

Role of Pharmacists during and Post COVID-19 Pandemic-An Indian Perspective

Anuradha Dey[#], Shreya Das[#], Gautam Singhvi, Richa Shrivastava^{*}

Department of Pharmacy, Birla Institute of Technology and Science, Pilani, Rajasthan, INDIA.

[#]Authors Contributed Equally.

ABSTRACT

The multiple outbreaks of COVID-19 have led to a public health crisis, affecting millions across the globe. The healthcare fraternity is shouldering a huge responsibility and is working tirelessly to curb the spread of the disease. These unprecedented times demand that the usual roles of pharmacists be modified. Pharmacists have to rise up to the challenges and strategize accordingly. Many nations are trying to tackle the repercussions of the second wave of COVID-19 and the latest third wave by OMICRON variant, which has punctured the healthcare system and led to question the resource management and governance failures that have affected thousands of lives. It is difficult to bring the situation under control in several places, predominantly middle and low-income countries. Thus, to succeed in providing all the healthcare services, changes pertaining to operations, supply management, safety precautions, spreading awareness, vaccination drives, etc., must be incorporated by healthcare workers, especially the pharmacists, to create a maximum positive change. This article highlights the roles and responsibilities of the pharmacists that they can fulfil during and post this pandemic. It also reviews the nature of their functioning, the roles that they can adapt, and identifies places wherein their roles can be expanded or modified in accordance with the country-specific guidelines.

Keywords: COVID-19, Pandemic, Pharmacist, Community health, Patient care.

INTRODUCTION

A pandemic can be defined as “an outbreak of a disease that occurs over a wide geographical area and affects an exceptionally high proportion of the population”.¹ The oldest known pandemic to man is the black death, i.e., the bubonic plague that outbreaked in the middle of the 14th century affecting Europe and Asia. The deadly disease was caused by the bacteria *Yersinia pestis* and killed up to 200 million people.² The Spanish flu, whose causative agent was the H1N1 virus, was one of the most deadly pandemics in recent history occurred in 1918-1919. Although it is termed as Spanish flu, yet its origin could not be identified. It infected one-third of the world’s population and led to the death of more than 50 million people.³ Flu pandemics that spread in

1957 and 1968, known as Asian flu and Hong Kong flu, respectively, occurred in the modern era where virology as a science was much developed, leading to the characterization of the causative agents of these pandemics. Asian and Hong Kong flu was caused by H2N2 and H3N3 influenza virus, respectively.⁴ The H2N2 and H3N2 pandemics claimed around 2 million and 1 million lives worldwide, respectively.⁵ Similarly, SARS (severe acute respiratory syndrome) caused by SARS-CoV was first reported in 2002 from Guangdong province in southern China. In 2009 a pandemic known as the swine flu pandemic caused by the H1N1 influenza virus resulted in the death of about 0.3 million people worldwide.⁶ Another respiratory viral pandemic occurred in 2012, which was first reported from Saudi Arabia and hence named as Middle East Respiratory Syndrome (MERS). Its causative

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Address for

correspondence:

Dr. Richa Shrivastava,

Department of Pharmacy,
Birla Institute of Technology
and Science, Pilani-333031,
Rajasthan, INDIA.

Email id: richashrivastava18888@gmail.com



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agent was a coronavirus, MERS-CoV resulted in 858 casualties worldwide.⁷ Today the world is facing another pandemic challenge, COVID-19, caused by the outbreak of SARS-CoV-2. It was first reported from Wuhan, China, in December 2019.⁸ It was declared a global pandemic by World Health Organization (WHO) on 11th March 2020. As of 7th February 2022, it has affected more than 200 countries resulting in more than 390 million cases and the death of around 5.7 million people worldwide.⁹ This article gives a detailed description of the scope of actions that can be undertaken by pharmacists in order to tackle the healthcare crisis due to the COVID-19 pandemic. The classification and discussion of the roles are bifurcated into during the pandemic and post the pandemic.

