (PPE's) because of the pandemic?	71 (88.8%)	9 (11.3%)	37 (82.2%)	8 (17.8%)	34 (97.1%)	1 (2.9%)	0.036
Did you encounter any change in the cost of PPE's because of the pandemic?	75 (93.8%)	5 (6.3%)	41 (91.1%)	4 (8.9%)	34 (97.1%)	1 (2.9%)	0.379
Did you encounter any shortage of personal hygiene materials because of the pandemic?	70 (87.5%)	10 (12.5%)	40 (88.9%)	5 (11.1%)	30 (85.7%)	5 (14.3%)	0.741

Bold: Significant at $P < 0.05$

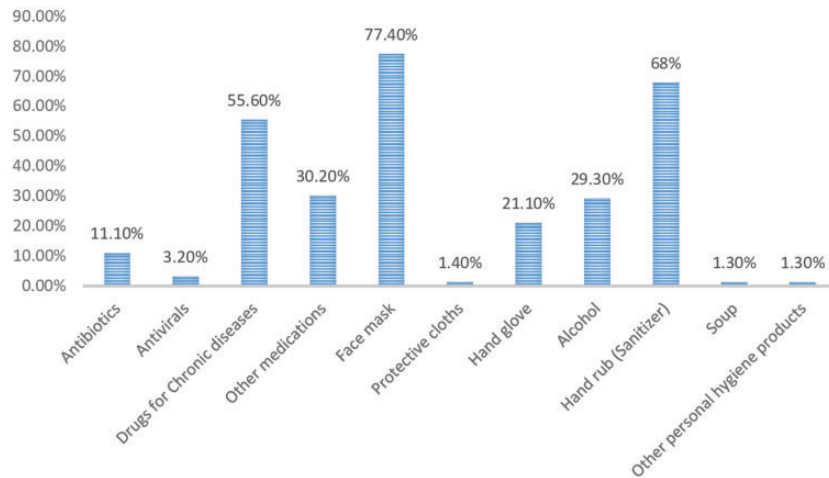


Figure 1. Types of Pharmaceuticals in Shortage of Supply at Community Pharmacies Due to the COVID-19 Pandemic.

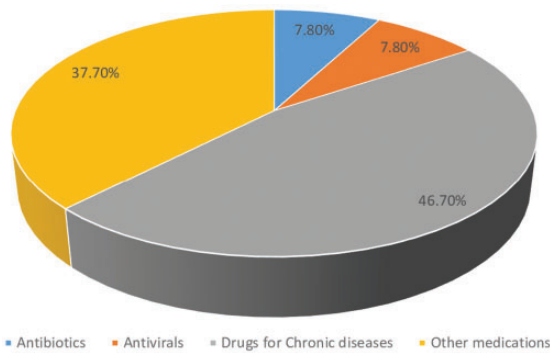


Figure 2. Types of Medications Highly Consumed at Community Pharmacies After the Outbreak of the COVID-19 Pandemic.

reported that they used the WHO guideline, while the remaining reported utilizing other internet sites 1 (4.3%), pharmacy textbooks 1 (4.3%) and 1 (4.3%) without using any formula.

A greater number of the study participants had also reported; they counsel their patients about the proper utilization of a face-mask upon dispensing 65 (81.3%), they were able to screen outpatients with signs and symptoms of COVID-19 46 (57.5%), and they were always readily available to provide consultation on proper self-protection skills or psychological support for those identified patients 64 (80%). However, only 9 (11.3%) of the participants have reported having accessed/read the International Pharmaceutical Federation (FIP) issue on “Coronavirus 2019-nCoV outbreak: Information and guidelines for pharmacists and the pharmacy workforce (Table 3).

The majority of the respondents had reported a 50-100% and >100% increment on the price of a sanitizer (alcohol-based hand-rub) at their premises after the COVID-19 outbreak 28 (35%) and 26 (32.5%)

respectively. However, >100% increment on the price of a facemask was reported by the majority of the respondents 32 (40%) followed by a 50-100% increment 31 (38.8%) (Figure 3). Only 23 (28.8%) of the study participants had reported that they prepare alcohol-based hand-rub (sanitizer) at their premises with the main reasons being a shortage of ingredients 35 (58.3%), lack of equipment 18 (30%), lack of confidence 3 (5%), other reasons 3 (5%) and lack of knowledge 1 (1.6%).

