



A STUDY ON EFFICIENCY OF HOSPITALS IN TERMS OF PATIENTS' HEALTH EXPENSES (EHPHE) AT GOVERNMENT AND PRIVATE HOSPITALS OF WEST BENGAL

Majumdar Anirban

Future Institute of Engineering and Management, Sonarpur Station Road, Sonarpur, Kolkata – 700150,
West Bengal, India

Corresponding Authors' Email: animaj1970@gmail.com

ABSTRACT

The number of corporate private hospitals and super specialty hospitals is growing in India to fulfill the demand for quality healthcare. With growth of private hospitals the patients' health expense is increasing day by day. The rising health expenses, sometimes, becomes disastrous for Indian households. There is also a rising demand for cost effective healthcare service in India. At present efficiency of hospitals does not depend only on quality service that they provide to customer but also it is important to understand that the health expense is also another factor to determine efficiency of hospitals. This paper focuses on the determination of Efficiency of Hospitals in terms of Patient's Health Expenses (EHPHE) based on the deviation of patient's actual health expense from their expected health expenses and to study how EHPHE varies with the types of hospitals across different regions of West Bengal

KEYWORDS: Health expense, Efficiency based on Expenses, Expected Health Expenses, Actual Health Expenses EHPHE

INTRODUCTION

In liberalized and globalized India, demand for cost effective super specialty hospitals is growing day by day. Indian market looks for the quality care, technical advancement in medicine and upgraded infrastructure in all those super specialty hospitals. At the same time there is a demand for medical services of international standard in affordable price. The pressure of cost reduction and better treatment leads the hospitals and healthcare providers to analyze their efficiency in terms of optimization based approach (Muthusamy, 2015). The high health expenses become the financial burden of Indian households (Bermanet.al, 2010). In India, where a substantial number of people do not have the income of one dollar per day, the cost of medical care is very high in comparison to their purchasing power and affordability (Mehrotra and Kumar 2013). Generally, patients who come to hospitals for treatment have some expectations about the reputation of hospitals and cost involved in treatment. If patients' expectation is not fulfilled, it causes dissatisfaction of patients (Mishra and Mishra, 2014). Though patients are very much concerned about the treatment of their ailment and the quick recovery, yet cost is another factor that affects their satisfaction level to some extent (Mishra and Mishra, 2014). It has been observed in the study conducted by Dr. Mishra and his coauthor (2014) in Specialty Tertiary Care Hospital that patients expect the explanation about the cost of treatment before getting admitted in the hospital. Majumdar and Chakraborty (2015), in their study, observed that the difference between patients' expected expenses before admission and their actual expenses after discharge has an enormous impact on their satisfaction. Majumdar and

Chakraborty (2015) suggested a concept of Efficiency of Hospitals in terms of Patients Health Expenses (EHPHE) and proved that EHPHE has a significant effect on patient satisfaction. Therefore, in this paper, our focus is to understand whether EHPHE varies with types of hospitals and different regions of West Bengal.

LITERATURE REVIEW

The measurement of efficiency is done on the basis of a ratio between the output and public spending. The efficiency is ensured by increasing output in the given amount of public spending or by reducing public spending for given amount of output (Mandl et.al.2008). Efficiency of hospital depends on various performance indicators viz. occupancy rate, average length of stay and capital invested in operations. Any problems in the above mentioned area signifies the low efficiency of a hospital (Bhat and Jain , 2006). Bandyopadhyay et.al (2014) conducted a study on hospital efficiency in West Bengal by applying the Data Envelopment Analysis(DEA) in terms of eight inputs and two outputs to determine the technical efficiency of hospitals. Data Envelopment Analysis (DEA) technique is applied to understand the efficiency of hospitals in terms of ratio of input viz. number of doctors and staff , required infrastructure etc. and output viz. all kind of services given to the patients (Davey et.al.2015). Majumdar and Chakraborty (2015) in their study on efficiency of hospital care described the efficiency from different perspective altogether. In their study they emphasized the expense of patients for defining the hospital efficiency. They suggested a new concept EHPHE (Efficiency of Hospitals in terms of Patients' Health Expenses) where the efficiency is measured on the

basis of the difference of patients' actual expenses in a hospital and their estimated or expected expenditure in the same hospital.

