International Journal of Research in Medical Sciences
Walecha A et al. Int J Res Med Sci. 2025 Jan;13(1):173-179
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20244111

Original Research Article

Preparing for tomorrow's health challenges: lessons from COVID-19 pandemic from a tertiary healthcare setting in Delhi

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Received: 20 October 2024
Revised: 16 December 2024
Accepted: 24 December 2024

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ABSTRACT

Background: The COVID-19 pandemic highlighted the fragility of healthcare systems, underscoring the urgent need for preparedness in managing medical emergencies. This study aims to evaluate the strengths and challenges within a tertiary care hospital, focusing on the lessons learned to improve future crisis management. This qualitative study investigates the strengths and limitations of Lady Hardinge medical college and associated hospitals during the COVID-19 pandemic. The findings aim to contribute to the development of a standardized preparedness plan for future epidemics and medical emergencies.
Methods: Ethical approval was obtained, and confidentiality was maintained. The research was conducted from August 2022 to December 2023 using purposive sampling. Data were collected through interviews and focus groups with hospital staff across all levels, including administrators, faculty, residents, nurses, paramedics, and support staff. Thematic analysis was used to identify key patterns and themes related to hospital preparedness and response strategies.
Results: Key themes emerged around service delivery challenges, communication issues between departments, resource management, and psychological concerns such as the need for acknowledgment. Insights from staff during the first and second waves of the pandemic revealed both weaknesses and strengths, providing valuable lessons for managing future emergencies.
Conclusions: The study emphasizes the importance of addressing the identified challenges to strengthen hospital systems for future crises. The findings offer essential guidance in developing effective preparedness plans to enhance healthcare resilience during emergencies.

Keywords: Medical emergency, Pandemic, Preparedness

INTRODUCTION

The history of epidemics reminds us of the sudden and unforeseen nature of public health crises, reinforcing the critical need to strengthen healthcare systems for future challenges. COVID-19, as a recent example, has illuminated vulnerabilities in global healthcare infrastructures, highlighting the urgency to fortify institutional capacities.[1-3]

Hospitals are pivotal in national and local responses to medical emergencies, showcasing the importance of resilient healthcare systems, particularly in developing countries where challenges are amplified. The strain experienced during COVID-19, especially second wave underscored the fragility of some healthcare infrastructures, emphasizing the necessity for comprehensive reforms and strengthened foundations at the institutional level.[4-6]

To effectively prepare for future epidemics, it is essential to rigorously assess existing healthcare systems. This involves evaluating strengths and limitations, continually refining infection prevention and control protocols, and making proactive adjustments as needed. Establishing

cohesive preparedness plans that leverage institutional strengths while addressing vulnerabilities is paramount. This approach ensures that healthcare institutions can respond promptly and effectively to any future health crisis, drawing from both historical lessons and recent experiences such as COVID-19.[7-9]

This study aims to evaluate the strengths and limitations of a tertiary care hospital during the pandemic and would aid in developing a standardized preparedness plan for better management of similar epidemics or any other medical emergency in the future.

METHODS

This qualitative cross-sectional study was conducted at Lady Hardinge medical college and associated hospitals in New Delhi, India, to examine the impact of COVID-19. The study period lasted from August 2022 to December 2023, with data collection occurring between September 2022 and October 2023. Data analysis was completed by December 2023.

Study population

The study focuses on healthcare faculty, encompassing administrators, senior consultants, mid-level faculties, residents, nurses, and paramedics. The sample size includes senior faculty and administrators for in-depth interviews (IDIs), such as the director, vice principal, additional medical superintendents, and heads of departments like medicine, anaesthesia, paediatrics, and surgery, among others. Additionally, three focused group discussions (FGDs) were conducted with representatives from each department, comprising senior residents, junior residents, nurses, paramedics, and support staff.

Sample size

The exact number of participants involved in the study was 66; out of these, 13 participants were part of IDIs, and 53 were a part of FGDs. Convenience sampling was utilized as a technique.[10,11]

Table 1: Overview of participants.