Pharmacists at the Frontline

“Pharmacist is a health care professional licensed to engage in pharmacy with duties including dispensing prescription drugs, monitoring drug interactions, administering vaccines and counseling patients regarding the effects and proper usage of the drugs and dietary supplements”.¹⁰ A pharmacist has multiple roles to play in health care infrastructure like community pharmacy, hospital pharmacy, long-term care facilities, pharmaceutical industries, government services including defense, railways, mail services, and academics and research. Community pharmacist connects patients to medical professionals. A pharmacist is exceptionally trained to counsel the patients on taking multiple medications effectively and managing any side effect arising due to the same. In addition to being trusted, a pharmacist is also more accessible than a physician to the general public.¹¹ In the hospital setups, a pharmacist, has the responsibility of monitoring the supply of all medicines, vaccines, saline, medical equipment, and surgical in the hospital. He is in charge of purchasing, dispensing, and quality testing of the same. Long-term care facilities admit patients suffering from a chronic disease requiring hospitalization. The duties of the pharmacist in these facilities include filling the medical prescriptions, deciding doses, informing the patients about their disease and treatment they are undergoing, planning of long-term therapy, observing if any adverse effect or drug interaction takes place. These roles a pharmacist plays in association with clinicians and paramedical staff. They are also involved in clinical trials.¹² Pharmaceutical companies can be considered as a forte of the pharmacist. Here pharmacist is involved in a range of duties which include drug discovery, regulatory and safety studies, clinical trials, marketing and management of the manufactured products. It is the responsibility of the pharmacist to verify that the manufactured products meet all the safety and regulatory

guidelines. Pharmacovigilance ensures that drug therapy and medical care reaching the patients is safe. Pharmacist engaged in pharmacovigilance monitoring, identifying, recording or documenting and reporting of the adverse drug reaction which helps in prevention of occurrence of similar incidences.¹³ Academics and research have been one of the most fascinating target options relevant to almost all fields. A pharmaceutical science faculty or scientist imparts basic training to undergraduate students along with training research scholars, supervising their research and publishing scientific research related to the field of medicine.¹⁴ Table 1 below describes the role of Pharmacist in various pharmacy settings.

COVID-19 SCENARIO IN INDIA

As of March 22, the number of reported cases in India was over 43 million,¹⁵ which is second highest country wise, a few million cases behind the United States which has reported around 81 million cases since the beginning of the pandemic. This meteoric rise in the caseload in India is attributed to the second wave, which sent jitters through the entire nation and left them reeling to bring the situation under control.¹⁶ India stands at second

Table 1: Range of Pharmacy Settings.

Community pharmacies	Every locality has numerous pharmacies which cater to the people living nearby. Community pharmacies play an integral part during the pandemic as they are in continuous touch with the people area-wise.
Long Term Care Facilities	Generally, most care facilities have an in-house pharmacy in order to meet the medicinal needs of the people staying there. Especially the pharmacists at old age homes have to be more observant and willing to help in whichever way possible as elderly people are more susceptible to infections.
Hospital pharmacy	Monitoring the patients and visitors who come to the pharmacy, reporting authorities any suspected carriers based on symptoms.
Pharmaceutical industry	Fulfilling their roles at various levels of the industry-conceptualizing production, manufacturing, transportation, operations, and distribution during the pandemic.
Government Services	Serving as government employed pharmacists at the allocated place such as railways, navy, army, air force, and hospitals.
Academic and research	Expending the available resources to further the research related to COVID-19. Assisting multinational corporations in their work at full capacity.

position in terms of number of reported cases. India has the second-largest population in the world; this clearly depicts the high rates of transmission in case of any disease outbreak, given that people live in such close proximity.¹⁷ The above statistics are quite alarming, and thus there is a need for more stringent measures to be undertaken.

Since the reporting of the very first case in southern India at Kerala, the numbers of cases have been on an uphill climb.¹⁸ Given the alarming conditions across the globe, where various health infrastructures are toppling down due to the inability to cope with the current needs. It stands as a huge challenge for India to implement plans which are sustainable and can control the given situation, keeping in mind the high population of our country.¹⁹ The regulations and guidelines being brought forth by the government and medical agencies have to be followed diligently in order to tackle this situation in the best possible way.

