
**Service delivery space and accessibility issues: An
understanding of efficiency of primary health centres in
Purulia District of West Bengal, India**

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Introduction

Healthcare is fundamentally different from usual commodities like food, clothing and shelter. Health goods are not homogeneous in nature, thus the market clearing situation at some part does not imply that absence of imperfection in others. Under a proper healthcare system, alternative providers are available and we have to choose among them depending upon the improvements on expected outcome (Arrow, 1963). Considering this, a rational consumer tries to choose the alternative which yields highest utility (Dreze & Sen, 1995). The literature on healthcare is not only confined to the qualities of healthcare use, but also extends to the quality of service provided by them (Farrell, 1957). Performance of the health sector is a very important indicator of human development index of a society (Grossman, 1972). Productivity factor of a society is severely affected by the poor health condition. The publicly provided health facilities have some common features like higher-tier hospitals or health units overloaded with patients, whereas the basic levels are underutilized (Gertler & Van der Gaag, 1988). Hence it is an important and significant task for the stakeholders to consider the efficient side as well as the inefficient side of the health support function of the publicly provided institution (Banker, Charnes & Cooper, 1984). In this study, we try to capture the scenario of healthcare delivery system of Primary Healthcare Centres (PHCs) in Purulia district of West Bengal State of India.

The study attempts to assess the impending room for service release of the PHCs. The room for service release means, to what extent government and its associates allow the resources (existing and additional) for the improvement of service delivery (Evans et al., 2000) of the PHCs and to achieve specific objectives of health. The present study considers basically two issues regarding healthcare need. One is how much the need is satisfied by the existing system and the other is how much remain unmet in the Purulia area. The study considers a simple supply demand frame to observe this. Two main research questions are fitted in the study are (1) Services rendered by PHCs in terms of service grouping and (2) Service rendered by PHCs in specific geographical areas. The first question

identifies, what amount additional competences are to be allowed to the PHCs of Purulia to face the extra (uncertain /certain) burdens of future, which may generate from inpatient care, outpatient care, maternal and child health care etc. The second question recognize the most vulnerable blocks in terms of inefficiencies of PHCs.

Methodology

The service delivery space of PHCs in case of inpatient care, outpatient care, institutional deliveries, immunisations are variable in nature. As for example, the PHCs are mainly deal with outpatient services rather than inpatient care. The study considers all the 53 PHCs of the district, and each and every PHCs were visited three times of a month to undertake the outpatients (1282) and inpatients (171) response. Thus to allocate resources for the PHCs, the government have to make a priority based list which may be termed as enormity of space. Thus to consider such issues, the study considers two scenario, one is base or foundation or existing scenario and other is desirable scenario. The base scenario is estimated from the household survey, patients' survey and administrative facility survey of the PHCs. The desirable scenario can be derived on the basis of certain set of assumptions. Then we can assess the service delivery space by comparing these two scenarios.

Purulia, a cluster of biosphere reserves and home about 2.5 million people, is a part of West Bengal state with 20 blocks (purulia.nic.in). The nature of the data is both the primary and secondary type. For the purpose of the study, detailed visits were made in all the 53 PHCs under structured questionnaire. The infrastructural, manpower, medicines, inpatients admission and outpatients visits was observed very carefully for each PHC under structured questionnaire. In case of outpatient department (OPD) every second patient in the speciality queue was approached and briefed about the study by the investigator. If he or she agreed, they were asked about their socio economic conditions at that time. As they finished their visits in the PHCs completing all types of services like doctor's advice, medicines allocation, diagnostic tests etc., they were again approached at the gateway of PHCs regarding the experiences they gathered from such facilities. By this way a total of 1282 patients have been surveyed from OPD facilities of the existing PHCs. In case of inpatient department (IPD) visits the study first considered that bed size of the all 53 PHCs of Purulia district varies from 0 to 10, and there are total 232 beds providing IPD services for the 2.5 million people at the primary level healthcare. Here the study meets with the two third patients of the IPD in each PHC. The selection of the patients has been made on the basis of every first and second patients from the three patients admitted in the respective PHCs. Thus out of 232 beds 171 patients have been interrogated

regarding their perception of service quality rendered by the PHCs of the study area.

Here, the base scenario conditions are already known to us for the following inputs and what level of output produced by them is also in our knowledge. Among these outputs one major output is number of child birth taking place in the institution like PHCs. One may consider this as a proxy for the indicator like institutional delivery. The estimation of Table 1 points out that if, institutional delivery increases by 10 percent, the PHCs of Purulia delivered extra 566 births (considering other facts remain same). Now if we assume that average length of stay for a birth delivery is 3 days, then the number of inpatient days translated to 1698 (roughly) days. Now in the study area there are 232 bed performing for the year i.e. there will be 82592 bed days. If the average length of stay is 3 days, then this will generate 27531 bed days per patient. Now due to 10 percent increase in institutional delivery 1698 inpatient days further generated which is 6.17 percent of the present capacity. But our survey study on PHCs indicates that they (PHCs) are already close to the saturation level, though there are some gaps in the manpower and infrastructural facilities. Now the additional burden of 6.17 percent in inpatient capacity will make the conditions of PHCs more critical, and has happened due to increase in institutional delivery by 10 percent. Thus additional support for the PHCs become urgent need, otherwise we will observe a huge referral tendency and by-pass inclination to the higher-tier hospitals.

