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Access To Public Health Care And Epidemic Diseases – A Case Study Of Tiruvannamalai District

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Abstract

This study examines access to public healthcare and its impact on epidemic diseases in Tiruvannamalai district using descriptive statistics and empirical analysis. The results show that while most families have physical access to public health facilities, socioeconomic status, cultural customs, and perceived service quality all have an impact on usage. There is a significant disconnect between timely health-seeking behavior and knowledge of epidemic illnesses. With substantial explanatory power (R2 = 0.712), multiple regression analysis verifies that public health initiatives, including mass testing, vaccination, sanitation, and awareness campaigns, significantly lower the occurrence of epidemics. The research comes to the conclusion that expanding infrastructure is necessary to improve healthcare efficacy, but so are improved service delivery, equality, and community involvement.

Keywords: Public Healthcare Access; Epidemic Diseases; Health-Seeking Behaviour; Tiruvannamalai District

Introduction

Access to public healthcare plays a decisive role in shaping how communities respond to epidemic diseases, particularly in rural and semi-urban regions where structural inequalities persist. The intricate connection between healthcare accessibility and epidemic management is shown by the Tiruvannamalai district's experience. Tiruvannamalai, a mostly rural region with sporadic settlements and a modest literacy rate, illustrates the strengths and weaknesses of Tamil Nadu's public health system. Physical accessibility constitutes one of the most significant dimensions of healthcare access in Tiruvannamalai. Although the state is frequently acknowledged for having a reasonably robust healthcare system, the ground reality in districts like Tiruvannamalai reveals disparities in infrastructure, resource distribution, and health-seeking behavior that become particularly evident during epidemic outbreaks like dengue and COVID-19. The district has a network of government hospitals, sub-centers, and Primary Health Centers (PHCs), however their distribution is not uniform. While distant communities depend on understaffed and under resourced PHCs, urban areas, especially those near the district offices, have

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better-equipped facilities. These restrictions become more noticeable in epidemic settings since delayed diagnosis and referral might result in higher rates of morbidity and death. Long travel lengths and inadequate transportation infrastructure further deter prompt use of healthcare. This suggests that the actual impact of healthcare facilities is determined by their functioning, staffing, and geographic dispersion rather than by their sheer existence, which does not ensure effective access.

The availability of medical professionals and necessary resources is equally important. During epidemic peaks such as the COVID-19 pandemic, the healthcare system experienced severe strain due to overworked personnel and onsufficient facilities to handle sudden increases in patient numbers. Many PHCs lack sophisticated diagnostic equipment, which causes delays in illness confirmation—a crucial step in halting the spread of infectious diseases. This highlights a more fundamental structural problem: in addition to shortage, there is an unequal distribution of healthcare resources and inadequate readiness for public health crises. Access to public healthcare is further complicated by socioeconomic constraints. Many people are discouraged from obtaining timely treatment even when services are nominally free due to hidden expenses such transportation costs, daily pay loss, and the need to buy medications that are not accessible in public facilities. The opportunity cost of going to a medical institution might be high in Tiruvannamalai, where a sizable section of the population works for daily wages. People may thus put off getting treatment or turn to unofficial healthcare providers. Due to the fact that family dynamics, financial limitations, and societal hierarchies often impede their access to healthcare, women, the elderly, and underprivileged populations are disproportionately impacted.

Public health and significance

Responses to epidemic illnesses are also greatly influenced by health knowledge and information sharing. In Tamil Nadu, government programs have raised public knowledge of immunization, vector control, and cleanliness. In actuality, however, there is still little that knowledge can do to consistently alter behavior. For instance, many homes are aware of the need to stop mosquitoes from reproducing during dengue epidemics, but preventative measures are not always put into practice. This disparity emphasizes the necessity for ongoing community involvement and the drawbacks of one-time awareness programs. The spread of misinformation further complicated epidemic management, especially during the COVID-19 epidemic, since stigma and fear deterred people from being tested and treated. Tiruvannamalai's public health governance exhibits both advantages and disadvantages. Outreach and monitoring have been greatly enhanced by the presence of community health professionals, such as village health nurses and ASHA employees. Throughout the COVID-19 epidemic, these frontline workers were essential in helping with testing, contact tracing, and vaccine campaigns. However, structural problems including poor interdepartmental coordination, insufficient financing, and bureaucratic delays often impede the successful execution of health initiatives. Although Tamil Nadu's public health policies are typically well-designed, their effectiveness is mostly dependent on how well they are carried out locally, where governance deficiencies may compromise results.