Even though India has a large workforce of healthcare professionals, including doctors, paramedical staff and pharmacists, given the population size and the current demand, it is taking a toll on their physical and mental health.²⁰ Due to this, the hospitals have issued guidelines restricting the in-person visit of patients to the hospitals until extremely necessary. As a result, consultation with the doctors on a one-to-one basis has reduced drastically.²¹ With the private clinics also being closed, the common man is confused about whom to approach with their queries. Hence in these inadvertent circumstances, the connecting links are the pharmacists. This article emphasizes on the roles and responsibilities of the pharmacist in tackling the COVID-19 crisis impact on public health and post-pandemic challenges.

Multiple waves and variants of COVID-19

India, as a country has been one of the worst hit amongst all the countries by the massive second wave of COVID-19, which began in the early months of 2021 in India.²² Following suit after this was the third wave which occurred in the early months of 2022. Around mid-March 2021, the number of reported daily cases was more than 400,000, leaving the entire healthcare infrastructure and governing bodies in shambles, having displayed sheer ineptness in containing the spread.²³ In 2020, after struggling through the first wave of COVID-19 outbreak for several months, India saw a decline in the number of cases from September 2020 thus relaxation in lockdown restrictions was incorporated across the nation and return of the businesses and other activities to normal was being initiated. This decision of letting the guard down

was in fact, “too soon”, as from March, 2021 onwards, there was an exponential increase in COVID-19 cases throughout the country.²³ The reported positive rate was around 8% for the whole country and nearly 30% in Maharashtra. Some experts claimed that it was due to triple mutation in the virus which had attributed high contagiousness to the virus strain. Natural evolutionary changes in the virus had rendered it more transmissible than previous strains.²⁴ India’s health ministry released a data in the month of March 2021 on genome-sequencing of thousands of samples collected from different states and it was found that the mutations that had occurred in the virus made it have lesser binding affinity towards monoclonal antibodies.²⁵ Thus, as this has an impact on the neutralization of monoclonal antibodies, it became a major concern.²⁶ Till now, several variants of concern have emerged and they pose a worldwide concern given that they have higher rates of transmission and also have the ability to potentially escape the immune system. In the last month of 2021, the number of COVID-19 cases was again on an uphill climb leading to the third wave. This had an infection rate four times that of the second wave. However, the rate of being hospitalized and the rate of fatality was much lesser this time.²⁷ Existing labs concerning viral diagnosis like Virus Research Diagnostic Laboratory and labs for genome sequencing like Indian SARS-CoV-2 Genomics Consortium (INSACOG) labs are already in place and actively working to identify and monitor any novel SARS-CoV-2 variant.²⁸ Early and active surveillance along with efficient genome sequencing programs will help in getting a better grasp over the circulating variants and mapping the evolving strategy of their mutated versions. Along with this, mass vaccination of all age groups, strict implementation of COVID-19 protocols, like social distancing, sanitizing, masks, and restricted movements of people all over the country along with more training programs for pharmacists to increase their involvement in managing the pandemic are the only possible methods that can help to tackle the impending waves of infection and end the pandemic without further pushing the number of people succumbing to it and thus driving the mortality rates higher.²⁹ These measures are of particular importance at this stage for being wary of consequent multiple waves given that any slack in implementation of measures to curb this virus will potentially choke the adversely affected healthcare infrastructure in our country.

ROLE OF PHARMACISTS DURING THE COVID-19 PANDEMIC

As people are getting frustrated with the imposed lockdowns, the seriousness has reduced and people have

developed a complacent attitude towards the current pandemic and have started showing relaxation in obeying the government mandates.²² Thus, now more than ever it is required that each segment of the community steps up and fulfills its role to the best. The pharmacists are the people who are at the forefront and continuously interact with the larger public and hence it is required that they genuinely urge the people to observe the regulations and take the safety measures without compromise. The prime responsibility of every citizen during this pandemic panic is to control the spread of infection. In addition to this, a pharmacist should serve as a care and support system in their respective localities. Below we provide a summary of their role during the current COVID-19 pandemic.

