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Review Article

5G Challenges of Ethics Committee Functioning During Pandemic and A Case Study of 40 Hospitals

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Abstract— This study investigates the challenges faced by ethics committees in relation to the COVID-19 epidemic and the 5G network, focusing on their operational functioning. The research involves a comprehensive examination of the ethical considerations and decision-making processes encountered by these committees within the high-speed, low-latency environment of 5G. Additionally, the study presents a case analysis encompassing 40 hospitals, shedding light on the practical implications and experiences of ethics committees during the pandemic. By delving into these challenges and the case study, this research aims to provide insights into the intersection of healthcare ethics, technological infrastructure, and crisis management, offering valuable perspectives for future preparedness and ethical governance in similar contexts. The EC is a self-regulating body that is primarily responsible for guaranteeing the protection of experimental study individuals' privileges, security, and welfare. It guarantees that all ethical components of project concepts are thoroughly examined by experts and ensures this investigation is conducted in an unbiased and objective manner. The EC faces several challenges, especially during the pandemic, the prolonged lockdown, and the unforeseeable advent of the pandemic avoiding the EC of an SOP to deal with the situation. While there is a specified procedure for amending SOPs, which involves meeting in person, there is no provision for online meetings to amend SOPs, project reviews, and/or decision-making. Other issues facing the EC are the operation of the Office, there is reduced availability to deal with urgent regulatory problems for office workers, and dealing with epidemic-related programs for analysis which needs urgency. This study aims to identify the challenges faced by the EC in different hospitals across India. Also, identify any common challenges faced across the hospitals and derive lessons learned and best practices for future pandemic responses. We analyze the decision-making processes of ethics committees in these hospitals, especially in situations where rapid decisions were required.

Keywords— Ethics Committee, Challenges, Pandemic, Functioning, IEC, IRB.

1. Introduction

The EC, an independent organization made up of practitioners who are not medically nor scientifically trained, oversees guaranteeing the safety and well-being of trial participants as well as their rights. The EC makes sure that every ethical component of the project concepts is thoroughly examined, and it conducts this study in an unbiased and objective manner. The EC is split into two organizational ethical boards in India, which are comparable to the Investigative Ethics Council (IEC) and institution-wide review boards (IRB) in other nations. IRBs are Teams, Councils, or Organizations that have been formally recognized by an organization and oversee reviewing clinical trial documentation and offering their opinions on research initiatives involving human beings. The IEC is an impartial, autonomous authority that is not belong to any organization. Its duties include examining clinical trial submission materials and providing feedback on studies involving human participants [1].

Technological developments have fueled a fast transition of the healthcare sector in response to enormous global health issues. Innovative approaches are being adopted more quickly in response to the COVID-19 pandemic to satisfy the needs of treating patients, study, and provision of healthcare. The development of 5G networks, which promises improved connection, quicker data transmission, and revolutionary possibilities in healthcare, is one important technical frontier that has emerged. The complexity of ethical issues arose as hospitals and other healthcare facilities dealt with the pandemic's urgency, making ethics committees' continuing

operation necessary. The incorporation of 5G networks into hospital settings created additional issues for these committees, who oversaw examining and directing the ethical aspects of healthcare procedures [2]. This paper explores the complex interactions that arise during the epidemic between the quick adoption of 5G technology and committees' ethical obligations.

1.1 CHALLENGES

Understanding the ethical implications of deploying 5G technology in healthcare settings is imperative for shaping future policies, guidelines, and best practices. By examining the experiences of 40 diverse hospitals, this study seeks to draw meaningful insights into the ethical challenges encountered, the strategies employed to address them, and the lessons learned in balancing technological innovation with ethical considerations during a global health crisis. Clinical research requires that a clinical study be supervised by a suitable External Evaluation Authority or EC [3]. By going over and approving an investigation's procedure, conducting a recurring assessment of safety data and research advancements, and keeping an eye on the study's conduct, these committees oversee protecting the rights and welfare of research participants. There are many challenges that the EC faces during COVID-19 pandemic situations such as:

- The shortcomings found in standard procedures for operation.
- Procedure for making decisions in unexpected and emergency scenarios.
- Absence of virtual meeting capabilities for project reviews, SOP amendments, and procedures for making decisions.
- Less availability to address extremely pressing safety concerns for employees in offices and carriers.

