



Invited paper

Provisioning health care infrastructure in communities: Empirical evidences from West Bengal, India

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ABSTRACT

We developed a framework to reinvigorate communities in terms of public health care infrastructure provisioning for outpatient needs within the neighborhoods. The health care seeking episode is often influenced by the physical and health care infrastructure availability within the neighborhood, need of the health care seeker as well as personal, household, occupational, and latent perception of the users. This empirical study has been developed for two different groups in West Bengal India, firstly based on location and secondly based on the choice of the health care seeker. In case of resident based approach, we focused on the revisit decision of the rural inhabitants who sometime tend to travel to the regional facilities in urban areas. Facility based approach analyzed the people who were at the regional facilities for health care services. We devised scenarios ascertaining improvisation in service delivery, emergency facility and mobility ease at local public facilities might reduce regional tours and instigate higher utilization of the neighborhood health care facility. We develop integrated choice and latent variable models to incorporate latent perception in choice of scenario for instigating revisit decision. Results showed choice of development scenarios have association with the household structure, social network, locational and infrastructural impedance. This framework lead to two distinct outcomes: (1) method to identify programs, those are essential to by initiate_revisit_to the health care facility (2) perception based assessment of the current mobility and health care infrastructure of the region, which could be instrumental in developing the overall health care infrastructural planning policy as a whole.

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1. Introduction

Formulating health care infrastructure development strategies to promote better accessibility should be conceived based on people's needs and aspirations; this might improve the utilization of public health care facilities in developing countries. Strategies have been formulated by the central ministries in India since historic times; state governments are majorly responsible for implementation and service delivery. However, monitoring and assessment of the health care facilities has been neglected, except for occasionally addressing the reported grievance. The cumulative effect of these inadequate measures might have affected the utilization rate of the public providers negatively.

In the last few decades, non-availability and uneven allocation

have been a key concern [27]. This has led to increased private investment in the health care sector and proliferation of private providers. Under the National Health Policy 2002, National Rural Health Mission (NRHM) and National Urban Health Mission (NUHM) were formulated aiming towards architectural correction of infrastructure availability, leading to construction of Primary Health Centers (PHCs). However, lack of trained medical personnel rendered these facilities obsolete and they remained unused or underutilized. 18% of the PHCs were reported to be without a doctor and 38% without a laboratory technician [22]. Attempts were made by the private sector to fill these gaps, but such options were expensive. Due to lack of insurance policy, India had one of the highest out-of-pocket health care expenditures in the world – estimated to be 71.1% in 2004–05 [1]. Strategizing policies and building health care infrastructure without considering people's health care seeking behavior might facilitate physical availability but might not essentially ensure utilization of the built infrastructure. Therefore, evaluation of social acceptance of proposed policies might be a key. Wüstenhagen et al. [39] argued that social

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acceptance could be a constraining factor of achieving governmental targets through disagreement of applied policy. Furthermore [6], commented that inadequate public involvement in the provision of basic education, health care, social security, and related fields has been the cause of India's failure to eliminate basic deprivation. Furthermore, people's needs might vary due to the heterogeneity of varied representative groups, which has often been neglected to a major extent. In India, there are diverse socio-economic classifications influencing affordability, whereas locational aspects affect spatial accessibility emerging from the rural urban disparity. Moreover, the access to basic services such as water, sanitation, drainage, hygiene etc., varies remarkably across communities within a region and also between regions, causing variance in health care needs. Cools et al. [5] argued that segmentation to identify homogenous groups would allow policy makers to better frame their future actions, while increasing the chance for successful implementation of these measures. We argue that these heterogeneous groups exhibit distinct health care seeking behavior and if the factors affecting these behaviors are estimated, services and facilities provided by PHCs can be customized based on needs and aspirations of the people. Further strategies can be evaluated and grouped based on the feedback of the people residing in diverse geography, thereby customizing the health care infrastructure development strategies to match people's needs. In this paper, two approaches were developed to assess health care facility choice owing to health care infrastructure development scenarios. 'Resident based approach' and 'facility based approach' were estimated to incorporate household and individual preferences, while integrating the inherent and existing infrastructure drawbacks. The goal was to develop a novel framework to aid in reinvigorating the public health care facilities, especially the PHCs, while considering the heterogeneity of the needs.