Table 1 Estimation of gap in institutional delivery of PHCs, Purulia, 2016

	Estimated Birth in 2016	Estimated Institution Delivery in 2016	Estimated Deliveries in PHCs, 2016	Total birth Delivered at PHCs	Additional Load on PHCs
Assumptions	Population 2.5 million, birth rate 2.2% p. a	60% of Population as per district health information	10% of the estimated Institutional delivery	From HMIS If data, 2016	Institutional delivery increase by 10%
Western Doars	55000	33000	3300	3284	566

Source: Purulia District Health Office, 2016

The inputs of the specified health system used by the PHCs are defined as bed, equipment, doctor, nurse, health assistant, group-D staff, and medicines. All these inputs are used to produce four qualified output like Quality adjusted in-patient output (QAIPD), Quality adjusted out-patient output (QAOPD), Number of child birth, and Number of health education sessions.

Before the data analysis the study tries to illustrate the output specifications of this analysis. The true fact is that state has not supplied the full component of

staff including doctors, required to all the PHCs of the country. Health managers know that more or less homogeneous inputs need not always lead to same outputs. Thus it is an important task from their end also to mark the critical performers regarding production of health outputs. This will help them to identify the areas which need to be strengthened and the investment that need to be carried out.

Accessibility in a block is classified in three categories- good, moderate, and poor. The good, poor, and moderate physical accessibility indexes blocks are identified by following criteria like (i) More (less) than 50 percent of the village have bus services within 5 km; (ii) More (less) than 10 percent of the villages have railway line within 5 km; (iii) Less (more) than 10 percent of the villages have river bodies on their approach roads; (iv) Less (more) than 10 percent of the villages have 10percent area under forest; (v) Distance of farthest sub-centre to BPHC is less (more) than 20 km or less than 2 hours journey.

Results and discussion

The study used output-oriented DEA model in the analysis because inputs of the PHCs are not controlled by themselves, it has to depend upon others. For example the deployment of human resources in the PHCs are not in the management part of the PHCs. It is difficult as well as unethical up to some point to reduce inputs, which are already in short supply position. Therefore we have made an attempt to look at the possibility of maximising the output with the given level of inputs. The output oriented approaches of DEA identifies that how much output units can be increased with the same use of inputs. Again DEA stipulated that input-orient approach and output-oriented approach leads to the same frontier. Thus the study identifies the PHCs as the best efficient performer according to output-frontier and input-frontier are same. But the measures changes for the inefficient PHCs. Thus it is expected that the choice of process will not affect the results significantly. Out of the 53 PHCs, 39.6 percent (21) are established to be relatively technically efficient score with a TE score of 100 percent and they should be considered as the peer group among the lot. The remaining 60.4 percent (32) are technically inefficient since they had a TE score of a lesser amount than 100 percent. These 32 PHCs are situated below the efficiency frontier with a mean score of 65.48 percent on a scale of 0 to 100. 12.5 percent (4) of the inefficient PHUs have a TE score of less than 50 percent. The overall sample average TE score is 79.11 percent [standard deviation (SD) = 21.23 percent]. This implies that if the inefficient PHCs are to work as efficiently as their 15 peers on the efficient frontier, outputs can be increased by about 20.89 percent without changing the point of inputs used. The mean TE score among the inefficient (23) PHCs is 65.48 percent (SD = 16.31 percent). This means that their output can be

expanded by 34.52 percent without altering their input combinations. The study shows a high degree of variation across different PHCs. In the study 15 PHCs are found efficient. This means that further increase in output is not feasible in the current structure. Some PHCs are found with so low score of efficiency that their expansion of output can be possible by more than 60 percent by the efficient utilisation of resources. In case of scale efficiency scores the study identifies that 31.58 percent (12) PHCs have a scale efficiency (SE) score of 100 percent. This means that these PHCs would significantly improve their efficiency and reduce their unit cost by increasing scale of operation and they have the most productive size for the particular input-output combinations.

The geographical distribution of the blocks over the district represents the physical accessibility criteria according to this study. All the 20 blocks of the district are analysed in terms of secondary data collected from district administration and district forest office. On the basis of such data level a rough categorisation has been made and the results in this respect indicate that blocks have poor physical accessibility compared to others. Anyone can be able to use "AccessMode" software developed by World Health Organisation (WHO) for modelling physical accessibility to healthcare. But in this study such type of application is not possible due to data unavailability and time.

Conclusion

The study observes that service delivery spaces for the existing PHCs are limited by various factors. The service delivery spaces are defined in terms of technical efficiencies and scale efficiencies derived for all 53 PHCs of the Purulia District. By considering both the physical accessibility and service delivery spaces for all the blocks in macro terms, the study identifies the strongest and weakest blocks performing in terms of both service delivery spaces and physical accessibility index. Next, considering the technical and scale efficiency scores of each PHCs the study tries to identify the PHCs at micro or individual level which offers health support at primary level. The study tries to identify the best practicing PHCs and the PHCs need special attention.

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