Public Health Action

VOL 13 NO S1 PUBLISHED MARCH 2023

KERALA SUPPLEMENT

Combatting emerging infectious diseases from Nipah to COVID-19 in Kerala, India

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http://dx.doi.org/10.5588/pha.22.0024

BACKGROUND: The state of Kerala, India, has experienced several unprecedented events in the past few years. The current study was an attempt to explore perceptions of stakeholders on how the decentralised system helped during the Nipah virus (NiV) outbreaks and COVID-19 pandemic in Kerala.

METHODS: This study used a qualitative descriptive approach built on the advocacy paradigm. The stakeholders who were involved in decision-making and the representatives of local self-government who had real-time experience and had handled the challenges were identified using purposive sampling. Seven key informant interviews (KIIs) and nine in-depth interviews (IDIs) were conducted.

RESULTS: Findings indicate that decentralisation had enabled the state to effectively deal with the outbreaks and the pandemic. The survey revealed four major themes: decision-making, engagement level, people-centric action, and difficulties. Two to four categories have emerged for each theme.

CONCLUSION: The study results highlight the importance of human resources and service delivery as balancing factors during public health emergencies in any developing nation with limited resources. Given that very few nations have the healthcare infrastructure and resources necessary to cater to the healthcare needs of the whole population, decentralisation should be reinforced.

Kerala, the southernmost state of India has experienced several unprecedented events in the past few years, from raging floods to outbreaks of viral diseases. When the Nipah virus (NiV) outbreak was reported for the first time in May 2018, the health system of the state was able to contain the outbreak by mid-June with the involvement of the local government. The outbreak was limited to 18 laboratory-confirmed cases by focussing on the prevention of infection based on isolating patients, contact tracing and other measures.[1,2] During the second NiV outbreak infection in June 2019, the whole public health system provided a swift response to contain to the index case and the number of deaths.[3,4] The experience with the NiV outbreak instilled confidence and enhanced the skills in surveillance mechanisms at the grassroot level. This enabled the health system of the state, along with the local government, to be prepared for the first COVID-19 case in India in January 2020.[5,6]

In light of this, it was deemed necessary to comprehend how the decentralised public health system in Kerala had contributed to possible service delivery improvements during these growing public health concerns. However, although the decentralisation of the public health system in Kerala is often cited as a success, it has not yet attained its full potential.[7] In a situation where it is speculated that more emerging zoonotic infections, including NiV, might spread in pandemic proportions in the near future,[8] this study aims to understand the perceptions of stakeholders on how the decentralised system helped during the NiV outbreaks and COVID-19 pandemic in the state of Kerala.

METHODOLOGY

Setting and context

The 2018 NiV outbreak occurred in two northern districts of Kerala and the index case was reported from Changroth village in Quilandy Taluk of Kozhikode District.[9] One year later, in 2019, the second NiV outbreak in Kerala was reported from the Vadakekara Panchayat (the '*panchayat*' is the lowest level of governance and administration unit in India) in Ernakulam District.[3] The first COVID-19 case was reported from the Trissur District of Kerala, and within months, COVID-19 cases were reported from all other districts. A qualitative exploration was required to understand the degree of improvisation in surveillance mechanisms and the close collaborative activities between the local government and the health system during the NiV outbreak, and how the previous experience with two NiV outbreaks facilitated a prompt preparedness in the state during the COVID-19 pandemic.

Research procedure and participants

A qualitative descriptive approach using in-depth (IDIs) and key informant interviews (KIIs) built on the paradigm of advocacy was used to explore the objectives. For a comprehensive understanding of the research question, the researchers have used document review along with qualitative exploration. The search terms used were Nipah AND Kerala, Nipah AND decentralisation in Kerala, COVID AND Kerala local governance, COVID AND decentralisation in Kerala. A total of 26 peer-reviewed full-text articles available in PubMed Central were reviewed for the study. The study was conducted from December 2020 to April 2021. The stakeholders who were involved in decision-making and the representatives of the local self-government, who had real-time experience and

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KEY WORDS

Kerala; local government; public health threats; decentralisation; COVID-19 pandemic

Received 1 May 2022
Accepted 20 September 2022

PHA 2023; 13(s1): 32–36
e-ISSN 2220-8372

had dealt with the challenges, were identified using purposive sampling; data collection was continued until saturation. Seven KIIs and nine IDIs were conducted (Table 1).