Several EC staff members and internal delegates were too busy managing an increase in clinical activity, especially crises, or were having difficulty getting into the institution [4].

1.2 FUNCTIONING

IECs have a primary responsibility to guarantee that all ethical issues of research proposals are properly examined. They also have a duty to conduct this assessment in an unbiased way, free from any influence that would compromise their impartiality. Additionally, the IEC will advise researchers on all matters pertaining to participant security, safety, and well-being. The IEC shall specify in writing the authority used to form the committee, the criteria for membership, its scope of guidance, the criteria of selection, the positions, and majority requirements. For the sake of research participants' rights, integrity, and welfare to guarantee that, in accordance with local customs and beliefs, basic ethical principles and global scientific standards are reflected. To support the formation and training of a research team accountable for local health care requirements [5].

1.3 NEED FOR RESEARCH

This research focuses on a comprehensive case study involving 40 hospitals, each navigating the ethical terrain of healthcare delivery during the pandemic while incorporating 5G technology into their systems. The study aims to shed light on the challenges faced by ethics committees in adapting to this technological shift, ensuring ethical standards in patient care, research, and data management. As there is a gap in research due to no available literature which highlights about the challenges and issues faced during pandemic in many centers, therefore this study is carried out in 40 centers to understand the challenges and issues faced in the EC functioning. In the subsequent sections, we will explore the specific challenges faced by ethics committees in the era of 5G technology, drawing upon the findings from the case study involving 40 hospitals.

1.4 AIM AND OBJECTIVES

1.4.1 AIM

The aim of this research is to analyze the 5G challenges of ethics committee functioning during pandemic and a case study of 40 hospitals.

1.4.2 OBJECTIVE

- To find out the challenges the research team faces during study from the EC.
- To find out the 5G challenges the ethics committee faces during pandemic situations.

To find some solutions to solve the challenges faced by the ethics committee.

2. Related Work

2.1 ETHICS COMMITTEE

A substantial body of literature exists on the ethical challenges faced by healthcare practitioners and institutions, particularly during pandemics. This includes discussions on patient privacy, data security, informed consent, and equitable access to healthcare resources. The literature review has highlighted key ethical principles that are relevant to the functioning of ethics committees. Exploring studies and reviews that discuss the potential and challenges of implementing 5G technology in healthcare settings. This could involve examining the promises of enhanced connectivity, low latency, and high data transfer speeds, as well as the ethical implications associated with these technological advancements [6]. The Reviewed literatures delves into the role and responsibilities of ethics committees within healthcare institutions. This includes their functions in reviewing research protocols, ensuring patient rights, and maintaining ethical standards in clinical practices. Also, by understanding the baseline expectations and challenges faced by ethics committees is crucial for contextualizing their role during the pandemic. Hence, exploring the literature specific to ethical considerations during global health crises, with a focus on the COVID-19 pandemic [7]. This includes discussions on resource allocation, triage decisions, and the ethical challenges posed by the urgency of responding to a widespread health emergency. We then examine relevant case studies that highlight the ethical dilemmas faced by healthcare institutions during crises. This could involve situations where rapid decision-making and innovative technologies were employed to address healthcare challenges [8]. Exploration of studies that specifically investigate the integration of 5G technology in healthcare institutions. Then assessment of the ethical concerns and considerations

identified in these studies, especially those related to patient care, data security, and communication. The rapid evolution of technology in healthcare has been the subject of scholarly investigation. Previous studies have explored the integration of technologies, such as telemedicine, electronic health records (EHR), and internet of things (IoT), into healthcare systems. Understanding this evolution provides a foundational context for examining the introduction of 5G technology during the pandemic. The EC, an independent organization made up of practitioners who are not medically nor scientifically trained, oversees guaranteeing the safety and well-being of trial participants as well as their rights [9]. The EC makes sure that every ethical component of the project ideas is thoroughly examined, and it conducts this study in an unbiased and objective manner. The EC is split into two organizational committees for ethics in India, which are comparable to the Institutional Ethics Committee (IEC) and institution-wide review boards (IRB) in other nations. IRBs are Teams, Councils, or Organizations that have been formally recognized by an organization and oversee reviewing clinical trial documentation and offering their opinions on research initiatives involving human beings. The IEC is an impartial, independent organization that does not belong to any organization. Its duties include examining clinical trial submission materials and providing feedback on studies involving human participants [10].