Many retail pharmacies are generally situated in and around doctor's clinic or small hospitals, keeping this in mind the doctors can also tie up with certain pharmacies and provide the service of online consultation via various platforms.³⁰ The pharmacists generally have a good idea about a doctor's practice and thus can guide the public especially in rural areas for direct virtual connect with the patients. Keeping a record of the customers who are purchasing drugs related to respiratory illness can provide a database which can serve as a referral point in order to check in the future whether these people have contracted the infection. Thus, it is very much required that pharmacists have complete information of each customer on their tips even if the purchase made by them is not a lot.³¹

Following Protocol

Usually, each pharmacy has a minimum 2-3 staff, one being the head pharmacist among them. They are familiar with their regular customers from the vicinity and many even have a good rapport. Thus, the customers/patients have some amount of trust in them. This serves as the foundation to guide them. As per various surveys conducted it was found out that pharmacies are following strict guidelines for better service provision and for their own safety.³² For example, a window can be used for dispensing, and a rope of some sort can be tied across the counter to prevent the people from leaning on and crowding close to the pharmacists themselves.³² Various international bodies have been at the forefront to keep the pharmacists updated on the protocols which are to be followed. The international pharmaceutical federation (FIP) came out with 10 guidelines for protecting pharmacists.³³ The need of the hour is that pharmacists themselves are well prepared. Various organizations can help by implementing a set of mandates given in order to strengthen the community. For example, free dispensing of sanitizer to every individual, giving

masks to customers before they enter, a temporary window should be in place for the transfer of goods in a tray and scheduling multiple cleaning.³⁴

Staff is integral to the smooth functioning of any organization and thus their safety and well-being are also of paramount importance. Hospitals are the hotspot of infection and transmission of COVID-19 and hence the pharmacists should ensure that they have minimum contact with the patients. In order to carry out this, they can themselves implement various strategies and develop a system of working in shifts. Proper scheduling of the working hours during the pandemic is important. It is even required that a strict log of entry and exit of the pharmacists is maintained for ascertaining the source in case anyone gets infected, also the staff can work in rotation to ensure that even if anyone of them gets affected there's always someone who can replace them.³⁵

Educating the Customer and Patient Care

Given that a large proportion of the population cannot read or write in English, the lack of correct information to the public poses to be a challenge and this gap can be bridged by pharmacists in these troubled times.³⁶ They can very well shoulder the responsibility of conveying correct information to their customers when they visit the pharmacy. The staff of both retail and hospital pharmacies should be well trained in answering the queries of the people, give them information on general steps of personal hygiene, and hand washing technique recommendations, which are required for the people of that locality and in their respective languages. Pharmacists can provide information brochure to each customer in which details on what steps one should take if suspecting a case, or how to wear masks, can be written.³⁷

Pharmacists can also contribute by volunteering to serve at COVID-19 centers and hospitals and assist the patients in the safest way possible. Demonstrations on how to operate various essential medical devices can be shown. These can include, blood pressure measuring device, device for measuring the oxygen saturation levels, or for measuring pulse rate. The vitals of a COVID-19 affected patient has to be monitored on a regular basis and thus pharmacists can help by teaching them to do so via live demonstrations to the patients' family members or via video streaming avenues. This can be done in addition to the usual roles of explaining prescriptions, drug interactions, adverse reactions, and allergies.³⁸

The retail pharmacists can display several information on their premises such as, the number of COVID-19 cases in the locality, provide links of reliable apps and websites

regarding COVID-19 updates, give helpline numbers in case of emergency and even information of COVID-19 testing centers.³⁹ For example, many pharmacies are displaying the latest information on the advice issued by the Indian Council of Medical Research (ICMR) on using the Rapid Antigen Detection Test. Posters of all this can be made and pinned on the notice board of the pharmacy or on some wall which is easily noticeable to the customers. It is of crucial importance that preventive measures are also mentioned in a similar way.³⁹