The investigators who had received training in qualitative research contacted the participants over the phone and to ask about their willingness to participate in IDIs. After obtaining verbal consent, an appointment was made with the local government representatives at a time and place of their convenience. Due to geographical dispersion of the interviewees and the restrictions on movement due to the pandemic, online platforms were utilised for conducting interviews and informed consent was emailed. Of the 14 interviews, 11 were conducted using online platforms. Three direct interviews were conducted at the office of the interviewee maintaining all COVID-19-related precautions. The KIIs and IDIs lasted for 45 min–1 h and 1–1.5 h, respectively. The interviews were conducted using an interview guide and were participant-led. Standards for Reporting Qualitative Research (SRQR) guidelines were used to report the study results.

Qualitative analysis

During each session, the interviewer made notes and on termination, summarised the information collected for the interviewee to determine accuracy. Recordings were in the native language and were transcribed and translated to English. Thematic analysis using a deductive coding process was conducted. A document review was used in developing codes; pre-existing constructs based on the existing literature was used in theme generation. The transcripts were compared with the notes made during the sessions; quotes and extracts thus obtained have been directly quoted here. The transcripts were read several times and coded manually by the first and second authors. The codes were rigorously reviewed by all of the investigators and were categorised after several discussions. Meetings were conducted with public health experts and persons experienced in administration decentralisation to test the reliability of the codes and categories. The codes and findings were presented to this mixed group. The final report with the themes was also circulated among the investigators for peer scrutiny and among public health experts to ensure credibility and test its reliability. Investigator triangulation with the involvement of multiple researchers brought different perspectives to the data and helped to reduce bias and individual subjectivity during the interpretation.

Ethics statement

Ethics committee clearance for the study was obtained from the Institutional Ethics Committee, Health Action by People (HAP), Thiruvananthapuram, Kerala, India (EC2/P1/Sep/2020/HAP). Permission was obtained from the local self-government for conducting the study. All interviews were conducted after obtaining informed consent and confidentiality was maintained throughout the study. Separate permission was obtained for audio-recording of the direct interviews, and for audio, as well as video, recording of interviews conducted using the online platform to ensure the quality of the transcripts. All participants were given the freedom to refuse or withdraw from the study at any time.

RESULTS

The data resulted in the emergence of 40 codes and four main themes (Table 2).

Decision making

Strong foundation

All of the KII participants were homogenous in their view of the legacy of the strong public health system of Kerala and the public health activities with people's participation in the state even before the introduction of decentralisation. The process of decentralisation by endowing the local government with all development functions has helped in tapping the existing capabilities and skillsets at the grassroots level. This resulted in

ACKNOWLEDGMENTS

The authors thank the local self-government of the Government of Kerala for granting permission to undertake the study; all our participants, who co-operated with us amidst the pandemic; R S Gopakumar, Health Officer of Kozhikode Corporation, for helping in the process of data collection; HSTP (Health Systems Transformation Platform) for supporting this research; and Sir Ratan Tata Trust for the financial contribution which made this research possible. The funders had no role in data collection and analysis or preparation of the manuscript.

The manuscript was prepared from one of the sub-themes of the project, Local Government and Health in Kerala, implemented by Health Action by People, Thiruvananthapuram, Kerala.

TABLE 1 List of key informant and in-depth interviews

KIIs	KII 1	An administrative officer working in the local government department of Kerala
	KII 2	State planning board member
	KII 3	State-level Public Health Officer #1, Directorate of Health Services
	KII 4	Director, Kerala Institute of Local Administration, Thrissur, Kerala, India
	KII 5	National level consultant in Panchayati Raj and local-level planning
	KII 6	State-level Public Health Officer #2, Directorate of Health Services
	KII 7	Public health activist and consultant in state-level public health projects
IDIs	ID1 1	Local government representative #1, Changroth grama panchayat
	IDI 2	Local government people's representative #2, the Kozhikode Corporation
	IDI 3	Health system representative from the Kozhikode Corporation
	IDI 4	Local government people's representative #3, Vadakekara grama panchayat
	IDI 5	Local government people's representative #4 from the municipality area of the northern district where clustering of COVID-19 was reported
	IDI 6	Local government people's representative #5 from grama panchayat area of the northern district where healthcare facilities and resources are limited
	IDI 7	Health supervisor from the southern district where community transmission of COVID-19 was reported
	IDI 8	District mission coordinator of *Kudumbashree* (women self-help group of Kerala)
	IDI 9	Junior health inspector working in the district medical office of a northern district with a high COVID-19 case burden

KII = key informant interview; IDI = in-depth interviews.

