Efficiency of General Hospitals in Kathmandu Valley

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Abstract: This study focus on the relative efficiency level of general hospitals around the Kathmandu valley. In this study Data Envelopment Analysis (DEA) was used to assess the relative efficiency of general hospitals and to compute DEA, most widely used four inputs and four outputs found in international literatures related to hospital efficiency analysis were used.

This study includes the data from twenty nine general hospitals and on the basis of that the average Technical efficiency score (Constant Return to Scale (CRS) technique), average Pure Technical efficiency score (Variable Return to Scale (VRS) technique) and average scale efficiency of general hospitals in the Kathmandu valley were found to be 0.784, 0.923 and 0.841 respectively under input orientation DEA model and 0.784, 0.890 and 0.884 respectively under output orientation DEA model. Further Super efficiency analysis model was used to rank the efficient hospitals.

Apart from efficiency, which is related to resource utilization only, another equally important factor for hospitals as health care service provider is the satisfaction of the patient. So in this study the survey was also performed to access the patient satisfaction level in the efficient hospitals. The Construct validity of the survey questionnaire was assessed with factor analysis and the reliability was assessed with Cronbach's alpha coefficients. The factor analysis revealed the factor loading on four factors as priors. These four factors are Nursing care, Doctor's care, Physical Environment and Pain management. The survey result shows that the overall patient satisfaction score of the efficient hospitals are satisfactory.

Keywords: Data Envelopment Analysis (DEA); Constant Return to Scale (CRS); Variable return to scale (VRS); Scale efficiency; Super efficiency ranking; Patient satisfaction

1. Introduction

The rise in health care awareness and health consciousness among general people has demanded more health care facility in the country. In order to get the advance care and treatment, large number of people from different corners of the country enters the Kathmandu valley. To fulfill the health care need of the people and to provide the easily accessible and effective services, the number of hospitals in the Kathmandu valley is increasing rapidly.

The number of hospital in Kathmandu valley has reached around 115 and the total number of beds inside Kathmandu valley is nearly 10,200 that is around 34% of total bed share of the country.

The chart in figure 2, extracted from World Bank Data, shows the total health expenditure in percentage of Gross Domestic Product (GDP). The total health expenditure in Nepal is around 5.44% of total GDP, out of which public health expenditure contributes around 2.14% and remaining 3.30% is from private expenditure. Further it shows that the world average spending in health sector from the public expenditure is more than that of private expenditure but in Nepal the private health expenditure contributes more than that of public health expenses (World Bank Data).

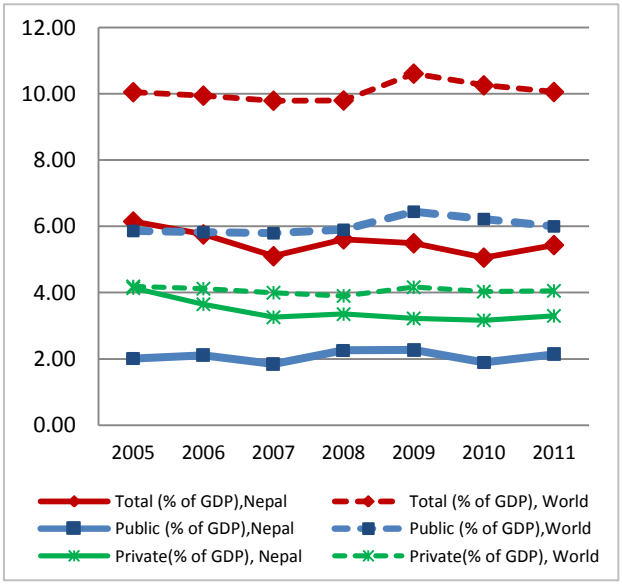

Figure 1: Health Expenditure (% of GDP)

The out-of-pocket health expenditure which is a part of private expenditure, contributes about 90% of private expenditure on health in Nepal, but in case of the rest of the world average, it contributes about only 69.09% of private expenditure. It can be clearly observe from the figure 2 that the out-of-pocket health expenditure is increasing rapidly in Nepal. It was about 72.72 percent

in 2005 and reached to 90.36 percent in 2011 (World Bank Data).