Maintenance of Supply

Many pharmacies are displaying an updated chart on their premises which showcases the units of masks, sanitizers, PPE, and other frequently bought medicines associated with COVID-19 available currently. Upon the announcement of the series of lockdowns, there was a state of panic created which led to a high surge in the pharmacy sales. People were confused and started buying in excess fearing that the medicine shops might run out of their supplies.⁴⁰ Thus, seeing the situation many pharmacists have taken the decision of not dispensing more than a specified unit of same medicinal supply to a particular household. Pharmacists have the responsibility of ensuring that steady supply of essential medicines which are most frequently purchased is maintained.⁴¹ Here, their relations with various wholesale distributors and pharmaceutical companies come to test. Additionally, pharmacies can put technology into use to keep records by installing an IT system, so as to collect the data about both sales and purchase of all pharmaceutical products during each transaction, for real-time monitoring purposes. This will further be helpful for the general population if such information is made publicly available on their official website.³⁷ Pharmacies of a particular district/locality have to come up with plans for meeting the needs of one another too. If one area has a deficit of a certain group of medicines, they should help one another and deliver their own supplies at such pharmacies. This is done to avoid the customers from travelling from one area to another which can be detrimental, especially if that customer is from a locality having higher number of COVID-19 cases.³⁴ Thus, in order to contain the people of one locality in their own locality it is better that the pharmacist travel and meet the demands of the customer. It goes without saying that it is very important that every pharmacy has a home delivery system in place. It is very much required in order to curtail the number of people visiting the pharmacy. This is the best way to keep in check the spread of COVID-19 to some extent. Pharmacists have a database of their customers which has all the information regarding them. This can prove useful in sorting the customers into various segments

and catering to their need respectively.⁴² Especially for the aged customers refill can be provided for their monthly medications. In many countries the governments have even allowed the pharmacists to provide refill of medications without prescriptions. Well, generally when it is a regular customer and the pharmacy already has a record of previous prescription in its system, it can go ahead with providing a refill.⁴³ This is a must for patients older than sixty-five years of age or who are confined at their homes or staying at quarantine facilities.

Aid in Vaccine Distribution

In India, the DCGI (Drug Controller General of India), who is the head of CDSCO (Central Drugs Standard Control Organization) gave approval for emergency use of two COVID-19 vaccines: the AstraZeneca-Oxford University vaccine which is being developed by Serum Institute of India called as Covishield and the other belonging to local giant Bharat Biotech known as Covaxin.⁴⁴ These are the two vaccines which are driving the vaccination efforts in India apart from the recently approved Sputnik V (Gamaleya).⁴⁵ Given the population of India and the government's strategy to make vaccine available free of cost or at nominal rates in the first round to healthcare workers and frontline workers followed by the general public will require thorough planning. The logistics associated with these must be well-planned and executed taking due measures. Pharmacies can function as a point of local distribution in respective localities as they can pileup some stocks in their refrigerators and supply to hospitals or checkpoints of administration, thus supporting and playing their part in the plan being initiated by the government. Figure 1 highlights the roles of the pharmacists towards patients and healthcare sector.

ROLE OF PHARMACISTS POST COVID-19 PANDEMIC

Being Vigilant

The ramifications of every step will be felt eventually. Any small negligence on behalf of any person can lead to a huge surge in number of people getting affected and

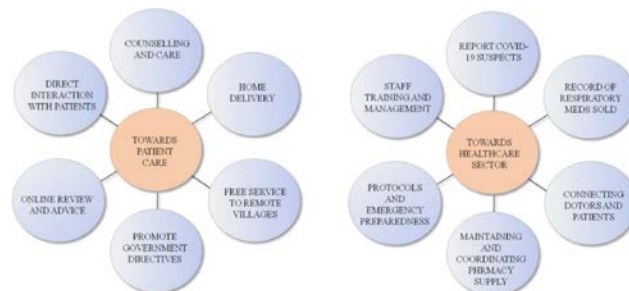


Figure 1: Role of Pharmacist towards Patient care Healthcare sector: Both during and post pandemic.

thus it is of utmost importance that the pharmacists are quite vigilant. Retail pharmacies need to gauge measures for reporting the people whom they suspect of being infected with SARS-CoV-2.⁴⁶

By various data analyses it is being estimated that the peak in the cases in India will be seen in the upcoming months and thus a different level of preparedness is required going forward.⁴⁷ Pharmacists have to start imposing stricter analogies in order to circumvent the spread as much as possible. Trays can be used for handing over the supplies thus minimizing direct contact as much as possible. Home deliveries have to be increased; bulk orders can be taken from an area and then deliveries made accordingly at a suitable time.⁴⁶