Participant type	Number of participants
IDIs	
Director and Vice Principal	2
Head of Departments	8
Administrators	1
Senior faculty	2
FGDs	
1st group (postgraduates, senior residents)	15
2nd group (nurses and paramedics)	16
3rd group (support staff)	22

Study tools

IDIs were conducted using structured guides with probes designed to explore detailed insights into participants' experiences and perspectives regarding the hospital's response to COVID-19, as well as their leanings and recommendations for future preparedness plans. FGDs (FGDs) utilized similarly structured guides with probes aimed at fostering interactive discussions and capturing collective viewpoints across departments.[12,13]

Data collection

Prior to data collection, informed consent was obtained from all participants. Confidentiality was strictly maintained throughout the study. IDIs and FGDs were either recorded with consent or handwritten for participants who declined recording. Data from interviews and focused group discussion was transcribed manually to ensure accuracy and privacy.

Analysis

Thematic analysis was employed to analyze qualitative data from IDIs and FGDs. This method facilitated the identification and interpretation of key themes and patterns. Cross-thematic analysis was conducted to explore connections and relationships between different themes emerging from the data.

RESULTS

Themes identified

Several themes were identified from IDIs of faculty and senior administrators. During the first wave, key problems included inadequate testing facilities**,** such as a shortage of supplies, kits, equipment, and efficient sample collection processes, which led to increased costs and logistical challenges. To address these, separate sample collection points were established for different faculties and residents, porta cabins were used for patient sample collection, and portable X-rays were deployed.

"*Nasal swab testing was uncomfortable for the patients, and at times they didn't reach up to the depth, so these technical issues create some problems, and the report availability was time-consuming. Secondly in government hospitals, ID generation took time, at times took 12-24 hours for it*."

Fear and hesitancy among healthcare workers were tackled through deferred duties, enhanced staff motivation, and the prioritization of PPE kits and masks. Psychosocial issues, such as fear among junior faculty and staff due to the novelty of the situation, were partially alleviated through motivational online and offline meetings by higher officials. Departments adopted morning drill**s** to identify and address issues with possible solutions.

"*In the first wave, the main context was defined by novelty; there was uncertainty resulting from novelty, and neither the patients, the community nor the doctors knew what was hitting us. The responses were adaptive and flexible. Doctors feared the risk of exposure; there was a situation of anxiety and panic among the doctors and the community. We had to keep the staff motivated and their morale high so that they could take reasonable and proportionate risks.*"

"*Ownership at the head of institutes was there, but at some senior, middle, and junior levels lacked ownership.*"

"*We used to have a morning hurdle every day; I used to take that; we immediately identified the problems and look a stalk of what had happened over the previous day; there was a fixed place. Everyone would walk in there from 9-9:45. We used to identify problems, assign the tasks and then solve them.*"

The increased bed occupancy led to a waiting list, prompting the expansion of ICU beds and oxygen-equipped beds. Patient load was managed by implementing social distancing measures and expanding telemedicine services. Still, some of the HODs also had some issues. They were facing burnouts since critical care could not be managed by not properly trained manpower.

"*Beds were full during the second wave, and there was no way to get in more beds, for the simple reason that all government hospital beds were not equipped with oxygen. So, one lesson that we could learn is that any hospital that is built, that is, every hospital bed, should have a provision for oxygen, and that provision should be made.*"

A significant problem during the second wave was the lack of oxygen supply, which was mitigated by supporting the installation of oxygen plants and deploying oxygen concentrators through government support and donations. Online training programs were introduced for all departments on ventilator handling; one of the senior administrators said, "*In the second wave, there were days when we were just close to having no oxygen during one night. I made many calls, we were just 15 minutes away from having the oxygen completely gone, but we were saved by a tanker which gave us oxygen for 8 hours, it was tough, but we managed, now we've learned, there won't be a situation like this, we've got oxygen plant*."

The shortage of specialized manpower for managing quarantine centres was mitigated by strengthening inter-departmental and intra-departmental support and coordination and by providing training for faculty and residents from pre- and para-clinical departments. However, most of the departments felt that there was an unequal distribution of the workload.