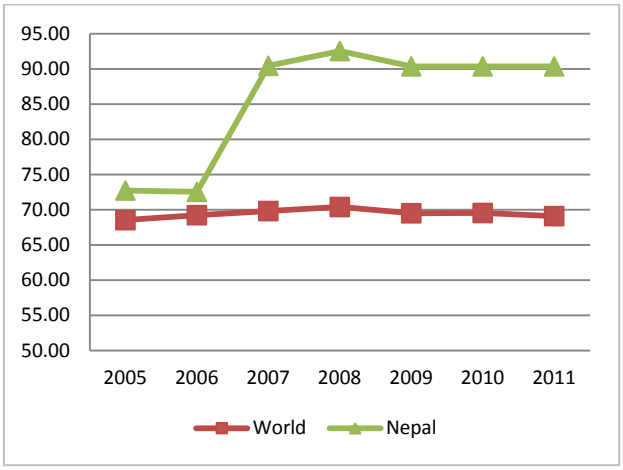

Figure 2: Out of pocket expenditure

The huge amount of capital resources has been invested in the hospital sector and it is unknown whether these hospitals are operating efficiently or not. Further the inefficiency in the hospital can only aggravate the rising price in health care and in worst case the inefficiency became prime reason for shutdown of the hospitals thus increases the risk in the health sector investment. So it is imperative to find out the efficiency of hospitals. The resources available at the hospitals are supposed to be utilized properly and efficiently for the benefits and welfare of the patient.

The main objective of this study is to measure the comparative efficiency of general hospitals in Kathmandu valley and to find out the patient satisfaction level of the efficient hospitals.

One of the challenging and complex tasks before measuring the efficiency of hospital is to find out how to measure the efficiency of hospitals. Measuring the efficiency of health sector is not straight forward. The hospital sector is characterized by its complicated structure. It produces an extreme degree multiple output-services using multiple inputs. The ultimate product is ambiguous but has of course to do with the specific goods and services given to patients (Olesen & Petersen, 2002).

Extensive literature reviewed done in this study shows, Data Envelopment Assessment (DEA) as a widely used technique for the efficiency measurement of hospitals. It is popular in evaluating hospital efficiency because it is applicable to the multiple input-output that is essential for the nature of a health care system (Hollingsworth, Dawson, & Maniadakis, 1999). Studies on hospital efficiency mostly focus on the issue of maximum gain with limited resources (Sorkis & Talloru, 2002).

Literature review of DEA studies on hospital efficiency shows that there are a number of studies applied in USA, Austria, Jordan, Germany, Greece, Oman, Taiwan, Spain, Thailand, Africa (Botswana), Norway, Ireland, and Finland. Number of beds, specialists, medical practitioners, medical stuff, and manager are seen to be most frequently used input variables in these studies. Number of inpatients, outpatients, surgical operations, visitors, and patient days are seen to be most frequently used output variables. Also degree of training, technology, number of clinic, laboratory, morbidity, mortality, and proprietary capital, costs of medical services, management, discharge, payment, and total profit are seen to be used for DEA variables in such studies (Gok & Sezen, 2011).

Data Envelopment Analysis (DEA) is a nonparametric approach that compares similar entities, i.e. decision making units (DMUs), against the best virtual decision making unit. Usually modeled as a linear programming (LP) model, the method provides a relative efficiency score for each decision making unit under consideration (Kongar, Sobh, & Baral, 2009).

It is a technique to measure relative efficiency of a set of decision-making units (DMUs) having similar multiple inputs to produce similar multiple outputs. The relative efficiency of a DMU is defined as the ratio of the sum of its weighted outputs, to the sum of its weighted inputs. The objectives are to identify units that are relatively inefficient and setting targets for them based on examining the operational practices of the units classified as efficient. The underlying concept of DEA is based on Pareto optimality (Charnes, et al., 1985). A DMU is considered relatively efficient if there is no other DMU or a combination of DMUs which can produce at least the same amount of all outputs with less of one input and not more of any other input. It computes the comparative ratio of outputs to inputs for each unit, with the score expressed as 0–1 or 0–100%. A DMU with a score less than 100% is inefficient compared to other units. It is used to identify best practices and is increasingly becoming a popular and practical management tool. DEA has been initially used to investigate the relative efficiency of nonprofit organizations but now, its use has spread to hospitals, school, banks, and network industries, among others (Kengil, Gökmen, & Tozan, 2010).