During the time of the survey, 64 (80%) and 67 (83.8%) of the community pharmacies had a sanitizer (alcohol-based hand-rub) and a facemask available at their premises respectively. The majority of the study participants have also reported that they had enough stock of medications for chronic diseases 42 (52.5%).

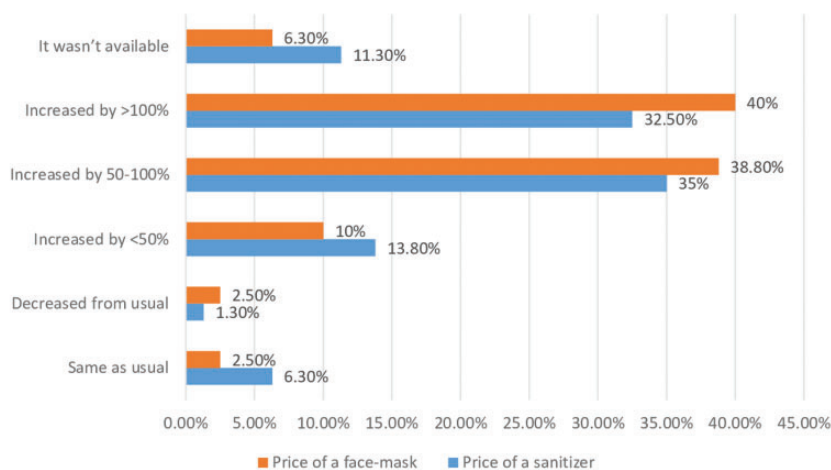
Discussion

COVID-19 is a highly contagious, global pandemic currently affecting people of all ages and sectors without any discrimination (Atif & Malik, 2020; Sheppard & Thomas, 2021). Community pharmacists as part of the healthcare team are the frontline health professionals in the control and prevention of the spread of the disease. In the current study, out of the total pharmacists invited to participate, only 79.2% of them had completed the survey. This may be due to workload, fear of COVID-19 transmission, and/or other personal reasons (such as; fear of being exposed as some pharmacists were irrationally increasing the price of some pharmaceutical products, mainly PPE’s, for only business purposes).

In the current study, 98.8% of the pharmacists reported that COVID-19 had brought a significant impact on the provision of pharmaceutical care services in community pharmacies. This finding was supported

Table 3. Role Played by Community Pharmacists During the COVID-19 Pandemic; N = 80.

Statement	Frequency (%); (N = 80)	
	Yes	No
Have you installed personal hygiene products in your premise	45 (56.3%)	35 (43.8%)
Do you prepare alcohol-based hand-rub formulations at your premises?	23 (28.8%)	57 (71.2%)
Do you currently have a sanitizer (alcohol-based hand-rub) on your premises?	64 (80%)	16 (20%)
Do you currently have a face-mask on your premises?	67 (83.8%)	13 (16.3%)
Do you counsel your patients about the proper utilization of a face-mask upon dispensing?	65 (81.3%)	15 (18.8%)
Do you have enough stock of medications for chronic diseases	42 (52.5%)	38 (47.5%)
Did you read the International Pharmaceutical Federation (FIP) issue on “Coronavirus 2019-nCoV outbreak: Information and interim guidelines for pharmacists and the pharmacy workforce	9 (11.3%)	71 (88.8%)
Do you think you can screen patients with signs and symptoms of COVID-19	46 (57.5%)	34 (42.5%)
Are you always readily available to provide consultation on proper self-protection skills or psychological support for those identified patients?	64 (80%)	16 (20%)

**Figure 3.** Price of Face-Mask and Sanitizer at Community Pharmacies After the Outbreak of the COVID-19 Pandemic.

by a study conducted in England, which reported that COVID-19 has affected every level of the society including health care service in the community pharmacy (Willan et al., 2020).