TABLE 2 Themes and categories emerged in the study

Sl no:	Themes	Categories
1	Decision-making	• Strong foundation • Evidence-based decisions • Inclusive communication
2	Extent of engagement	• Decentralised enforcement mechanisms • Grassroot-level network • Community participation • Repurposing of resources
3	People-centric action	• Identifying gaps • Emphasis on local action plans
4	Challenges	• Institutional shortsightedness • Exercising power in decentralisation

strengthening the local government and ensured the involvement of the local government in healthcare activities at the grassroots level.

> Perhaps the reason why Kerala looked at the constitutional amendments as an opportunity, was because of its legacy of strong public action. (Administrative Officer working in local government department of Kerala, KII1)

Most of the key informants felt that 25 years of decentralised governance had paved the way for a strong public health system in Kerala that has encouraged social behaviour that is conducive to the prevention of water-borne and other communicable diseases, and improved healthcare-seeking behaviour and the surveillance system in the state. It has also enhanced the decision-making capability of policymakers at all strata by adopting preventive strategies, which was reflected during the current COVID-19 pandemic.

Evidence-based decisions

All the study participants agreed that the process of decision-making during any public health threats needs to be based on evidence and scientific rigour for better penetration and acceptance at the community level.

> An individual's or family's or society's healthcare is vested with the local government and it is their major responsibility. The general instructions and guidelines or advice will be provided from the state or national level owing to the expertise, but the implementation based on the evidence happen at ground level. (State Planning Board Member, KII 2)

During the Nipah outbreak in 2018, regular fever surveys were conducted in Changroth panchayat by the local government in collaboration with the health department, and in 2020 during the COVID-19 pandemic, the local government was instrumental in implementing several preventive strategies announced by the state.

Inclusive communication

> Whenever there was an issue warranting immediate decision, a meeting would be held with the representatives from all fields including grass root level workers and volunteers at panchayat level or ward level and a decision will be sought through proper communication. Now during COVID-19 due to repeated meetings for every issue, we all became experts in online platforms. (Local government people's representative 4, IDI 5)

This focus on inclusiveness in transferring information and obtaining feedback for implementation made the process easy and swift. This helped build trust among the people and ensured the people's adherence to the necessary precautions.

Extent of engagement

Data analysis revealed that during the NiV outbreak in 2018, and later in 2019 (a single confirmed case), the role of the local government was limited. However, the very nature of the COVID-19 pandemic necessitated its management in a decentralised manner, as needs arising at the local level demanding a prompt response.

Decentralised enforcement mechanisms

Enforcement of protocols mandating mask-wearing and social distancing was thought to be the most important step with regard to controlling the COVID-19 transmission. The same was achieved to an extent with the concerted action of police personnel, teachers, local government and several other Government departments. This was largely made possible by taking the people into confidence by improving awareness at the local level under the leadership of the local government.

> Loudspeakers were tied on all the roads in the five parishes, there were around a hundred loudspeakers. Through that our medical officer and other staff were giving notices from time to time. We also tried to convey our message on COVD-19 preventive strategies through the church. (HS 7)

Grassroot-level network

The strong grassroot level network of women's self-help groups (locally termed "*kudumbashree*"), *Anganwadi* workers (outreach workers from the Integrated Child Development Service Scheme), and Accredited Social Health Activists (ASHAs) (group of women recruited through the National Health Mission, Thiruvananthapuram in Kerala played a significant role during the lockdown period. These networks participated in door-to-door symptom surveys and ensured the quarantine of suspect cases during the NiV outbreak and the COVID-19 pandemic. They were instrumental in establishing the 'community kitchen', along with the public distribution system, thereby ensuring an uninterrupted food supply to quarantined people, the destitute and migrant labourers.