DEA algorithms can be classified into two categories: input- and output-oriented DEA models, according to the 'orientation' of the model. Input oriented DEA models concentrate on reducing the amount of input by keeping the output constant. Output-oriented DEA models, on the other hand, focus on maximizing the amount of output with the identical amount of input. In DEA modeling, inputs are considered as the items that

are subject to minimization (i.e., less is better), whereas, outputs are the items that are subject to maximization (i.e., more is better).

Further classification of DEA models can be given depending on the 'optimality scale' criterion. Here, DEA models can work under the assumption of Constant Returns to Scale (CRS), or non-constant returns to scale, i.e. Increasing Returns to Scale (IRS), Decreasing Returns to Scale (DRS), and Variable Returns to Scale (VRS), implying that not all DMUs are functioning at an optimality scale. Here, CRS assumes changes in output values subsequent to a proportional change in the input values. VRS was initially introduced as an extension of the CRS DEA model (Banker, Charnes, & Cooper, 1984). For ranking efficient units a new procedure developed by Andersen & Petersen, (1993) known as Super-efficiency ranking techniques is found to be used in various literature.

The literature review done in this study which are related to efficiency of health care and hospitals in Benin (Kirigia & et al., 2010), Botswana (Tlotlegon & et al., 2010), Brazil (Bellaguarda, 2006), China (NG, 2011), Ghana (Osei & et al., 2005), Greece (Athanassopoulos & Gounaris, 2001), India (Bhat, Verma, & Reuben, 2001), Iran (Kiadaliri & et al., 2011), (Jandaghi & et al., 2010), Italy (Ippoliti & Falavigna, 2012), Namibia (Zere & et al., 2006), Nigeria (Ichoku & et al., 2011), Portugal (Afonso & Fernandes, 2008), Saudi Arabia (Bahurmoz, 1998), Spain (Caballer-Tarazona & et al., 2010), Taiwan (Chang & et al., 2004), Turkey (Gok & Sezen, 2011), Uganda (Yawe, 2010), USA (Leute, 2010), (Valdmanis, Rosko, & Mutter, 2008) and Zambia (Masiye, 2007) give us the evidence of popularity of DEA in analyzing the efficiency of hospitals.

Further the literature review done in this study which are related to efficiency analysis of hospital using DEA, shows that the most used inputs in the literatures are Beds (89%), Doctors (69%), Nurses (61%) and administrative staff (22%) and the most used outputs are Outpatient Visit (58%), Number of Surgery operation (53%) and Inpatient (47 %) as shown in figure 3 and figure 4 respectively.

Apart from efficiency, which is related to resource utilization only, another equally important factor for hospitals as health care service provider is the satisfaction of the patient. A hospital may be well organized, ideally located and well equipped but it will fail in its responsibility to provide quality care if patient satisfaction is not of a high caliber (Nguyen, Briancon, Empereur, & Guillemain, 2002).