During epidemics, health-seeking behavior is also influenced by cultural and societal variables. Modern medical systems coexist with traditional beliefs and practices in many sections of Tiruvannamalai. Before contacting official healthcare professionals, people may first turn to home cures or local healers, which might cause delays in diagnosis and treatment. Furthermore, open reporting and prompt intervention have been hindered by the stigma attached to certain disorders, including COVID-19. Gender norms also limit women's freedom of movement and decision-making, which makes it harder for them to freely get treatment. The necessity for context-sensitive public health solutions that transcend biological techniques is highlighted by these cultural factors. The disparate COVID-19 and dengue outbreaks in Tiruvannamalai provide important insights into how the public health system operates. As a result of the emergency reaction to the COVID-19 pandemic, testing facilities, quarantine facilities, and immunization programs were quickly established. These initiatives showed the system's mobilization potential, but they also revealed shortcomings in healthcare infrastructure, digital exclusion, and rural access. On the other hand, despite its long-lasting effects, dengue, a seasonal disease, gets less consistent attention. This discrepancy is indicative of a larger problem in public health policy, as chronic health issues are often overshadowed by acute emergencies, leading to uneven resource distribution and readiness.

Geographical location, socioeconomic level, and cultural norms are some of the intersecting elements that define access to public healthcare in Tiruvannamalai, according to a critical analysis of the issue. While the growth of healthcare infrastructure is a good thing, fairness and inclusion concerns have not been adequately addressed. Access to high-quality healthcare remains a challenge for marginalized people, such as lower caste groups and economically disadvantaged populations. Additionally, the healthcare system is still mostly reactive, concentrating on treatment rather on addressing the underlying environmental and social factors that contribute to epidemic illnesses, such as insufficient urban planning and poor sanitation. In the context of epidemic illnesses, the Tiruvannamalai district example highlights how difficult it is to provide fair access to public healthcare. Even though there has been a lot of success in improving public health outcomes and growing healthcare services, efficacy is still constrained by enduring disparities in social justice, infrastructure, and resource distribution. These vulnerabilities are shown by epidemics like COVID-19 and dengue, which disproportionately impact the most vulnerable groups. A comprehensive strategy that incorporates healthcare delivery with social policy, community involvement, and long-term investment in public health infrastructure is needed to address these issues. The objective of robust, egalitarian, and accessible healthcare can only be achieved by such all-encompassing activities.

Objectives

To examine the level of access to public healthcare services among different socio-economic groups in Tiruvannamalai district.

To analyse the relationship between access to public healthcare and the prevention, management, and outcomes of epidemic diseases in the district.

Methodology

The study used a quantitative, cross-sectional research design to examine the relationship between access to public healthcare and epidemic disease management in Tiruvannamalai district. 480 respondents are selected using a multistage random sampling procedure, ensuring representation from both urban and rural areas. Primary data is gathered using a standardized questionnaire including sociodemographic characteristics, educational achievement, health condition awareness, and healthcare consumption patterns. To ensure accuracy and clarity of responses, data is collected via in-person interviews. The collected data is coded and analyzed using statistical techniques such as percentage analysis, chi-square testing, and correlation approaches to identify associations between education and health-seeking behavior. The study is carried out strictly in accordance with ethical guidelines, including confidentiality and informed consent.

Analysis

Table 1(a): Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	0.756	0.712	0.678	2.2	1.001

A. Predictors: (Constant) Mass clinical testing, Public health campaigns, sanitary work Immunization
B. Dependent Variable: Epidemic illnesses

$Y= \beta_0+ \beta_1 X_1 \beta_2 X_2 .....\beta_n X_n$
Y= dependent
X=Predictors
R^2 and adjusted R^2 of the model are greater than 0.5. Hence the regression model is good prediction

Table 1(b): ANOVA for Regression Model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	145.6	4	36.4	5.06	0.003*
Residual	3422.2	476	7.2		
Total	3567.8	480			

A.Predictors: (Constant) Mass clinical testing, Public health campaigns, sanitary work Immunization
B. Dependent Variable: Epidemic illnesses

The ANOVA results indicate that the regression model is statistically significant (F = 5.06, p = 0.003). Since the significance value is less than 0.05, the null hypothesis (H_o) is rejected and the alternative hypothesis (H_1) is accepted. This confirms that public health interventions such as mass clinical testing, public health campaigns, sanitary work, and immunization significantly influence epidemic disease management.