Utilizing IT Support

The pharmacists can set up district wise or state wise online portal giving information about the availability of masks, gloves, sanitizer, disinfectants, and other essential commodities. The pharmacies which don't have an online portal can easily set it up with some help from the technology sector,³⁴ Pharmacists may even collaborate with various app developers and come out with platforms depicting the availability of medicines in an area unit wise, provide details on what services are being offered by which pharmacy, or discount details. This can also include a portal to showcase emergency numbers of hospitals and ambulance services, counseling and care providers.⁴⁸

Taking Tele-Medicine and Tele-Health Service up by a Notch

A post COVID-19 scenario will be quite different and difficult to comprehend but will bring a sigh of relief across the country. It has become increasingly clear that online platforms are the best way to cater to the needs of the people. Mega online shopping retailers like Amazon, Flipkart, and Myntra have already begun with their businesses and taking a cue from this, an attempt can be made to shift pharmacies also completely online.⁴⁹ The method of no-contact delivery being observed by various online app services such as the ones mentioned above and even food delivery services is a good option to look out for. India has many online pharmacies which have been in the market for quite some time and portals include Medlife, NetMeds and 1MG. This will significantly reduce the risk of exposure of the pharmacists themselves to so many patients. Online platforms addressing queries of the patients can be set up. On these certified pharmacists can register, protect and once proper authentication has been done, they can provide services online including explanation on various adverse drug reactions, give

suggestions on common over the counter drugs which can be taken for certain ailments unless too severe and requires doctors opinion immediately.³⁰

Getting Additional Trainings

In the post COVID-19 pandemic era, the profession of pharmacy practice needs to be viewed and nurtured with more attention, by encouraging and including a greater proportion of pharmacists in a wide range of medical practices like, manual ventilation, bronchoscopy, tracheostomy, tracheal intubation, cardiopulmonary resuscitation, intravenous access to oxygen therapy and other techniques of importance like non-invasive ventilation. The additional training will equip them to handle pandemics like COVID-19 with better readiness in future.⁵⁰

Shift in Research Approach

Currently, a large percentage of pharmaceutical research is invested in therapeutic management of chronic diseases like cardiovascular disorders, cancer, and diabetes. Extensive resources and work towards finding a cure for these diseases is of paramount importance, but in the quest to be absorbed in such research, pharmaceuticals scientists tend to side-line the need to invest their skills and knowledge in finding therapeutic solutions for infectious diseases which have the ability to take the shape of a pandemic quite swiftly. More pharmacy students should be encouraged to choose the less explored research topics as it will allow them to grow as well as have a better insight when faced with challenges such as COVID-19.⁵¹

Preparedness for Emergency Health Situations

Pandemics are situations of medical emergency and require that immediate measures are taken to control the spread of the infection as early as possible. The fast transmission of different variants, bringing the entire nation on the verge of lockdowns is an example of such medical emergencies which have started becoming a routine over the past two years. Thus, the entire community of health care professionals need to be prepared to handle such situations. A minimum training and knowledge have to be imparted at institutional levels during their education period on tackling different emergency situations, be it pandemics, epidemics, or bioterrorism. Pharmacists have to foresee the implementation of such courses across India. All the aspects related to the pandemic such as controlling its spread, applying precautionary measures, and strategizing initiatives to be undertaken while adjusting to post pandemic phase also come under preparedness.⁵² Various government organisations, health

departments and pharmacy boards can take up these agendas and come to a decision.⁵³

Preventing Unwanted Outcomes

Owing to the lack of knowledge of medication to be taken and the subsequent panic created among people, a surge in the use of antibiotics was witnessed during this pandemic. This paves the way for an additional concern of increased antibiotic resistance in the post-pandemic period. The ever-evolving resistance mechanisms have already threatened the ability to treat infectious diseases and when antibiotics are brought to use without prescription, the emergence of resistance becomes worse. Pharmacists can play a very important role by making both people and healthcare professionals understand the potential effects of this lurking danger. They have to promote the need for urgent action in this regard, without which there are chances of the post pandemic era taking the shape of an antibiotic resistance era, in which common infections and minor injuries will once again have the potential to kill.⁵⁴