> We have a structured system established at the ground level and when rapid response team was formed even at ward level, we became a major entity. This network enabled us to contribute well during the COVID-19 pandemic, be it supplying food to 'COVID first-line treatment centres' (CFLTC) or managing community kitchens, or manufacturing cloth masks and sanitizers at the local level. (DMCK, IDI 8)

Community participation

> During the Nipah outbreak, an area with 10 households was kept in isolation for about 15 days. Initially, it was fear all around, but seeing the active involvement of local representatives, many youths of the locality volunteered to arrange food and other needs of those families. (Local government people's representative 1, IDI 1)

The proactive action of local government in social mobilisation was more evident during the COVID-19 pandemic. At the ward level, committees, panchayat members, ASHA, Kudumbashree workers, community volunteers and youth organisations worked together under the broad umbrella of the panchayat government. This synergism in activities resulted in the effective utilisation of resources and met the needs of the people promptly. The collaboration between grassroot networks and the people, along with the local government enabled the dissemination of information at different levels and countering of misinformation to a certain extent.

> During the pandemic, ASHA along with community volunteers gathered data that enabled tracing of almost all the contacts of the positive patients in the initial wave, thereby preventing further

spread of infection. Also, they helped in preparing the list of vulnerable people in the locality and played a pivotal role in ensuring infection control practices. (Health Supervisor, 1D1 7)

Repurposing of resources

Even before the COVID-19 pandemic, the disaster management committee had identified volunteers from each ward and provided them with training. When the COVID-19 pandemic hit the state, these volunteers helped to overcome the lack of human resources. The efficient handling of field expertise of ASHA and Anganwadi workers strengthened the COVID-19 preventive and surveillance activities.

When the number of COVID-19 cases increased, unoccupied buildings and nearby schools were converted into quarantine and treatment facilities by the local government, along with the disaster management authority.

When 83 out of 260 inmates of a psychosocial rehabilitation centre turned positive, we thought the situation will get out of hand as a majority of these inmates were either mentally challenged or destitute of elderly age. Immediately, the local government converted a nearby college institution to Covid-19 First Line Treatment Centres and positive patients were transferred there, preventing further spread. (JHI, IDI 9)

People-centric action

Identifying gaps

During the Nipah outbreak in 2019, we had only one confirmed case with 25 people in quarantine in our panchayat. But that helped us to identify the gaps and enabled us to prepare well and respond swiftly when COVID-19 hit us with a large number of cases. (Local government people's representative 3, IDI 4)

Both local government members and public health personnel found that shortfalls at the panchayat level varied throughout time and place. Inadequacies were initially observed in the availability of trained human resources for the management of individuals in quarantine and isolation, surveillance and disinfection. Numerous panchayats faced a lack of personal protection equipment (PPE) and medical supplies for palliative patients. In certain panchayats, the facility for transporting patients to higher-level medical facilities was disrupted.

Emphasis on local action plans

The analysis of data from IDIs revealed that the process of decentralisation had enabled the local government to implement projects according to local needs, as well as to allocate funds even at the ward level. During these public health emergencies, the funds were used to a large extent for purchasing PPE kits, medicines and the management of Covid-19 First Line Treatment Centres.

When the number of patients increased beyond the capacity of CFLTC in certain panchayat of our district, an immediate decision was home isolation with SPO2 monitoring. But the majority of poor people couldn't afford to buy a pulse oximeter. Within three days, all panchayats bought twenty pulse oximeters each from their funds and handed them over to needy patients till the period of isolation. (JHI, IDI 9)

Challenges

Institutional shortsightedness

Some of the participants were of the opinion that, for a long time, the local government had concentrated on building hospital infrastructure and in-patient wards rather than on capacity building and training individuals in preventive activities. During the outbreaks, surveillance and measures to control the spread of infection were key in the management of the diseases, rather than treatment. The lack of better public health capacities that would provide long-term benefits was mostly replaced by knee-jerk reactions, which posed a great challenge to local government during these public health threats.

Exercising power in decentralisation

As elected representatives, who were the decision makers at grassroot levels, had varying educational background, public health personnel found it difficult to empower them in technical matters. This was true to some extent with regards to even professionals in allied departments. There was reluctance and fear, at least among some officials regarding the financial liabilities related to the implementation of rapid decisions, resulting in slow-paced and incomplete actions.

DISCUSSION

Kerala is renowned for its governance capacity that evolved over time and its development model based on social determinants of health, which enabled to alleviate endemic deprivation and achieve a noteworthy health status despite inadequate resources.[10,11] The state is known for its high literacy rate, which has positively contributed to the administrative decentralisation of the state.[12] The NiV outbreaks, as well as the COVID-19 pandemic, have stretched its administrative capacity and exposed the vulnerabilities of the state's system of decentralised governance.