Table 1(c): Regression Coefficients

	Unstandardized Coefficients		standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Epidemic illnesses	2.247	5.74	0.00	2.058	0.003
Mass clinical testing	2.04	1.42	0.15	0.27	0.001
Public health campaigns	1.41	3.36	0.48	0.25	0.003
Sanitary work	1.34	1.61	0.15	0.29	0.001
Immunization	2.70	3.84	0.23	0.15	0.004

A.Predictors: (Constant) Mass clinical testing, Public health campaigns, sanitary work Immunization
B. Dependent Variable: Epidemic diseases

Y (Epidemic diseases) = β_0+ β_1 (Mass clinical testing) + β_2 (Public health campaigns) + β_3 (Sanitary work) + β_4 (Immunization)

$$EI = 2.24 + \underset{(0.002)}{0.15(MCT)} + \underset{(0.001)}{0.48(PHC)} + \underset{(0.001)}{0.15(SW)} + \underset{(0.003)}{0.23(IMZ)}$$

Results and discussion

The results of the Tiruvannamalai district case study provide a rationally sound and empirically supported picture of the relationship between epidemic illness management and public healthcare access. According to descriptive data, 68% of respondents had access to a government Primary Health Center (PHC) within a 5-kilometer radius, while 32% have to go further, indicating glaring geographical disparity. Physical accessibility seems to be sufficient for most people, but use trends show a more nuanced reality. Due in significant part to perceived benefits including shorter wait times and higher-quality treatment, just 54% of families mainly rely on public healthcare, while 46% choose private providers. This discrepancy draws attention to a crucial empirical finding: while qualitative considerations greatly influence healthcare decisions, proximity by itself does not guarantee trust or use. 72% of respondents said they were aware of epidemic diseases including COVID-19 and dengue, but only 57% sought medical attention right once, and 43% postponed treatment. Economic limitations, cultural dependence on home cures, and reluctance toward institutional treatment are all reasonable explanations for this disparity between knowledge and action. These delays are crucial because they may increase the severity and spread of diseases. 61% of those who used public facilities during epidemics said they were satisfied, while 39% mentioned systemic problems such lengthy wait times, congestion, and medication shortages. These results provide empirical support for the claim that effective healthcare usage is still largely dependent on service quality.

This perspective is further supported by socioeconomic discrepancies. While just 38% of higher-income families often choose private healthcare, 64% of lower-income households only depend on public healthcare. This implies that public healthcare serves as a safety net for those who are economically disadvantaged, but it also shows disparities in access to healthcare. Furthermore, 48% of healthcare seekers were women, but their access is frequently mediated by family decision-making, suggesting underlying gender dynamics that limit independent health-seeking behavior. Multiple regression analysis was used to examine the impact of public health initiatives on epidemic disease outcomes in order to support these descriptive findings. With an R value of 0.756, R^2 of 0.712, and adjusted R^2 of 0.678, the model explains approximately 71.2% of the variance in epidemic diseases, indicating strong explanatory power. The Durbin-Watson value of 1.001 suggests mild positive autocorrelation: however, it remains within an acceptable range for exploratory social science research. Additionally, the model's statistical significance is confirmed by the ANOVA findings ($F = 5.06$, $p = 0.003$), indicating that the independent factors together affect epidemic outcomes. Deeper empirical insight is provided by the coefficient analysis. Immunization, public health campaigns, mass clinical testing, and sanitation initiatives all have favorable and statistically significant impacts ($p < 0.05$). Public health campaigns ($\beta = 0.48$) had the greatest impact among them, highlighting the vital role that awareness, behavior modification, and community involvement play in controlling epidemics. This makes sense in light of past research showing that awareness was there but did not necessarily result in prompt action, suggesting that engagement and communication tactics are crucial to closing this gap. Similarly, by addressing environmental factors as well as preventive, vaccination and sanitation initiatives directly lower the incidence of illness. Although Tiruvannamalai's public healthcare infrastructure is reasonably accessible, its efficacy in controlling epidemic diseases is largely dependent on the caliber of services, socioeconomic circumstances, and the potency of public health interventions, as demonstrated by the combination of descriptive statistics and regression analysis. Improving healthcare access and epidemic response requires strengthening these aspects via focused policy initiatives.

Conclusion

An examination of epidemic diseases and public healthcare access in the Tiruvannamalai area indicates a system that is functionally existent but unevenly effective. Public health services are physically accessible to a large majority of the population, but perceived quality, socioeconomic limitations, and cultural norms influence actual usage. The descriptive data show a glaring disconnect between timely health-seeking behavior and knowledge, especially in epidemic settings when treatment delays might worsen the severity and spread of illness. The empirical results also show that public health efforts, including mass testing, vaccination, sanitation, and awareness campaigns, are crucial in lowering the occurrence of epidemics. However, its effectiveness depends on community involvement and effective execution. The regression findings show that these variables work together to limit the pandemic, but differences across economic groups and genders point to ongoing discrepancies in outcomes and access. The study leads to the findings that increasing facilities is not the only way to improve public healthcare access in Tiruvannamalai: affordable healthcare delivery, high quality services, rapid response, and community involvement are all necessary, Epidemic prevention is greatly aided by public health initiatives including mass testing, sanitation, immunization, and awareness programs: yet, social and cultural barriers still have an impact on healthcare availability. Therefore, effective epidemic management necessitates complete and accepting public health system.

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