Pharmacists as an Aid to the Vaccination Process

All over the world pharmacists are playing a significant role in administering and achieving high and rapid coverage of the COVID-19 vaccines, opening gates for new opportunities in addition to some noteworthy challenges.^{52,55} Currently efforts are directed towards facilitating their equitable distribution based on the regions which are most affected globally as well as making sure that economic disparity doesn't stand to be a hurdle in determining access to the vaccines. These can be better addressed by adopting a patient-centered approach and complete scrutinization of the healthcare systems. In order to maintain the fluidity of vaccine supply chains, it is important to promote improved communication between pharmacists, government health departments and the responsible authoritative bodies, to meet increasing patient demand, and delivering up-to-date information about new requirements of administration of vaccines all over the country.⁵⁶ Swift mechanisms of pharmacist training in vaccine administration and upskill programs for those already trained are crucial to increase their efficiency in accomplishing successful COVID-19 vaccination programs. This will also broaden their roles as patient educators on the efficacy and side-effects of the available vaccines. This will also encourage people to get themselves vaccinated as the recommendation of a healthcare provider will increase their preference towards the vaccine.⁵⁷ In addition to managing efficient vaccination programs, collecting and maintaining complete, accurate and timely data profile

of vaccine recipients is of utmost importance, as it will help to determine the uptake, effectiveness and adverse effects of a particular COVID-19 vaccine.⁵⁸ This can be facilitated by integrated electronic platforms to maintain records of vaccinations and other patient data, which will help to overcome inadvertent errors and also reduce the administrative burden on staff to a great extent. In addition to increasing the efficiency of all pharmacist-delivered services, these methods can largely contribute to improving patients' experiences and thus expediting the vaccination drive across regions.⁵⁹

As a response to the increased vaccination rates in the country, pharmacies are required to implement proper standards so as to minimize the risk of exposing both staff and vaccine recipients to SARS-CoV-2. The responsible personnel should strictly adhere to cleaning protocols and perform all the tasks in PPE to ensure the safety of all involved. The impending vaccination drives will include mostly children belonging to the age group of 0-14 years, who will require special attention and care, both during and following the vaccination. Pharmacists must educate the parents on the same and also have to ensure proper monitoring of the vaccination process with undivided attention so as to see that each and every child is vaccinated following proper safety protocols.⁵⁹

Thus, community pharmacists can prove to be the most capable vaccine providers as they possess appropriate knowledge and are widely accessible to the public. The lessons learned from this pandemic and systems or services implemented during its course, can be the source of improvement of routine pharmacist vaccination services, strengthen the role of pharmacists as immunizers, and increase their capacity to deliver efficient vaccination services in future public health emergencies in India.⁶⁰ As documented in a recently published editorial by Nature journal, "COVID is here to stay: countries must decide how to adapt", it is very clear that the emergence of OMICRON variant is the confirmation of a harsh reality that the world needs to be ready for such frequent outbreaks of SARS-CoV-2.⁶¹

CONCLUSION

Pharmacists can compile their thoughts on roadblocks they face and their experiences during this pandemic which can be documented. These will be helpful insights to decide what are the preparedness required for dealing with such situations. Post successful vaccination drives, the pharmacists can keep a record of patients in their vicinity who have taken the vaccine but are reporting mild to severe reactions towards the vaccine if any. Such

Table 2: Role of pharmacist in contributing towards fight against COVID-19.