This paper is organized as follows: the next section briefly illustrates the determinants of health care facility choice, followed by Section 3 elaborating on the methodology and model framework adopted. Results are discussed in Section 4, followed by concluding remarks in Section 5.

2. Determinants of health care facility choice

To ensure better health care infrastructure and facility to the users, determination of gaps and fulfillment of aspirations have been considered to be pivotal. While realization of infrastructure gaps and ensuring patient centeredness can ensure satisfaction [29], rebuilding trust through fulfillment of aspirations might ensure utilization of public infrastructure [40]. Nevertheless, it is evident that health care seeking behavior is influenced by the complex interrelationship among acceptance, trust, information and participation [35]. Furthermore, efficient and effective PHCs do have a positive impact on population health over time [18], therefore, it might be worthy to instill 'trust' among the users.

The decision to engage in a particular health care facility is influenced by a number of endogenous parameters, such as socio-economic status, gender, age, the type of illness, access to services and perceived quality of the service [34]. Furthermore, some ecological parameters such as geographic, cultural, political, institutional etc., have also been identified as a key concern [15,16,28]. Review of existing literature states that wait-list times, availability of needed information (e.g., for system navigation) and service quality [36] and communication determines the satisfaction of the users, especially for outpatient needs [30]. According to Ref. [11] first-contact accessibility in PHC pertains to 'the ease with which a person can obtain needed care (including advice and support) from the practitioner of choice within a time frame appropriate to

the urgency of the problem'. This results in 'access' encompassing meanings that range from the capacity to pay [37], clinic operation times [17], culturally sensitive services, ability and interest to access services [3], to the physical siting of PHC service sites [32]. It has often been argued that quality of care is associated with patient volume. Hence, regionalization of care of a selected service is one of the approaches to improve better quality of care and superior outcomes [21], which eventually leads to decrease in the spatial accessibility to the facility [20]. This is observed mostly in case of inpatient and specialized treatments [12,24,38], which are dependent on highly trained workforce and specialization [19].

Economic constraints, such as, capacity to pay [37], and the institutional constraints, such as, availability of the desired services, timing of the facility and cost of treatment [17], affect the choice. The financial costs and quality of health care service, transportation cost and intermediate logistical difficulties such as finding an intermediate transport or motorized vehicle for transportation are linked to reduced uptake in biomedical services [8,10,26] and delayed health care seeking behavior [7]. From the supply side, it has been observed that choice based competition between health care service providers often lead to better outcomes [25]. In many of the developing countries (including India) where public health care services are offered free of cost, the accessibility of health care seekers to the facility and hierarchy of the facility govern the choice significantly [13].

3. Methodology & model framework

Four different health care service schemes were adopted as development scenarios for PHCs. Scenarios such as, emergency response, enabling interaction with the specialist through tele-medicine, mobility enhancement schemes, especially in areas with constraints, and low regional connectivity have been considered. Willing respondents were canvassed and their responses were collected through a paper-based questionnaire survey.

Formulated development scenarios are as follows:

- Option 1—Upgrade of existing PHCs
- Option 2 —ICT (Information and Communications Technology) based telemedicine services in PHCs
- Option 3 – Allocation of free mobility scheme (if the respective PHCs desires to refer to other HFs)
- Option 4 – Development of 24 h health care emergency service

In this context, it is essential to mention that the adopted scenarios are based on several deployment strategies being applied by different agencies in India. For example, ICT (tele-medicine) has been experimented upon in the last decade in various forms in India. This may be useful not only to reduce exclusion through equal access and delivery of service at 'point of need' [31], but might also reduce travel demand at source, specifically in case of those with mobility disablement. As an outcome, it has been observed that there can be a considerable increase in outpatient visit with a corresponding decrease in visit of emergency [9]. Additionally, emergency telemedicine programs are feasible, however, depending on active interaction between the cooperating health care facilities [4]. In case of developing nations where state of art facilities are mostly concentrated in the urban areas, tele-medicine facility might be instrumental in reducing the geographical barriers.

3.1. Segmentation of study groups

To devise tailor-made solutions, the approach has been to identify need-based homogeneous subgroups or segments within a

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