The majority of the participants reported that they have faced a shortage of pharmaceutical products especially PPEs and an alcohol-based sanitizer. Similar results were also reported in other countries (Kuhn, 2020; Vergano et al., 2020). This shortage of pharmaceutical products affects pharmaceutical care in the community pharmacy (Buerhaus et al., 2020). The travel restrictions imposed by many countries has highly affected the global pharmaceutical supply chain in which the impact is very severe in countries like Ethiopia, which is highly dependent on importation to cover the pharmaceutical needs of its population (Kassema, 2020; McKibbin & Fernando, 2020). This has eventually led to shortage and increased price of those products.

Shortage of PPEs such as protecting gears, masks, and hand sanitizer may discourage health professionals from actively participating in the control of the spread of the disease.

In the present study, drugs for chronic diseases were the most frequently reported group of medications in short supply. This finding was in line with a study reported by Tuccori et al. (2020) which reported that the drug demand was increased by 30–40% related to the COVID-19 outbreak. This may be due to the high consumption of those medications by patients due to the stress induced by the pandemic or due to panic buying and storing with fear of future shortage of supply.

From personal protective equipment's, face mask (77.4%) followed by hand glove (21.1%) were the most common products under shortage. This may be associated with the high consumption of those products by the community and the health professionals as these

are the mainstay of prevention of the spread of the disease.

In the present study, only 28.8% of the pharmacists have reported that they prepare alcohol-based hand-rub (sanitizer) in their premises. Compounding sanitizers is within the realm of compounding pharmacies and can serve to fill the gaps in PPE shortage for healthcare workers and contribute to the prevention of the disease after contact with a diseased person (Aruru et al., 2021). In this study, 68.8% of the pharmacists also reported that they provide education for their patients about COVID-19. This is important for prevention, control, and making appropriate referrals for suspected cases. In Nigeria, during the previous Ebola outbreak in 2014, community pharmacists' dedication to public health education had hugely contributed to infection prevention and control (James et al., 2016). Community pharmacists had also provided a great contribution in the previous H1N1 pandemic in 2009 (Cadogan & Hughes, 2021; Watson et al., 2020).

In this study, the most commonly cited source of the formula for the preparation of a sanitizer was WHO guidelines (87%). A report from China also showed that community pharmacists used WHO guidelines (Ung, 2020). This guideline is relatively easy to apply and familiarized with the procedure for community pharmacists (World Health Organization, 2010). The current study also revealed that the majority (80%) of community pharmacists were ready to provide psychological support for COVID-19 infected patients. This finding corroborates with a study done in China (Song et al., 2021). Community pharmacists should pay attention to psychological disorders related to COVID-19 and assist psychiatrists in providing psychological intervention for patients.

Limitation of the Study

The study has some limitations that need to be taken into account while interpreting the results. The main limitation of the current study could be the reliability of the data collection instrument. Due to lack of previously conducted similar studies at the time of the current study, as per the best knowledge of the authors, the current data collection tool was custom developed after careful review of other studies conducted in similar areas, which was then pilot-tested before being administered. The other limitation could be the sample size. Due to fear of the COVID-19 pandemic which was wide spreading during the current study, many of the contacted health professionals were very reluctant to participate in the study. This has brought a significant limitation to the sample size which could make it difficult to make generalizations and make inferences to other areas of the country. However, this survey might

have widespread implications for identifying the impacts of COVID-19 on the promotion of pharmaceutical services. It should also be noted that the current study was conducted at the beginning of the pandemic and the identified shortages may improve with time, thus implying future studies to compare the findings.

Conclusion

This study revealed that the COVID-19 outbreak had brought a significant impact on the pharmaceutical care services in the community pharmacy. The study also showed that the majority of community pharmacies faced shortages and increased prices of pharmaceutical products especially personal protective equipment's, and an alcohol-based sanitizer. There is a gap in community pharmacist's involvement in the control of the current pandemic and underutilization of their potential was identified.

Recommendation

Strategies should be implemented to improve the availability and affordability of various essential pharmaceuticals to mitigate the spread of the disease and prevent other complications. Community pharmacists should be more engaged in the prevention and control of the pandemic through maintaining a stable drug supply, patient education, preparation of alcohol-based hand rub, and applying updated strategies of prevention and control of the COVID-19 outbreak.

Author's Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis, and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Declaration of Conflicting Interests

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