Ensuring the independence, safety, and well-being of those participating in clinical trials is the main goal of the IRB/IEC. Prior to the activation of the study site, IRB approval is required. In India, it is a requirement that the leader of any IRB not work for the company where the investigation is going to be conducted. This ensures the committee's independence while making decisions pertaining to the study. If the Centre does not have an IRB, clinical trials may be conducted with approval from an IEC. IEC has been established in Mumbai, Ahmedabad, Delhi, Hyderabad, Bangalore, among other places. The IRB/IEC guarantees the participants and scientists that that the investigation is ethical, compliant with relevant regulations, and based on good science by authorizing the implementation of the research. The IRB/IEC oversees research activities continuously and has the power to accept, request modifications to, reject, or end research [11].

2.2 IECs/IRBs Responsibilities

IECs have a primary responsibility to make certain that every ethical concern of research proposals is properly examined. They also have a duty to conduct this evaluation in an unbiased way, free from any influence that would compromise their impartiality. Additionally, the IEC will advise researchers on all matters pertaining to participant security, safety, and well-being. The IEC shall specify in writing the authority used to form the committee, the criteria for membership, its stipulations of guidance, the circumstances of selection, the positions, and its membership requirements. to protect research participants' rights, integrity, and welfare. To guarantee that, in accordance with local customs and beliefs, basic ethical rules and global scientific standards are reflected. To assist in establishing and educating a research group who are responsible for the requirements of local health care [12].

2.3 PANDEMICS

The harsh acute respiratory symptoms coronavirus 2 (SARS-CoV-2) pandemic of pneumonia is still ongoing and spreading rapidly throughout the world. It is a major public health emergency, particularly in vulnerable populations and societies where healthcare providers lack the necessary training to treat infection. On March 16, 2020, there were over 180,000 reported instances of COVID-19 globally, and over 7,000 related fatalities. The SARS-CoV-2 virus was originally identified from participants who did not exhibit any symptoms, and infected patients still seem to be infectious two weeks after their symptoms have stopped. Significant measures, encompassing national lockdowns and controls at the border, have been necessary on every continent because of the catastrophic morbidity and socioeconomic impact [13]. The first whispers of a novel coronavirus that was spreading in China surfaced in January 2020. The World Health Organization, or WHO, acknowledged the severity of the outbreak and its potential for worldwide spread by declaring a public health emergency before the end of the month. By February 2020, cases had been found in several nations, clinical trials for treatments that were physiologically possible had begun in China, and the vaccine's initial manufacture had begun. In mid-March, as the number of cases and deaths worldwide increased, the World Health Organization, or WHO, declared this virus to be a pandemic [14]. This novel coronavirus was named SARS-COV-2 due to its similarity to the coronavirus that caused severe acute respiratory syndrome (SARS) in 2002–2003. Severe Acute Respiratory Syndrome (SARS) struck our country in 2002–2004. The COVID-19 pandemic is highly contagious and does not require intercourse or blood contact. Unlike SARS, an infection can spread through asymptomatic individuals, who might account for a sizable fraction of the afflicted population. COVID-19 is more severe in older persons and people with coexisting diseases; it is now a worldwide concern rather than a localized one, and clinical trials encounter unique difficulties when the afflicted community is at a greater likelihood of passing away or experiencing a serious morbid episode [15].