Prioritization	Prevention	Planning	Facilitation	Restoration
Priority is given to the maintenance of medical supplies pertaining to COVID-19.	Measures on pharmacy premises towards controlling the infection spread by timely cleaning and disinfection.	Setting up emergency protocols in advance for being prepared for any situation whatsoever.	Serving to facilitate as a platform to connect doctors and patients.	Being vigilant and gathering insights during the entire pandemic so as to identify gaps in the system and improve thereon.
Making services more conducive for the elderly.	Educating the public via display of up-to date information and reliable data.	Efficient supply management from various distributors to assure that essential goods are available.	Provision of counseling to patients and customers on a case-to-case basis.	Systematically reinstate normal functioning in all aspects of the operation-staff schedule, supply continuity, and medicine purchase.
Prioritizing the patients with chronic ailments and taking necessary steps, for e.g., providing medicine refill, home delivery, and counseling.	Obeying the norms related to social distancing, maintenance of hygiene, etc.	Planning concerning the management of pandemic medical waste- masks, gloves, syringes, etc.	Assisting the state government and municipal bodies by obeying orders and facilitating the medical supplies across regions.	Compiling the patient data collected during the pandemic and thus establishing relations with the patient base.

insights will be helpful in creating a database region wise which can be assessed and based on which, further precautions can be taken for others who are going to take the vaccine.

As information on the pandemic is ever evolving and new insights are being gained, it is vital that pharmacists remain updated and serve as safeguards for the people by taking up challenges as the situations demand. Such crises require conceptualization and implementation of new and improved strategies to combat and control the pandemic in the best way possible. The roles of a pharmacist outlined here can serve as a reference point for pharmacists to realize gaps in their work and thus make necessary changes to optimize their functioning. Table 2 compiles the role of a pharmacist in contributing towards the fight against COVID-19. The world needs to be more prepared to beat the ever evolving viral paths in terms of diagnosis, vaccination and drug candidates, and pharmacists have the most significant role to play in mediating this journey by strengthening our defenses against the pandemic.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

COVID-19: Coronavirus Disease; **SARS-CoV-2:** Severe Acute Respiratory Syndrome Coronavirus 2; **MERS:** Middle East Respiratory Syndrome; **WHO:** World Health Organization; **INSACOG:** Indian SARS-CoV-2 Genomics Consortium; **FIP:** International Pharmaceutical Federation; **ICMR:** Indian Council of Medical Research; **DCGI:** Drug Controller General of India; **CDSCO:** Central Drugs Standard Control Organization; **PPE:** Personal protective equipment; **IT:** Information Technology.

SUMMARY

The review highlights the importance of pharmacists, the major working force in healthcare field, in managing global pandemics. A pandemic refers to an epidemic of an infectious disease spread across a large region like multiple continents or even worldwide. Throughout the human history, the world has witnessed many such deadly pandemic outbreaks like small pox, the Black Death, the 1918 influenza pandemic. The extent of damage inflicted by each one of them include mass deaths, burden on existing resources and a dent on global economy. Pharmacists constitute an important work force of medical fraternity of any country and are therefore capable of increasing preparedness of the government against any pandemic or managing it effectively in terms of vaccine distribution, prevention of spread, busting prevailing myths, distribution of supplies amongst the masses and managing drug shortages or educating the population with protocols to be followed in emergency and infection prevention basics. This review covers the

COVID-19 scenario in India and highlights the role that pharmacists have been playing as frontline warriors during the first, second and third waves of infection. In addition to this, their potential in the post-pandemic era has also been discussed in detail in terms of being vigilant, training them to be prepared for more such pandemic outbreaks and emergency health situations, broadening the research outlook to include infectious diseases and their prevention, utilization of the concept of tele-medicine and tele-health service and aiding in the vaccination process. It has already been witnessed that throughout the pandemic, pharmacists have played a vital role in various fields like management of drug shortages, testing of patients, interpretation of lab reports, development of treatment and hygiene protocols, exploration and research of new drugs, vaccine development and giving appropriate medication advice to patients, alongside, doctors, nurses, physicians and other healthcare professionals. Emergence of new variants of the SARS-CoV-2 virus every year is a confirmation of a harsh reality that the world needs to be ready for such frequent outbreaks in future. This review stresses on the need to beat the ever-evolving viral paths in terms of diagnosis, vaccination and drug candidates, and pharmacists have the most significant role to play in mediating this journey by strengthening our defences against the pandemic. The information and suggestions mentioned in this review can help in highlighting the unrealized potential of pharmacists and may also help in utilization of the full worth of their profession by governments and public health bodies in future pandemic emergencies.

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