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Dengue epidemic – Knowledge gaps and its mending in Kerala, India

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Abstract

Dengue fever is considered a pandemic-prone disease that is viral in origin and affects around 50-100 million people worldwide, according to the statistics published by the World Health Organization (WHO). It affects both urban and rural areas, with a very pronounced rate of annual incidence in the South-Asian region. The state of Kerala, in India, is an identified dengue-prone area due to being in the South-Asian zone and presents great potential for evaluating the disease incidence and complications associated with its attack. Being a globally affected viral disease with no widely-accepted and available vaccination to prevent the disease and only treatments that focus on symptom management, dengue epidemic demands urgent attention. An effective and sustainable knowledge translation initiative that educates the at-risk population to reduce the risk of the epidemic and promote preventative measures to avoid contracting the disease by considering the socio-economic challenges associated is very much vital.

Keywords: Mosquito, dengue, Kerala, Knowledge Translation, prevention and vector management

1. Introduction

Dengue fever is a systemic viral epidemic classified as a neglected tropical disease by the World Health Organization. Dengue fever (DF), and its more severe forms namely, dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS) have become issues of global health concern in recent years. As a tropical country having diverse cultural and geographical features, possessing ideal environmental and social conditions for the incidence and spread of a viral epidemic, India presents an interesting scenario to conduct an in-depth evaluation of the existing problems concerning the disease and its management ^[1]. In fact, some of the key problems hampering the effective prevention and management of an epidemic such as dengue is the lack of knowledge, indifference towards acquiring it and reluctance towards adhering to the established standards of prevention. As a matter of fact, the strategized method of dealing with preventable epidemics such as dengue has the potential to be adapted to other communities worldwide with necessary changes.

Given the fact that re-emergence of infectious diseases is a threat to the accomplished level of global health security, the incidence of a disease such as dengue in a location of high literacy presents a thought provoking question to ponder on ^[1]. The incidence of mosquito borne epidemics point to environmentally unsustainable and unfriendly waste management protocols that create ambient breeding grounds for infectious agents ^[2]. Additionally, the lack of a sense of social responsibility necessitates the need to widen one's own perspectives to look beyond one's own households and to develop a sense of community that would empower individuals to prevent and tackle such issues ^[3]. Overall, the strategy that is being proposed involves raising awareness and fostering attitudinal changes that both work in union to bring a positive change in the society for preventing and managing epidemics such as dengue fever ^[2].

As a preventable epidemic that is debilitating thousands of people worldwide each year, the potential of effective and practicable knowledge translation initiatives to control and curb the epidemic can't be understated. Therefore, it is crucial to strategize measures to evaluate the level of knowledge among the population, detect the gaps and design solutions that would mend the existing gaps in an effective manner. By raising awareness through knowledge translation initiatives, the deficiencies and the existing gaps that create practical applications of knowledge difficult can be effectively remediated. The main objective of my study is to analyse the existing knowledge gaps in the various strata of Indian society regarding dengue through informed consent interviews.

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Through the information I gain, I aim to propose an effective knowledge translation strategy that promotes preventative measures and effective Treatment regimens among the population.

2. Methods

In order to evaluate the presence and extent of ignorance regarding the potential of an epidemic such as dengue, it is vital to gather information on the current knowledge levels and understandings in the community through in depth surveys. These surveys gather information on the health status of the population, which would aid in detecting the at-risk population for the epidemic as well as aid in identifying the existing gaps in knowledge, attitude and practice with regards to epidemic prevention and management [3]. Initially, the prospective stakeholders that are involved in the prevention

and management of epidemics were identified and grouped. An informed consent study that included open-ended questionnaires tailored to the specific stakeholder groups and formal interviews that facilitated honest responses from the participants in the community were conducted to detect the true nature of the situation [4]. Following initial data collection, targeted interventions such as the distribution of information brochures that are aimed to rectify noted deficiencies in knowledge and practice needs to be implemented. The initial data collection enables the creation of customized programs that cater to the needs of individual communities by mending existing gaps and promoting practices that are preventative and community-friendly [5]. Additionally, post-intervention adherence studies carried out with the help of community liaisons can serve to evaluate the impact of the knowledge translation initiative in the long run.