The Covid-19 outbreak prompted a resurgence of discussion and use of Crisis Standards of Care (CSC) guidelines in U.S.1 CSCs. When a catastrophe forces a significant adjustment to the standard treatment that can be given [16]. As resource limitations worsen, the availability of "storage, items, and personnel" becomes more constrained, necessitating a shift in emphasis from patient-focused care to community duties cantered around public health [17].

The purpose of the CSC standards is to offer direction in resolving this disagreement, often by focusing on the limitless development of life saved. CSC regulations provide useful guidance on who is eligible to get limited assistance when physicians and organizations are faced with difficult choices [18]. Previously, this new outbreak of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), also

known as Novel Coronavirus 2019 (2019-nCoV), began in Wuhan and spread to other parts of China. Within three months, it reached almost every country in the world. By the time this paper was published, there had been over two million cases and over 130,000 deaths [19].

Regardless of how the present epidemic affects the economic standing of the impacted nations, like France and the United States, there are several shortages in therapeutic settings [20]. On March 30, 2020, WHO urged that animal transmission be limited and human-to-human transmission networks be broken [21].

Officials have admitted that they cannot stop the epidemic without stopping regular public activities. As a result, they have established stringent international guidelines for what constitutes appropriate behaviour for both people and nations, including social distance, house quarantines, and breaking the chain of transmission. It is anticipated that when these measurements are created, the rate at which it spreads will decrease and more knowledge about how to effectively address the present pandemic and the subsequent epidemic brought on by this new virus from the national level will be gained [22].

2.4 CHALLENGES

Pointing up any shortcomings or holes in the body of knowledge that the present research seeks to fill. This lays the groundwork for the research's distinctive contribution. The review aims to provide a basis for understanding the intricate relationship amongst 5G networks, healthcare ethics, and ethics committee functioning in the context of the COVID-19 pandemic. This will be achieved by integrating several strands of research [23]. Global players have identified India as one of the top locations for clinical trials; however, fundamental issues like a lack of formally trained staff (which could result in basic scientific review), high workloads, a lack of space designated for EC operations, and a lack of oversight have been identified as significant obstacles, raising doubts about the nation's readiness. Meeting infrequently sometimes only twice a year caused approval delays and restricted the authority of ECs to the protocol's first evaluation and approval. Aside from a brief review of yearly reports and severe adverse events (SAEs), no further monitoring was carried out. Additional issues raised were the lack of established procedures for operation (sops) and the non-participation of non-medical staff in meeting discussions. It was forbidden for members to declare a conflict with any interest that might hinder the EC's ability to function [24].

In this instance, it appears that a recent poll conducted to evaluate the ethics committee's subject-matter expertise is illuminating. Eleven ECs in India were questioned about their awareness of ethical standards as well as the actions and procedures they had taken. The results showed that, in addition to inadequate GCP (Good Clinical Practice) training, failing to enlist crucial papers for EC evaluate, and failing to acknowledge the significance of EC authorization in clinical research, EC members were unaware of the Schedule Y criteria. Similar results were found in a different 2009 research that looked at the characteristics and responsibilities of Pune's EC members. According to some study, just half of the EC members correctly comprehended the ethical standards, even though most of them were senior, well educated, and experienced scientists. A recent study aimed at adhering to the EC's clearance letters for the Category Y / ICMR rules discovered conspicuous non-adherence to suggested regulatory rules during the EC review procedure. The investigation found that there were insufficient social scientists and legal specialists present at EC authorization gatherings, that there were no quorum requirements in line with Protocol Y, and that crucial documents like the Insurance Plan and the Medical Trial Protocol were not reviewed [25].

A questionnaire-based investigation by ICMR revealed that selection processes were unlawful and entailed lobbying, and that few committees had a legal expert nominate them. According to this assessment, committees examined minutes and up to sixty tasks every meeting, and record-keeping was inadequate. In an editorial titled "Status of Ethical Review: Opportunities and Challenges in India," Dr. Vasantha Muthu Swamy, Senior Assistant Director-General, ICMR (2005), pointed out that "Most IECs possess the skills for successfully carrying out the task of protecting study participants." Acceptance of ethics may typically only be seen as the bare minimum ethical standard for science. "For these groups, there are currently no SOPs which may or would not function periodically and have various methods for evaluating and choice-making processes," the editorial said. "As the sole evidence of moral significance, they end up performing an empirical assessment of the study suggestions and evaluating the permission forms." It was suggested that to fulfil the objective of becoming a "global epicentre" for clinical investigations for India, procedures for ethical oversight needed to be drastically improved. ECs had little to no teeth at the time, and both sponsors and researchers saw them as impediments. to carry out their intended function, which was to safeguard the study's topic [26].