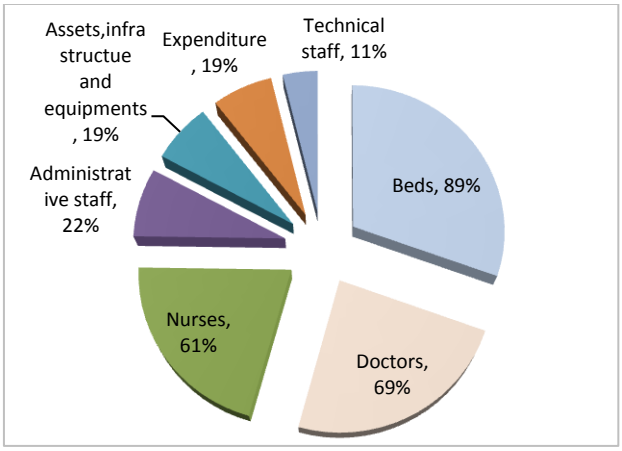

Figure 3: Most used Inputs in literature

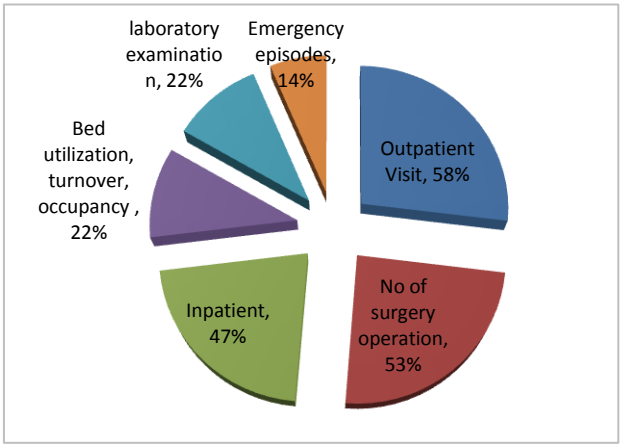

Figure 4: Most used outputs in literature

Patient satisfaction is a subjective and complex concept, involving physical, emotional, mental, social, and cultural factors (Auquier, Pernoud, Bruder, & et al., 2005). It is determined by the quality of the provided care and the patient's expectations of that care. Dissatisfaction arises if the patient experiences a discrepancy between expected and provided care (Heidegger, Neubling, Germann, & et al., 2004).

Patient satisfaction, as one of the ultimate validators of effectiveness and quality of care (Donabedian, 1992), is defined as the patient's opinion of the care received from nursing staff working in hospitals (Hinshaw & Atwood, 1981).Patient satisfaction is a major indicator of the quality care and quality of service can be assessed by mapping out patient satisfaction with care providers (O'Connell, Young, & Twigg, 1999).

According to the findings, the quality improvement efforts of private hospitals is advised to mostly focus on modernizing equipments, timeliness of care delivery, accuracy of performance as well as on enhancing the interpersonal relationships and communication skills of its physicians, nurses and other personnel (Zarei & et al., 2012).

Thus to be an exemplary hospital, the hospital should be efficient along with the quality of the service and patient satisfaction.

2. Research Methodology

Both qualitative and quantitative methods were used in this research along with extensive review of the literatures. The figure 5 shows the methodology diagram.

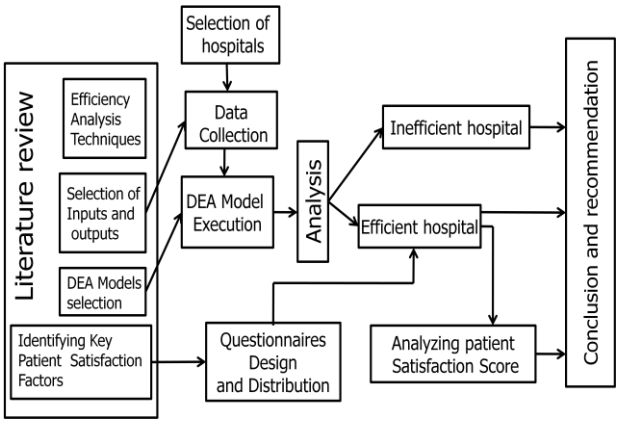

Figure 5: Methodology diagram

2.1 Selection of Hospitals

This study only includes the general hospitals in Kathmandu valley which have started their services before April 2011 AD. The target population for this study was 48 hospitals. A random sample of 37 hospitals was selected and the data collection forms were distributed in these hospitals by visiting the hospital. Only 29 hospitals show the positive response in this study. It includes 21 private hospitals, 1 private teaching hospital, 4 community hospitals, 2 government teaching hospitals and 1 government hospital. Out of 29 general hospitals 17 hospitals are from Kathmandu district, 6 hospitals are from Bhaktapur district and 6 hospitals are from Lalitpur district.

2.2 Selection of input and outputs for efficiency analysis of Hospitals

The efficiency of hospitals depends on the numerous inputs and outputs. It is not possible to include all inputs and outputs related to hospital efficiency. So, for the analysis of efficiency of hospital, the inputs and outputs were selected with the help of literature review.