"*Admissions were piled up during the second wave; we had to extend our ICUs to the wards, we had very little manpower, managing sick patients with less manpower was very difficult, every bed was not monitored although we had oxygen therapy devices, the ratio of nurses to sick patients should have been 1:4 which was around 1: 20, it was very scary.*"

"*We had burnout, most patients did not have relatives, we didn't get much support from the other departments, routine surgeries were not conducted, we didn't get much support from them.*"

Lockdown-induced transportation issues were resolved by deploying DTC buses, while safety concerns were managed through the use of quarantine facilities such as YMCA and hotels, as well as deferred duties.

The lack of a standardized treatment plan was addressed by frequently sharing updates from ICMR and GOI via digital platforms. Many senior faculty members and specialists were not happy with frequent changes in the management plan, and there was confusion.

"*Well, ICMR did issue the STP, but it was sort of a confused plan; there was panic use of drugs, Azithromycin, Tetracycline, and Ivermectin when everyone knew it was a viral fever. Similar to Remdesever, no clear-cut guidelines were issued at the beginning about which patients should use Remdesever; I feel every big institution should have a standard treatment guideline that should be followed. There was heterogeneity amongst the departments that admitted COVID patients, while anesthesia had frequently used Remdesever, and the medicine department used only in severely critical patients.*"

Patient segregation into specialized zones (red and orange) was implemented, and most of the administrators were satisfied with the demarcation of red, yellow, orange, pre, and para, medicine, and anaesthesia.

Biomedical waste management training was given through online and offline mediums. Biomedical waste management faced difficulties at some sites like the YMCA centre.

The surge in demand compromised the teaching of students, which was addressed by conducting online training sessions for faculty members through Microsoft Teams.

Non-COVID services were highly compromised, including the suspension of routine surgeries and mother and child services. Large-scale infections among faculty and residents were managed with backup support from other departments to ensure continued operation and care.

"*In obstetrics and gynaecology, we didn't stop admitting patients; the other departments didn't understand us, all our wards were converted into COVID wards, and our patients had to suffer a lot. We had non-covid ob-gyn patients who were sick and needed HDU and ICU; we didn't know where to put them; it was a challenge. I feel whenever there's a pandemic-like situation, the ob-gyn should be staying because patients would not stop coming.*"

Table 2: FGD of residents and junior faculty.

Themes	Sub-theme	*Verbatim*
Service issues	Non-covid and chronic diseases were ignored	*"Emergency services should be present even in dedicated COVID hospitals, as well as MCH services; at least drug availability for these diseases should be ensured."*
	Inadequate manpower	*"There was a major lack of manpower for shifting patients." "We should have different people from other specialties like pre and para-clinical departments to be trained." "It was overwhelming to work during the second wave; there weren't enough beds for many critical patients."*
	Separate zones for admitted COVID patient	*"I noticed a major breakdown in zone demarcation; even though it was a red zone area, many attendants were allowed, roaming attendants. Education of the attendant was not taken care of." "Even if we educate these patients about various zones, it's difficult for them to understand, so hospitals should be separate; it gets difficult in infectious disease…its better to identify different buildings."*
	The nonexistence of RRT at the institutional level	*"A separate team of doctors should be present, who should have shift rotations."*
	Proper signages	*"Lots of signs for patient education should be present in any hospital."*
PPE kits/ N95 masks		*"We had a lot of referrals; we had to go to various wards in same PPE kits, which somewhat increased chances of infection."*
	Disposal	*"BMW guidelines adhered, but sometimes there minor breaches"*
Sample collection and reports	Delayed reporting	*"Delayed reporting and few sample collection centers in the first wave but managed during the second wave."*
Stay	Separate quarantine facilities for healthcare workers - work upon its cleanliness and food availability	*"Many of us faced problems with washroom facilities and quality food. There were unclean washrooms, and food was not hygienic."*
Communication	Lack of proper interdepartmental, intra-departmental, and inter-institution communication networks	*"We were forced by the other department to perform a tracheostomy in some patients, which we felt was not even indicated."*

Table 3: FGD of nursing staff and paramedics.