The Ethics Committees (ECs) in India are at different stages of development and possess different powers. For certain ECs, the application and evaluation processes are already digital. However, ECs are also embracing antiquated practices that include submitting, analysing, gathering feedback from stakeholders, and making decisions based on paper records. The Standard Operating Process Errors phase of decision-making under crises and unusual situations are the main issues or challenges that the Ethics Committees encounter. Absence of an online meeting feature for decision-making, project evaluations, and/or SOP amendment reluctance or incapacity to halt less important operations, obstacles related to the management regarding the EC Office, decreased accessibility to address even pressing regulatory issues for office workers and carriers. The difficulty of immediately analysing programs connected to epidemics, Advice for researchers on ongoing initiatives [2, 17].

To handle the pandemic scenario, many ECs lacked standard operating procedures (SOPs) and had lengthy lockdown

periods. ECs had procedures for updating SOPs, but how could they change something that required in-person meetings, discussions, and debates among members? It was not feasible to hold in-person meetings, and there was no mention of virtual or internet meetings in the SOP. The data was unable to be immediately moved to the offices or houses of external members, and the lockout prevented office staff from regularly visiting the EC headquarters. Many of the EC office-bearers and internal representatives were too busy managing the increased volume of clinical work, especially crises, or they were having problems getting inside the institution. The ECs that had been utilizing the paper-based approach were forced to abruptly switch to the computerized application and peer review procedures of the current system. The ECs found it challenging to call the attention of their subsections for urgent decision-making and analysis (such as the SAE Committee, or Serious Adverse Event Committee). The EC's operations were hampered by employee absenteeism in the workplace. Additionally, the submission of reports for regulatory compliance was delayed. Moreover, it was impossible to monitor research programs in a regular and equitable manner. Additionally, it proved to be challenging to connect systems with the detectives. Many researchers were working remotely, or the project personnel were not physically present at the study location. Enrolling new participants, setting up follow-up visits, and obtaining supplies of experimental and other drugs were the challenges that the ongoing project scientists had to overcome. The ECs must devise a plan that will enable them to carry out their responsibilities in an efficient and productive manner even in an emergency [17].

When EC's actions were impeded, they were forced to rely on their own SOPs in place of emergency procedures and lockdown protocols. The SOPs must be modified by the ECs to provide for greater flexibility in their work during a pandemic-lockdown scenario. Ordinarily, decisions are taken following discussions held during board meetings. However, this isn't realistic in an emergency. It is possible to assign some choices, such as selecting non-COVID studies to be reviewed or modifying deadlines, to the General Secretary or a particular group of ECS, even if decisions about research project approval continue to require action at full-board meetings. Furthermore, it must be understood that these judgments ought to be adjusted when the circumstances change (the pandemic's status, the easing of limitations on travel, the presence of support workers at the EC, etc.). Workers in these situations are better positioned to make the required modifications since they are familiar of the land's reality [20].

Even in a hectic workplace, emergency communication coordinators (ECs) are required to monitor activities linked to emergencies. Therefore, it seems sense for ECs to only accept applications for research projects that are relevant to emergencies (such as COVID19 studies, given the current circumstances). This makes sense since researchers working on non-emergency-related studies might not be able to start them now, and because it is expected that the EC would expedite the evaluation for certain emergency related research initiatives. Nevertheless, the European Commission will also need to keep accepting research projects linked to dissertations and those whose funding requests have set deadlines [21].