The input variables used in this study are Number of Beds, Weekly-Full-Time Equivalent doctors, Total Number of Nurses and Total Number of Administrative staffs (excluding unskilled level personnel like janitor, cleaner, laundry person, driver and guards). The output variables used in this study are Number of Outpatient, Number of Inpatient, Number of Minor surgery and Major surgery.

2.3 Data Collection

After selecting the inputs and outputs parameters for efficiency analysis, a data sheet was designed to collect the data of fiscal year starting from July 2012 AD to July 2013 AD. The primary data was collected by visiting the different hospitals and submitting the data sheet form to the administration department of the hospitals. The secondary data was collected through the website of different hospitals. Also some of the data are extracted from the annual reports published by different hospitals.

2.4 DEA Model Selection

After collecting the data, all the data were imported in Max-DEA software. On the basis of literature review, the most commonly used models for efficiency analysis were selected. The selected Models were CCR (Charnes Cooper and Rhodes) Model and BCC (Banker, Charnes and Cooper) Model. Further the super efficiency model was chosen for ranking the hospitals.

2.5 Questionnaire design for Patient Satisfaction Survey

The survey sample question was designed to access the patient satisfaction level in the efficient hospital. The item question in the questionnaire design was selected from various popular patient experience surveys, like Hospital Consumer Assessment of Health Providers and Systems Survey (HCAHPS), Picker Patient Experience questionnaire, Service Quality questionnaire (SERVQUAL) and other questionnaire for assessing patient healthcare experiences in low-income settings. The items in the questionnaire were discussed with the panel committee consisting of four doctors, five nurses and five administrative staff and the total of 14 question items with Likert-type scale was finalized for patient satisfaction survey.

3. Analysis and Results

3.1 Ratio Analysis

Some of the major ratios of the hospital inputs and outputs for a year starting from July 2012 to July 2013 which are useful for hospital management point of view are given below.

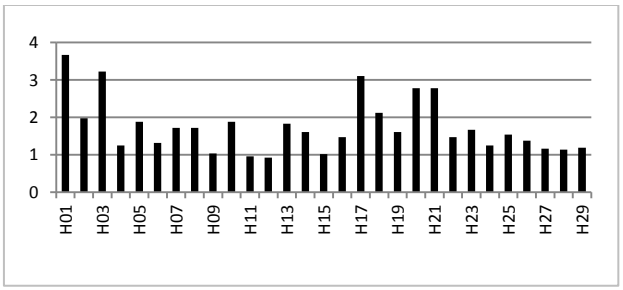

Figure 6: Bed/Nurse ratio of Individual hospital

Figure 6 shows the bed to nurse ratio of individual hospitals. The mean bed to nurse ratio of 29 hospitals is 1.75 so in average one nurse has to look after two beds. The maximum bed to nurse ratio is 3.5 and the minimum is nearly 1.

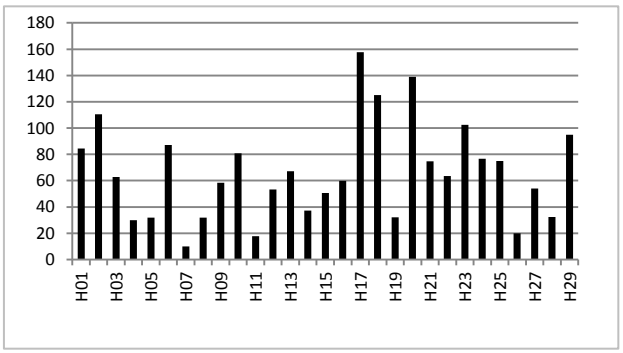

Figure 7: Inpatient/Nurse ratio of Individual hospital

Inpatient to nurse ratio is shown in above figure 7. The maximum Inpatient to nurse ratio for a year was found to be 157 and minimum is 10 inpatients per nurse. In average one nurse has to look after 66 inpatients in a year.