Themes	Sub-themes	*Verbatim*
Service issue	Inadequate manpower and untrained manpower Safeguarding manpower	*"First wave adequate services, but the second wave was overwhelming." "We had Infected family members at home who still were not able to take leaves; deferred suits were not strictly followed." "Even the pregnant and lactating women weren't given leaves."*
	Zone demarcation not followed, relatives on same beds as patients, SOP's for zone demarcation weren't followed"	*"Red zone guidelines were not followed strictly during the second wave." "Red zone staff should not rotate in green zones unless quarantine duration is completed."*
	Shortage of beds for health care workers, especially during the second wave	*"Partiality of service allocation, there was an instance where a senior doctor relative who was stable was given a bed but not a staff member who had his oxygen levels dropping to 62 percent was denied."*
	Lack of space for attendants	*"Attendants were roaming around in hospital wards, which augmented infection spread."*
	Lack of adherence to quarantine guidelines	
	Oxygen and ventilators supply	*"Scarcity during the first wave, but second wave had adequate supply." "Technicians and workers weren't enough, so we should have more trained technicians."*

Continued.

Themes	Sub-themes	*Verbatim*
PPE kits	No proper donning and doffing area and improper Changing room facility unavailable	*"Inadequate facility of changing rooms available for staff, single washroom for changing was there, and we had to wait for long periods for changing. There was no washroom facility for the male members of staff."* *"PPE kits weren't changed during referrals, and patient transfers were done by workers transferring the patients, which led to infection transmission."*
	Inadequate ventilation facility	*"It was suffocating to work in PPE kits; hospital wards had serious ventilation issues, and at times, staff refused to wear PPE kits."*
RRT	The nonexistence of RRTs at the institutional level	*"A disaster team should be there in the hospital with all trained manpower, including doctors, nurses, technicians, and support staff."*
Recognition and acknowledgement	Not duly recognized	*"Our work was not duly recognized; there was partiality for resource allocation."*

Table 4: FGD support staff.

Themes	Sub-themes	*Verbatim*
Service	Salaries were not given during quarantine Equality of work	*"If we took quarantine, money was deducted from salaries."* *"We did not get leaves even after working for long hours."* *"Senior officials did not work; their contribution was lacking."*
	Transport facilities	*"We were not given transport services like other hospital staff."* *"ID cards should be issued to us for transport convenience."*
	Drinking water facility	*"Adequate clean water facilities were not available for the staff."*
	Handling of dead bodies	*"Dead bodies piled up; many lacked relatives to claim them, and no hospital staff managed the situation. We had to do their burial, too."*
	Job security	*"We faced job insecurity because we were hired through agencies, which often led to the looming threat of abrupt job terminations."*
Equality	Equality in services and resource utilization	*"Priority for resources utilization"* *"Nurses were resistant to dispatch masks; resources were not shared equally."*
BMW disposal	Lack of BMW segregation and disposal training	*"Doctors and nurses did not take measures for proper waste segregation."* *"Had online and offline meetings for proper waste segregation, donning and doffing, etc."*
Awards and appreciation	Recognition for work	*"We did not get enough recognition for our work like other health care staff."*

DISCUSSION

The COVID-19 pandemic emphasized the importance of being prepared, highlighting the need for healthcare systems to have robust plans in place to combat future medical emergencies. It underscored the necessity of recognizing our strengths and learning from past experiences. Evaluating the lessons from the first and second waves of the pandemic, examining the solutions implemented by institutions, and identifying areas for improvement are essential steps to better manage future emergencies

We conducted this novel this qualitative methodology study during 2022-2023, utilizing FGDs and IDIs as study tools to understand the experiences of all stakeholders involved in managing the COVID-19 pandemic at our tertiary care hospital, which functioned as a partially designated COVID facility. Stakeholders indicated that while initial management was challenging, their effectiveness improved over time as they gained more information and support from various agencies. This progress highlights that while certain issues are inherent to any disease outbreak, sharing experiences and knowledge can lead to better preparedness and more effective management of future emergencies. We hope that insights gathered from the stakeholders will be used to develop a

preparedness plan aimed at enhancing our response to similar situations in the future. Other researchers have also explored similar themes and proposed various solutions.