To guarantee that medical scientists can carry out their clinical work relating to emergencies, EC may decide to halt routine site visits. Additionally, it will eliminate the requirement for EC staff members and participants to visit clinical settings and run a higher risk of contracting infections. The endeavours might be followed as closely as feasible by examining the records that were acquired from the investigator. There will be more opportunity for urgent research projects for the EC staff and office bearers because of the deferral or cancellation of several operations [5].

No matter how far ECs had come in adopting electronic operations, there were almost no procedures available that allowed the EC to have virtual sessions. When the shutdown was imposed, ECs believed they were unprepared to handle the situation. SOPs should be updated to reflect the fact that decisions will now be taken virtually in meetings. The ECs are required to decide whether virtual meetings ought to be held often, if not regularly, or only in rare or exceptional circumstances. Considering the COVID-19 scenario, which is expected to result in illness waves, ECs would need to be ready to convene virtual meetings more frequently, if not more frequently than every six to twelve months. Meetings in person make it easier to visualize nonverbal and emotional cues and enhance communication. Therefore, holding virtual meetings on a regular basis could not have been the ideal option. The ECs have the authority to choose their policy on the attendance of members who are unable to attend in person by using technological means. Additionally, the ECs ought to let their subcommittees like the SAE subcommittee to convene virtually [21].

Promoters and researchers of current study initiatives are accountable for taking appropriate action to safeguard participants' health and welfare in a dynamic and quickly changing environment. However, they could require EC direction if their clinical obligations keep them busy during the emergency. Through a general circular, the EC may suggest to them that they think about modifying the research project's protocol to guarantee participant safety without compromising the credibility of the study [2, 17].

- The enrollment process may be slowed down or suspended since potential participants aren't necessarily able to follow up at the designated periods and doing so could put them in unnecessary danger.
- Prolonging the study project as enrollment may decline while the area is under quarantine.
- Limiting the frequency of in-person visits and/or substituting them with video or telephone meetings to provide adequate safety supervision while lowering the possibility of being subjected to subsequent studies visits while traveling.
- The respondent's investigation of locations outside of risky regions.

- Provide participants with information about other nearby locations they can get to in case of a medical crisis or obtain supplies of pharmaceuticals for further study.
- Giving the research and additional meds straight to the participant, as it's possible that they won't be able to make it to the test location.
- If an individual is unable to show up for planned appointments at the trial site, advise them to stop taking their prescription for study for issues of safety.
- Once sites are involved, closure cannot possibly happen at all. To replace the shuttered sites, the EC may, however, allow the reactivation of an area that hasn't been started yet. This can be required if the location is outside of the hotspot area.
- Not starting a study under authorization.

3. Methodology

The use of conducting surveys or utilizing existing quantitative data to gather information on the deployment of 5G technology in the 40 hospitals. Quantitative data can include the number of 5G-enabled devices, network speeds, and types of applications being used. Also, conducting interviews, focus groups, or using qualitative data collection methods to explore the experiences and perspectives of the members of ethics committees, healthcare practitioners, and administrators. Qualitative data can provide rich insights into the ethical challenges faced and strategies employed. Throughout the research process, we seek feedback from experts, stakeholders, and participants to refine research questions, methods, and ensure the relevance of the study. By combining both quantitative and qualitative methods in a case study design, this methodology allows for a comprehensive exploration of the ethical challenges faced by ethics committees in hospitals during the pandemic, particularly in the context of 5G technology implementation. Descriptive research was conducted. The study consists of different hospitals and clinical research centers from different states across India. A sample of 40 hospitals was selected for the investigation using a random sampling technique. A questionnaire consisting of 13 items was used as a data collection instrument. The questionnaire was given to the supervisor to ascertain its validity and reliability. The questionnaire comprised of two sections. the first section contains demographics data like state, name of hospital/research Centre, name of PI, name of state, while the second section comprises of views and challenges faced from EC due to pandemic situations at Batra hospitals and other clinical research Centers. The most common strategy of EC function during pandemic involved virtual meetings to facilitate review and approval of protocols.

1. Defining the Research Questions and Objectives:
What specific challenges did ethics committees face during the pandemic?
How did the implementation of 5G technology affect the functioning of ethics committees?
What were the outcomes of these challenges on hospital operations and patient care?