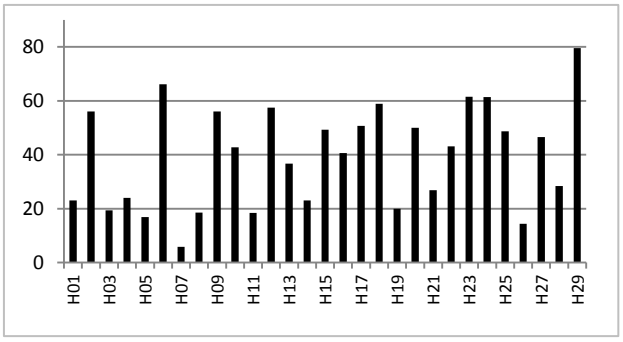

Figure 8: Inpatient/Bed ratio of individual hospital

Inpatient to bed ratio is shown in figure 8. In average one bed is used to treat 40 inpatients in a year. The minimum inpatient to bed ratio is 5.8 and maximum is around 80.

Figure 9 depict the number of nurses to Full Time Equivalent (FTE) doctors' ratio. The average Nurse to FTE doctors' ratio of the hospital in this study is found to be 4. The maximum ratio of nurse to FTE doctors is around 14 and minimum is 1.

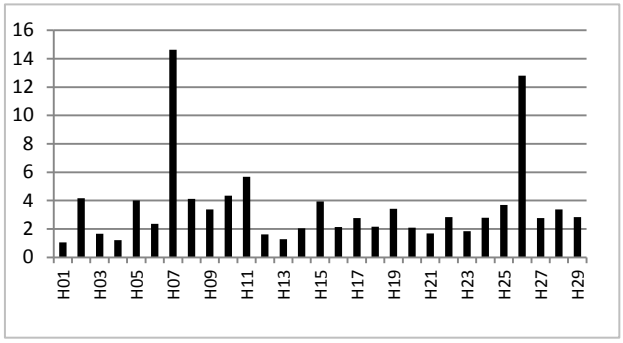

Figure 9: Nurse/FTE doctors ratio of Individual hospital

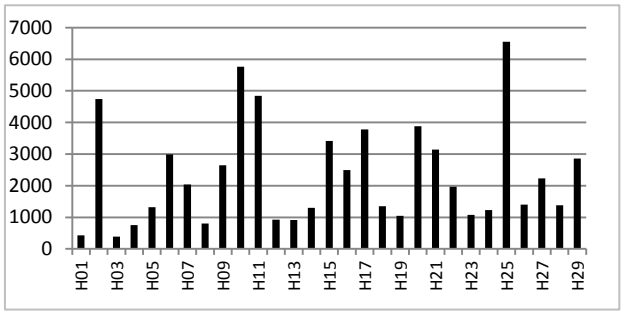

Figure 10: Total patient /FTE Doctors ratio of individual hospital over one year

The total patient to FTE doctors' ratio is shown in figure 10. The average patient treated by one Full Time Equivalent doctor in a year from July 2012 to July 2013 is found to be 2333.The maximum patient treated by one full time doctor is around 6555 and minimum is around 392.

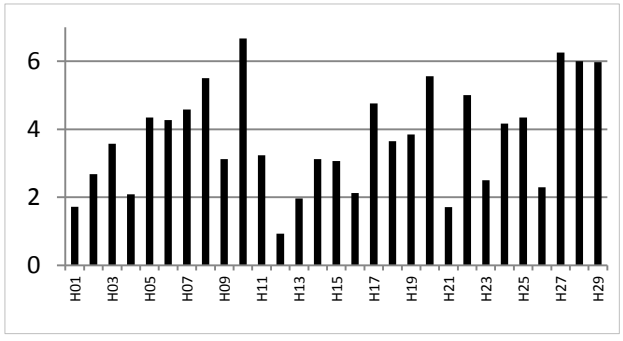

Figure 11: Bed/Administrative Staff ratio of individual hospital

The above figure 11 shows the bed to administrative staff ratio of individual hospital. The bed to administrative staff ratio varies from 6.6 beds per administrative staff to 1 bed per administrative staff. The mean bed to administrative staff is found to be 3.75. So in average there is nearly 1 administrative staff for 4 beds.