OBJECTIVE OF THE STUDY

This paper focuses on the measurement of the effect of types of hospitals and regions on EHPHE. The objectives of the paper is

- To determine the effect of types of hospital on EHPHE
- To measure the effect of different regions of West Bengal on EHPHE
- To determine the interaction effect of both hospital types and region on EHPHE

RESEARCH METHODOLOGY

In order to obtain the primary data, a sample of 474 patients have been interviewed on the basis structured questionnaire at three major regions of West Bengal viz. Kolkata and 24 parganas, District of South Bengal and District of North Bengal. In order to investigate the impact of health expenses on patient satisfaction some specific data have been collected from the above mentioned sample. These are

- 1) Household expenses of the patients in their family.
- 2) Expected health expenses at the time of admission or after two days of admission of patients
- 3) Actual health expenses at the time receiving discharge from a hospital.

The efficiency of hospitals in terms patients' health expenses (EHPHE) has been determined on the basis determination of standard health expenditure and calculation of ratio based on division the difference of expected and actual expenses by the standard health expenses.

- 1) Determination of the standard health expenditure for individual patient by taking the average of the

expected and actual expenditure for each individual patient i.e.

$$\frac{(\text{Expected Health Expenses} + \text{Actual Health Expenses})}{2}$$

- 2) Calculation of the difference between expected and actual health expenses

$$\text{i.e. } (\text{Expected expenses} - \text{Actual expenses})$$

- 3) Determination of efficiency of hospitals by applying the following formula:

$$\text{EHPHE} = \frac{2 (\text{Expected expenses} - \text{Actual expenses})}{(\text{Expected expenses} + \text{Actual Expenses})}$$

Performance of a hospital is considered to be efficient when the value of EHPHE is more than zero. With the increase of the value of EHPHE, the efficiency of hospitals will also be increasing. A negative value of EHPHE indicates the inefficiency of hospitals.

To understand the effect of categorical data viz. types of hospital, regions of West Bengal and their interaction effect on EHPHE scores, factorial design has been applied. Factorial Design is special type of two-way ANOVA that determines the effect of two factors and their interaction on continuous data i.e. EHPHE score for this case.

RESULT

In this study the dependent variable is EHPHE which is in continuous form or in ratio scale. This dependent variable depends on two independent factors viz. region and hospital types which are categorical data. Therefore, it is suitable to conduct a factorial design to understand the effect of independent factors on dependent variables. The Table- 1 shows the result of factorial experiment.

Table - 1: Result of Factorial Experiment

Dependent Variable: EHPHE					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Region	1.526	2	.763	4.485	.012
Hospital Type	.116	1	.116	.683	.409
Interaction between Region and Hospital Type	1.721	2	.860	5.057	.007
Error	88.313	519	.170		
Total	121.049	525			

From the above table (Table-1) it is clear that region, hospital type and their interaction all have significant effect as the P values corresponding to all the above mentioned factors are less than 0.05. Now it is important to know how much effect of different regions and hospital types is there on EHPHE.

The Table–2 shows the average effect of region, hospital types and their interaction on EHPHE. The table also shows the value of coefficient of variation that indicates the consistency of the effect of the above mentioned factors.

Table -2 : Descriptive Statistics

Dependent Variable:		EHPHE		
Locations of hospitals		Mean	Std. Deviation	Coefficient of Variation
Kolkata and 24 Pgs	Government Hospital	.2458	.40255	163.7707
	Private hospitals	.3793	.30070	79.27626
	Total	.3302	.34642	104.9228
District of South Bengal	Government Hospital	.2217	.48377	218.2216
	Private hospitals	.1954	.37831	193.5889
	Total	.2105	.44153	209.7132
District of North Bengal	Government Hospital	.2647	.47194	178.3099
	Private hospitals	.0600	.35042	583.8163
	Total	.1717	.43156	251.415

As per the result presented at Table-2, the overall performance of EHPHE considering both government and private hospitals is the best at Kolkata and 24 Parganas as the average EHPHE score is 0.3302. Districts of South Bengal occupy the second position with the average EHPHE score of 0.2105 and Districts of North Bengal occupy the last position with the average EHPHE score of 0.1717. The comparative study of coefficient of variations among these three regions also indicates that the EHPHE is most consistent in Kolkata and 24 Parganas with the score of 104.9228. District of South Bengal and North Bengal occupies second and last position respectively with their values of coefficient of variation 209.7132 and 251.415 respectively.