Kamali et al identified various challenges: insufficient knowledge, lack of standard guidelines for inpatients and outpatients, and managing non-coronavirus patients' challenges. Through their research, they were able to identify key strategies to improve patient care and human resource management.[8] Healthcare workers at our tertiary care hospital faced similar challenges, including a shortage of beds, especially during the second wave of the pandemic. The lack of a standardized treatment plan caused initial confusion, and the shortage of trained personnel further strained the system, highlighting the need for better preparation and resource management in future emergencies. Enhancing lab facilities, separate referencing areas to curb infection transmission, establishing efficient report management networks, and improving inter-departmental and inter-institutional communication are also critical to streamlining work and ensuring effective response in future emergencies.

Fullaondo et al reported that key factors in managing rapidly changing situations included quick responsiveness in planning and execution, the use of telehealth for non-emergency and chronic services, integration of all departments, and the mobilization of various health professionals.[14] Our hospital had an effective telemedicine service, we did not halt our non-emergency services which any other hospital should also take into account. Our participants also suggested that the mother and child care and chronic diseases are essential service departments which should remain uninterrupted.

Gifford et al found that there were resource constraints financially and physical manpower; they underscored collective collaboration and strong governance to overcome various healthcare challenges.[15] Participants in our study also highlighted that manpower should be utilized efficiently, the pre and para clinical department staff was also deployed to manage the emergency. The DRP (District Residency Program) has been recently introduced by Government of India to ensure all postgraduates are trained in emergency preparedness.

Førsund et al focused on adaptive approaches for navigating isolation and responsibility. They also emphasized the use of flexible work practices, including new ways of working and altering work routines.[7] Stakeholders highlighted the importance of an rapid response teams (RRT), which required further strengthening. RRT, should be present which should consist of healthcare workers, doctors, nurses, and technicians skilled in using critical equipment like ventilators and BiPAP machines. Additionally, strict adherence to zone protocols with clear signage is necessary, along with the appointment of ad hoc staff to address manpower shortages.

Another theme highlighted in our study was workplace equality, emphasizing the importance of acknowledging support staff and fostering mutual respect among various departments. Improving these psychological aspects would not only streamline operations but also enhance our ability to manage future emergencies more effectively.

The study has limited external validity as it was conducted in a single tertiary care centre, and the results and themes identified may not be universally applicable. Other healthcare facilities may face different challenges, and additional themes could emerge in their specific contexts. Additionally, the study was conducted in the pre- and post-COVID era, and future emergencies may present new scenarios and challenges. Furthermore, government interventions and improvements since the pandemic may have addressed some of the limitations identified in this study, potentially enhancing preparedness and response in future crises.

CONCLUSION

It is imperative to have effective management for future medical emergencies and pandemics. All healthcare settings should establish robust emergency management systems, addressing key pillars of healthcare operations. A dedicated disaster emergency management team should be formed to streamline resource allocation, ensure adherence to zone demarcation (or allocate separate hospital zones for emergencies), and coordinate responses across healthcare facilities. Clear roles in decision-making, mutual respect, and appreciation for all healthcare workers should be integral to this system.

ACKNOWLEDGEMENTS

We would like to extend our sincere thanks to Dr. S.K. Rasania, Head of the Department of Community Medicine, for his unwavering support and guidance throughout the entire process of our study. Our heartfelt gratitude also goes to Dr. Anil Gurtoo, Dr. Neeraj N. Mathur, and Dr. Atul Goel for their invaluable advice and contributions. We would like to express our deep appreciation to the entire healthcare community for their tireless and courageous efforts in managing the pandemic. Finally, we would like to thank Dr. Vishwa Vadodaria for his motivation, inspiration, and insightful guidance, which were instrumental in the completion of this project.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Walecha A, Goel MK. Preparing for tomorrow's health challenges: lessons from COVID-19 pandemic from a tertiary healthcare setting in Delhi. Int J Res Med Sci 2025;13:173-9.