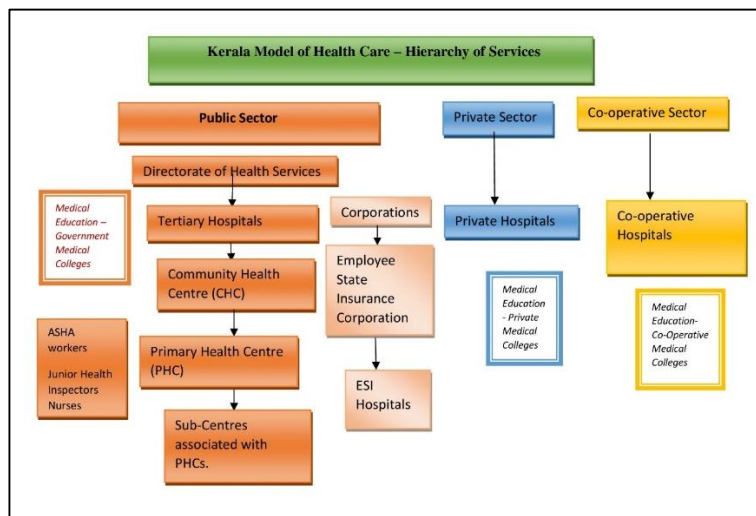


Fig 1: Kerala Model of Healthcare and service hierarchy.

3. Results

In the study, four key groups of stakeholders were interviewed and the information collected based on the informed consent interviews are detailed in Table 1. The key problems that impede the success of preventive measures in Kerala are the lack of knowledge about the disease and the lack of appropriate resources in helping people acquire information. Qualitative interviews with community members who are stakeholders representing the state population benefitting from the government initiatives revealed the lack of knowledge on mosquitoes, their breeding grounds and eradication. The absence of appropriate and targeted training

offered on preventing epidemics that make acquisition of knowledge cumbersome were also pointed out. Based on data collected from the initial phase interviews with stakeholders involved as policy makers, the lack of educated leaders or champions who can lead a change in the mindset of the population through targeted interventions that progressively improve based on feedbacks were pointed out as the fundamental problem. Added to that, the lack of social responsibility and commitment also result in attitudinal deficiencies that make compliancy to preventive measures problematic.

Table 1: Issues and barriers in acquiring and practicing preventive measures against epidemics

| Stakeholders | Issues addressed | Knowledge gaps exist? |
|----------------------|---|-----------------------|
| Policy Makers | Lack of leadership Interventions not designed to effect change in population’s mindset Lack of social responsibility | Yes |
| Community Members | Lack of information Lack of responsible preventive/eradication activity from governing bodies | Yes |
| Healthcare Providers | Inappropriate media coverage that misinforms public Patients’ demand for immediate cure without attention to prevention | Yes |
| ASHA workers | Lack of public support in receiving information Blaming attitude from house owners | Yes |

Based on the data collected by interviewing healthcare providers such as doctors and nursing staff, the stress induced by patients' persistent demand for cures without acknowledging the need for prevention was pointed out. Additionally, the care providers noted the role of media to be problematic in creating unnecessary and misleading disease 'hypes' that overburden the healthcare system as a whole. Another group of stakeholders were crucial to this study where *ASHA* (Accredited social health activists) workers who have the experience of interacting with the population directly in spreading the knowledge of prevention and disease management. *ASHA* workers pointed out the attitudinal deficiencies among the public in receiving information and accepting responsibility for their own surroundings' appropriate maintenance. In addition, the fact that many community members have a blaming attitude that puts the burden of epidemics on the authority's shoulders was also pointed out. Although the different stakeholders pointed out various issues, all of them agreed to the fact that knowledge gaps regarding the prevention and management of epidemics do exist in the society.

4. Discussion

According to the World Health Report of 1996, the incidence and re-emergence of epidemics (infectious diseases) could be considered a threat and warning to the accomplished levels of global health security and prosperity. In fact, it is worth noting that the efforts made in these zones could be wasted if timely interventions aren't performed to prevent and control such diseases [6]. Globally, dengue epidemic presents a threat to around 2.5 billion people living in tropical and subtropical areas [1]. Dengue is prevalent in more than 100 countries around the world belonging to the areas identified by the WHO as Africa, Americas, Eastern Mediterranean, South-East Asia, and Western Pacific, with the most severity reported in the regions of South-East Asia and Western Pacific [6].

Even amidst the significant interventions that were undertaken by world organizations such as WHO to curb the epidemic intensity, the world has witnessed frequent dengue attacks in the tropical and temperate regions [7]. As a matter of fact, the number of dengue cases that are getting reported has witnessed an exponential increase in recent times. With the increased levels of urbanization and global travelling facilities, the increased transmission of the virus across the globe became more feasible. Urbanization inevitably involves migration from rural to urban settings, which when met with non-ample levels of infrastructural amenities to support such an influx of population leads to inadequacies that are conducive to the development of such viral diseases. Several times, inadequate water supply, poor sanitation facilities and inappropriate sewage and waste disposal mechanisms combined with a poorly crafted and managed public health infrastructure make the vector management problem worse [8]. In fact, this is particularly pronounced in the case of a state such as Kerala which is facing the repercussions of inappropriate and ineffective plantation management protocols by property owners which create large scale sources for infectious agents to breed in. The lack of appropriate regulations and their ineffective implementations from the authorities create a scenario wherein the sustainable environmental practices don't gain much significance. Added