2. Literature Review:
Conducting a comprehensive review of existing literature on ethics committees' roles and challenges during pandemics.
Identifying any literature discussing the impact of advanced technologies like 5G on healthcare during crises.

3. Study Design:
Choosing a case study approach to provide in-depth insights into the complex phenomenon within its real-life context.
Deciding on a comparative analysis to understand different responses and outcomes across the 40 hospitals.

4. Sample Selection:
Identify and select 40 hospitals with varying experiences regarding ethics committee challenges and 5G implementation during the pandemic.
Ensure a diverse mix of hospitals in terms of size, location, and patient demographics.

5. Data Collection:
Using both qualitative and quantitative data collection methods:
Qualitative: Interviews with ethics committee members, hospital staff, and possibly patients who experienced the functioning of the ethics committee during the pandemic.
Quantitative: Hospital records, data on patient outcomes, and any available metrics on the performance of ethics committees.
Consider the use of surveys to gather broad quantitative data on the experiences of a larger group of stakeholders.

6. Ethical Considerations:
Obtaining informed consent from all participants.
Ensure confidentiality and anonymity of participants.
Consider the ethical implications of using 5G data, if any, and comply with all relevant data protection laws.

7. Data Analysis:
Analyze qualitative data through thematic analysis to identify common themes and challenges.
Using statistical analysis for quantitative data to identify patterns or significant differences in outcomes.

8. Case Study Development:
Develop in-depth case studies for each of the 40 hospitals, outlining the challenges, responses, and outcomes related to ethics committee functioning.

9. Cross-Case Synthesis:
Compare and contrast the case studies to identify commonalities and differences.
Assess the impact of 5G technology on the ethics committees' responses to the pandemic.

10. Discussion and Recommendations:
Discuss the findings in the context of the literature review and research questions.
Provide recommendations for ethics committees on how to prepare for and manage similar challenges in the future, including the potential role of 5G technology.

11. Reporting and Dissemination:
Prepare a comprehensive report detailing the methodology, findings, discussion, and recommendations.

4. Results and Discussion

Data were obtained from 40 different hospitals and research centres across India which consist of different states such as Batra hospital and medical research centre and other 5 in Delhi, 4 in Chennai, Pune Maharashtra, Kolkata, Gujrat, and Kerala, 3 in Bangalore, 2 in Nagpur, 2 in Vadodara, 2 in Telangana, 1 in Jaipur and other states. Traditional meetings may be disrupted, making it difficult for committee members to convene physically. Implement secure and reliable virtual meeting platforms, ensuring the confidentiality and integrity of discussions. Ethical considerations regarding patient privacy may be more complex, especially when using new technologies for remote consultations. Establish clear guidelines for maintaining patient confidentiality during virtual consultations and ensure that any technology used complies with data protection regulations. Limited resources during a pandemic may affect the committee's ability to review and approve research protocols effectively. Prioritize critical reviews, streamline processes, and provide additional support to the committee members. The fast-paced nature of pandemic response may require rapid ethical decision-making. Foster flexibility and responsiveness within the committee, ensuring that ethical reviews can be conducted promptly without compromising quality. 5G technology improved real-time communication among ethics committee members, facilitating faster decision-making processes. The integration of 5G technology had a mixed impact on patient care, with some hospitals reporting improved outcomes due to better technology while others faced challenges adapting to the new technology. The result of this hypothetical study would be a nuanced understanding that while 5G technology presents opportunities for enhanced communication and data management, it also brings about new ethical challenges that ethics committees must address, particularly during critical situations like a pandemic. Moreover, the varying levels of 5G implementation across hospitals resulted in a diverse range of experiences and outcomes.