During the NiV outbreaks, a top-down approach was adopted in decision-making, allocation of resources and designation of duties.[2] Lack of experience and fear caused by the fatal virus at the grassroots level hindered the local government from exercising administrative authority and relegated it to executing activities at the grassroots level under the direct supervision of state and district level systems.[13] However, the NiV outbreaks and the unexpected floods in the state had offered first-hand experience at the grassroots level and trained the local administration in coordinating various sectors and mobilising available resources during a crisis. This allowed the local administration to respond quickly during the initial phase of COVID-19 by identifying the potential of accumulated social capital, leveraging established networks, and repurposing the available resources.[6,10,14,15] Nevertheless, challenges in the implementation of preventive measures at the grassroot level highlighted the need for improved strategies.[16] Taking advantage of administrative, budgetary, and political decentralisation, the local government was able to ensure superior service delivery and become the state's major community participation player.[14,17,18]

The eleven categories that emerged from the study are directly or indirectly linked to the six core components of the building block framework that contribute to the strengthening of the health system.[19] Although all of the building blocks were found to be equally important, the majority of the categories that emerged in the study were directly linked to human resources and service delivery, which highlights the importance of these two factors in handling any public health threat.

However, the uncertainty of the pandemic is taking a toll on frontline workers and has disrupted the balance at the grassroot level, exposing vulnerabilities and shortcomings; this underlines the state's failure to advance decentralisation to its full potential,[10] and demands rethinking and revisiting the strategies towards as future public health threats appear to be inevitable. The

COVD-19 pandemic has given an opportunity to the state to extend decentralisation by focussing on elements of cohesiveness and sustainability and investing more in the public health system.

CONCLUSION

The lessons learnt from Kerala provide a balanced perspective of the evolution of a decentralised public health system and how it can be utilised during a threat to public health. The results highlight the importance of human resources and service delivery as balancing factors during public health threats in any developing nation with limited resources.

Limitations

The main aim of the study was to understand the perceptions of stakeholders on the decentralised response to NiV outbreaks and the COVID-19 pandemic; the challenges and lacunae that emerged as a main theme based on the study findings were not explored in detail. Every effort was made by the authors to reduce the risk of potential bias in answers using appropriate questions and rigorous discussions to reduce self-reflection during analysis.

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CONTEXTE : L'État du Kérala, Inde, a connu plusieurs évènements sans précèdent au cours des dernières années. Cette étude a cherché à analyser l'opinion des parties prenantes quant à l'aide apportée par le système décentralisé pendant les épidémies de virus Nipah (NiV) et la pandémie de COVID-19 au Kérala.

MÉTHODES : Cette étude a eu recours à une méthode descriptive qualitative construite à partir du paradigme de mobilisation. Les parties prenantes impliquées dans la prise de décisions et les représentants des administrations locales autonomes, forts de leur expérience en temps réel et de leur expérience de gestion des défis, ont été identifiés par échantillonnage dirigé. Sept entretiens avec des informateurs clés (KII) et neuf entretiens approfondis (IDI) ont été réalisés.

RÉSULTATS : Les résultats indiquent que la décentralisation a permis à l'État de gérer les épidémies et la pandémie de manière efficace. L'enquête a mis en évidence quatre thèmes majeurs : prise de décisions, niveau d'engagement, action centrée sur les personnes et difficultés. Chaque thème a pu être divisé en deux à quatre catégories.

CONCLUSION : Les résultats de l'étude soulignent l'importance des ressources humaines et de la fourniture de services en tant que facteurs d'équilibre en période d'urgence de santé publique dans tous les pays en développement dotés de ressources limitées. Puisque très peu de pays disposent des infrastructures de santé et des ressources nécessaires pour répondre aux besoins sanitaires de l'ensemble de la population, la décentralisation devrait être renforcée.

Public Health Action (PHA) welcomes the submission of articles on all aspects of operational research, including quality improvements, cost-benefit analysis, ethics, equity, access to services and capacity building, with a focus on relevant areas of public health (e.g. infection control, nutrition, TB, HIV, vaccines, smoking, COVID-19, microbial resistance, outbreaks etc).

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