to the mosquito breeding grounds created due to inappropriate management of latex collection containers, the lack of an efficient drinking water supply and sound sanitation facilities create additional problems. Due to the lack of effective rainfall harvesting mechanisms, many households collect rainwater in containers that aren't kept airtight after the collection. These manmade containers with collected rainwater serves as a good source for infectious mosquitoes to breed in and spread epidemics. Furthermore, due to the lack of effective chlorination initiatives, many larger water reservoirs such as wells and tanks also serve as a key breeding ground for mosquitoes.

While there are government organized cleaning and chlorination initiatives, the lack of community member's interest, knowledge and participation nullifies the impact that these interventions could make. As a matter of fact, the lack of awareness coupled with a lack of sense of community creates social tensions when programs involving community participation in eradicating mosquito breeding grounds are undertaken. In fact, being a state with the highest recorded literacy rate of higher than 90% with 94.2% for males and 87.7% for females, Kerala demands attention when investigating the causes of such attitudinal deficiencies and behavioural inadequacies that needs to be rectified through awareness and education as it has the potential to bring a positive change in the society in managing mosquito borne epidemics such as dengue [9]. Evidently, Kerala possesses deficiencies in its health literacy rate which measures the combination of cognitive and social skills that provide the motivation and ability to access, understand and utilize information in ways that promote and maintain good health [11]. The healthcare facilities in the state can be categorized into three major sectors which covers three genres of medical practice in the region namely allopathic care, homeopathic care and naturopathic (Ayurveda) care. The three sectors involved in healthcare delivery in the state are public sector, private sector and co-operative sector (Figure 1). The public-sector healthcare system predominantly focuses on rural areas where 74% of the population resides and its delivery is done through a hierarchy of service centres such as the directorate of health services, tertiary hospitals, community health centres (CHC), primary health centres (PHC) and sub-centres. Interestingly, each CHC in the state successfully serves a population of more than 230,000 people, while PHCs serve around 26000 patients in the locality, with an additional 4700 of the population served under each of the sub centers that are associated with the PHC. Additionally, there are educational institutions that are associated with each of the three sectors of care delivery that focus on training and educating new generation professionals in the medical field.

The developmental strategy of the state has been internationally praised as a developmental model for others to follow. However, the economic downturns, the lack of ability of public sector of healthcare to meet the demands of the increasing population, an aging society and the technological advancements which occurred at the expense of other sectors, made severe fiscal issues in the state [10]. Additionally, with the advent of urbanization and increased human migrations, Kerala succumbed to anthropogenic stressors and became susceptible to epidemics such as dengue and chikungunya – a scenario that wasn't anticipated previously, given the state's health status and accomplishments in the field [11].

Empowering individuals, communities, authorities and larger societies with information, equipping them with the necessary tools and skills to practice their knowledge and developing a sustainable sense of well-being grounded on the principle of social responsibility and unified community participation form the guiding notion of the proposed knowledge translation (KT) initiative. This KT initiative would fundamentally consist of dissemination of knowledge to the population through the actions of various liaisons at the individual, community and larger society levels. At the larger society level, this knowledge translation aims to facilitate effective and constructive partnerships between public and private sectors in health and social welfare. Community level knowledge translation initiatives can be grouped into two major categories – groups in schools/colleges and neighbourhood groups such as ‘*ayalkoottam*’ that are community based. Individual level knowledge translation initiatives would involve community actors such as *ASHA* workers who contribute in bringing attitudinal and behavioural shifts about prevention and disease management. By fostering attitudinal changes, the development of a sense of community and commitment that not only act in ways that benefits a larger society, but also empowers them to pass such a lesson on to future generations to create a sustainable chain of social commitment becomes a reality^[12].

5. Conclusion

As a systemic viral disease classified as a global burden by WHO, dengue epidemic demands the attention of the global community to shift from curative to preventative care which is economically and socially sustainable. On that note, the role of knowledge as a powerful tool to mend the existing gaps in the society receives pivotal prominence. Being a tropical country with recent attacks from dengue in the past years, India is a region with very pronounced dengue risk. The lessons that are acquired from Kerala’s conditions are applicable worldwide and it requires the global population to gain more health literacy, diagnose and mend own knowledge gaps and cultivate a sense of community that would empower oneself with the skills and tools to initiate and sustain a chain reaction of positive change in the society.

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