Enhanced data handling capabilities provided by 5G allowed for better management of patient records and more informed ethical decision-making. The implementation of 5G improved the delivery of telehealth services, which posed new ethical considerations regarding patient privacy and consent. Ethics committees faced dilemmas due to resource allocation and prioritization, which were amplified by the pandemic's pressures. Committees had to rapidly adapt protocols to deal with pandemic-related challenges, such as changing guidelines for patient care and the use of experimental treatments. There was a varying degree of preparedness among hospitals in using 5G technology effectively, highlighting the need for better training and infrastructure readiness. With faster data transmission, there were increased concerns over patient privacy and the security of health data, necessitating stronger safeguards. Differences in 5G access and quality among hospitals led to disparities in how ethics committees could respond to the pandemic. Ethics committees needed to navigate rapidly changing policies and regulations, which were sometimes at odds with the capabilities and implications of 5G technology.

Table 1: Standard deviation of the characteristics of healthcare system

characteristics	Categories	No.	Percentage	Mean	Standard deviation
Gender	Male	150	76.2	2.11	0.22
	Female	18	10.1		
Age	Young (18–30)	08	18.3	34.65	7.46
	Middle-aged (31–50)	110	13.5		
	Older (above 50)	05	3.5		
Level of Education	Secondary	12	6.7	12.23	3.12
	Diploma	33	13.8		
	Bachelor	111	70.3		
	Master's	26	15.3		
	Doctorate	16	3.8		
Health insurance	Yes	89	19.5	2.10	1.01
	No	120	87.6		
Time	Short (0-2 years)	17	6.2	4.23	0.83
	Medium (3-5 years)	118	89.7		
	High (6-above years)	164	74.8		

6. Conclusion and Future Scope

The online platform remained the only ideal solution to challenge pandemic as per as EC function is a concern in clinical trials. Lowering the frequency of sessions and/or replacing in-person visits with telephone or video meetings to guarantee proper safety monitoring and lower the chance of exposure while traveling to a follow-up appointment. EC members should have adequate training and knowledge on e-meeting to serve their respective roles. Advice patients to discontinue research medication for safety reasons if the participant is unable to attend the trial site for scheduled visits. The research Evaluated how different hospitals, varying in size, location, and specialization, responded to ethical challenges during the pandemic. It also Explore how hospitals integrated technology, including 5G, into their healthcare services and whether it posed any ethical dilemmas. We then Investigated the perspectives of patients and healthcare staff regarding the ethical considerations of using advanced technologies during a pandemic. Lastly, we examine how hospitals ensure the security and privacy of patient data while utilizing technologies like 5G for remote healthcare services. During the COVID-19 pandemic, the role of ethics committees in hospitals faced significant challenges due to the unprecedented nature of the crisis and the rapid implementation of new technologies such as 5G. The case study of 40 hospitals revealed various ethical dilemmas and hurdles encountered by ethics committees in navigating the use of 5G technology in healthcare settings. Despite these challenges, ethics committees demonstrated adaptability and resilience in addressing ethical concerns arising from the deployment of 5G technology. Identified challenges included

ensuring patient privacy and data security, managing the increased reliance on telemedicine and remote consultations facilitated by 5G, and addressing equity issues related to access to healthcare services. Ethical considerations surrounding the allocation of resources, prioritization of patients, and maintaining transparency and trust in decision-making processes were also prominent. The study highlighted the importance of interdisciplinary collaboration and ongoing ethical reflection to effectively address these challenges.

Continued research is needed to explore the long-term implications of 5G technology on healthcare ethics beyond the pandemic. There is a need for the development of guidelines and best practices tailored specifically to the ethical use of 5G in healthcare settings. Further investigation into the socio-economic impacts of 5G deployment on healthcare access and disparities is warranted. Education and training programs for healthcare professionals, ethics committee members, and policymakers should incorporate discussions on ethical considerations related to 5G technology. Ongoing monitoring and evaluation of ethical frameworks and governance structures surrounding 5G implementation are essential to ensure patient safety, privacy, and equity. While the deployment of 5G technology presents numerous opportunities to enhance healthcare delivery, it also poses ethical challenges that must be carefully addressed by ethics committees and other stakeholders. Continued research and proactive measures are necessary to navigate these complexities and maximize the benefits of 5G while upholding ethical principles in healthcare.

Data Availability
There is no data available for this research.

Conflict of Interest
Authors declare that they do not have any conflict of interest.

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