The above table (Table -2) shows that average EHPHE of private hospitals at Kolkata and 24 Parganas is 0.3793 higher than that of government hospitals i.e.0.2458. The coefficient of variation corresponding to private hospitals at Kolkata and 24 Parganas is minimum i.e. 79.276(approx) that indicates the average EHPHE value is very much consistent. However, the result EHPHE is better in government hospitals in the districts of South Bengal and North Bengal. The average value of EHPHE score for government hospitals in South Bengal is 0.2217 which higher than the value for private hospitals i.e. 0.1954. However, the value of coefficient of variation shows that the EHPHE of private hospital is more consistent than that of government hospitals. The value of coefficient of variation for government hospital is 218.2216 and for private hospitals the value is 193.5889. The average value of EHPHE score for government hospitals in North Bengal is 0.2647 which is higher than the value of EHPHE for private hospitals i.e.0.06. the comparison of the value of coefficient of variation for government and private hospitals in North Bengal indicates that the EHPHE of government hospitals is more

consistent than that of private hospitals. The value of coefficient of variation for government hospitals is 178.3099 whereas the same value is very high for private hospitals i.e. 583.8163.

The value of EHPHE for government hospitals in the districts of North Bengal is highest which is 0.2647. The value of EHPHE for government hospitals in Kolkata and 24 Parganas is 0.2458 which is second highest after the EHPHE score for government hospitals at District of North Bengal. The Value of EHPHE score for government hospital at districts of South Bengal is lowest i.e. 0.2217. The comparative study on consistency of EHPHE scores of government hospitals reveals that the EHPHE is the most consistent in Kolkata and 24 Parganas as the value of coefficient variation is minimum i.e. 163.7707. The position of North Bengal is better than that of South Bengal as far as the consistency of EHPHE is concerned in government hospitals. The coefficient of variation for government hospitals at district of North Bengal is 178.3099 which is lower than that of government hospitals in South Bengal i.e. 218.2216. The comparative study of private hospitals across the regions shows different result altogether. It is observed that the EHPHE is the best at Kolkata and 24-Parganas with average of 0.3793. Districts of South Bengal occupies the second position with average of 0.1954 as far as EHPHE in private hospitals is concerned. Districts of North Bengal is at last position with the average of EHPHE of 0.0600. The consistency level of EHPHE also shows the same result by putting Kolkata and 24 Parganas at the first position with value of coefficient of variation i.e.79.27626, district of South Bengal at second position with the value of coefficient of variation i.e. 193.5889 and district of North Bengal at last position with the value of coefficient of variation i.e. 583.8163. It is also important note that the difference of average EHPHE score for private hospitals across the

three regions is higher than the difference of EHPHE scores for government hospitals across the same three regions. Particularly the EHPHE scores of private hospitals in North Bengal is unexpectedly low in comparison to the region of Kolkata and 24-Parganas and districts of South Bengal. It is also true that the difference of EHPHE scores between Kolkata and 24 Parganas and South Bengal is also very high when the difference is compared in respect of government hospitals. The same kind of result is reflected on the comparison of consistency or variability level of EHPHE in government and private hospitals across these three regions. The variability of EHPHE performance becomes too high for private hospitals at North Bengal in comparison to the variability of EHPHE of private hospitals at South Bengal and Kolkata and 24 Parganas.

CONCLUSION

The survey of patients has established the truth that the difference in expected expense and actual expense is there in different government and private hospitals in West Bengal. The gap between expected and actual hospital expenses has been defined as EHPHE which indicates the efficiency level of a hospital in terms of patients' health expenses. The paper has the focus to highlight how EHPHE of different hospitals depends on its types across different regions of West Bengal. Analysis of data on EHPHE scores has revealed that average EHPHE considering both private and government hospitals is highest in Kolkata and 24 Parganas followed by South Bengal and then North Bengal. However, it has been observed that EHPHE of government hospitals is highest at North Bengal followed by the government hospitals of Kolkata and 24 Parganas and South Bengal. The EHPHE of private hospital is highest at Kolkata and 24 Parganas followed by South Bengal and North Bengal. Even it has been observed that the difference of average EHPHE of government hospitals across three regions is not very high whereas the difference of average EHPHE of private hospital is very high across the three regions.

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