Table 1: Efficiency score under CRS and VRS models

Hospital code	Technical Efficiency Score(CRS)	INPUT ORIENTED		OUTPUT ORIENTED		
		Pure Technical Efficiency Score(VRS)	Scale efficiency	Pure Technical Efficiency Score(VRS)	Scale efficiency	RTS
H01	0.535124	1	0.535124	1	0.535124	Increasing
H02	1	1	1	1	1	Constant
H03	0.397505	0.553325	0.718394	0.424682	0.936007	Increasing
H04	0.454263	1	0.454263	1	0.454263	Increasing
H05	0.472521	0.645061	0.732522	0.50184	0.941577	Increasing
H06	1	1	1	1	1	Constant
H07	0.858752	1	0.858752	1	0.858752	Increasing
H08	0.358436	0.811531	0.441679	0.447648	0.80071	Increasing
H09	0.802383	0.949387	0.845159	0.937612	0.855773	Increasing
H10	1	1	1	1	1	Constant
H11	0.784044	1	0.784044	1	0.784044	Increasing
H12	0.726896	1	0.726896	1	0.726896	Increasing
H13	0.587228	0.676284	0.868316	0.615328	0.954334	Increasing
H14	0.565942	0.93633	0.604425	0.871777	0.649182	Increasing
H15	0.819631	1	0.819631	1	0.819631	Decreasing
H16	0.940133	1	0.940133	1	0.940133	Increasing
H17	1	1	1	1	1	Constant
H18	0.998002	1	0.998002	1	0.998002	Increasing
H19	0.323586	0.406101	0.796812	0.327314	0.988612	Increasing
H20	1	1	1	1	1	Constant
H21	1	1	1	1	1	Constant
H22	0.621552	0.786094	0.790683	0.702932	0.884227	Increasing
H23	0.934598	0.997135	0.937284	0.996581	0.937804	Increasing
H24	0.817262	1	0.817262	1	0.817262	Increasing
H25	1	1	1	1	1	Constant
H26	0.796878	1	0.796878	1	0.796878	Increasing
H27	0.94417	1	0.94417	1	0.94417	Increasing
H28	1	1	1	1	1	Constant
H29	1	1	1	1	1	Constant
MEAN SCORE	**0.784100207**	**0.922802**	**0.841739**	**0.89054186**	**0.88356486**	

3.2 Efficiency Analysis under DEA Models

The efficiency analysis was done using DEA software. The efficiency scores of the hospitals computed by DEA software under Input oriented and Output oriented Constant Return to Scale (CRS), Variable Return to Scale and Scale efficiency are given in Table 1.Under Constant return to Scale, out of 29 hospitals, 9 (31.03%) are found to be efficient with an efficiency score of 1.The average technical efficiency score is found to be 0.784 and 10 (34.48%) hospitals are found to be operating below this average efficiency level.

The DEA model result under Variable Return to Scale with Input oriented shows that, 20 (68.97%) out of 29 hospitals are efficient with the score of 1. The average pure technical efficiency score is found to be 0.923. Only 6 (20.69 %) hospitals are found to be operating below average efficiency level.

DEA model under Variable Return to Scale with output oriented revealed that, 20 (68.97%) out of 29 hospitals are efficient with the score of 1. The average pure technical efficiency score is found to be 0.89. Only 7 (24.14 %) hospitals are found to be operating below average efficiency level.

The average score of Scale efficiency is found to be 0.841 under Input oriented model and 0.883 under Output oriented model. In both Input and output Orientation, all the hospitals which efficiency level is below 1 have increasing return to scale except hospital H15, which indicate that these hospitals can increase their efficiency by expanding their scale of operation.

The ranking of the hospitals was done by using super efficiency model. The results of the super efficiency score of hospitals shows that H06 (OM hospital) obtained the highest efficiency score with score of 1.78 followed by hospital H29 (Patan hospital) scoring 1.64. Out of 9 hospitals with a super efficiency score greater than unity, 4 hospitals are from Kathmandu district, 2 hospitals are from Bhaktapur district and 3 hospitals are form Lalitpur district.

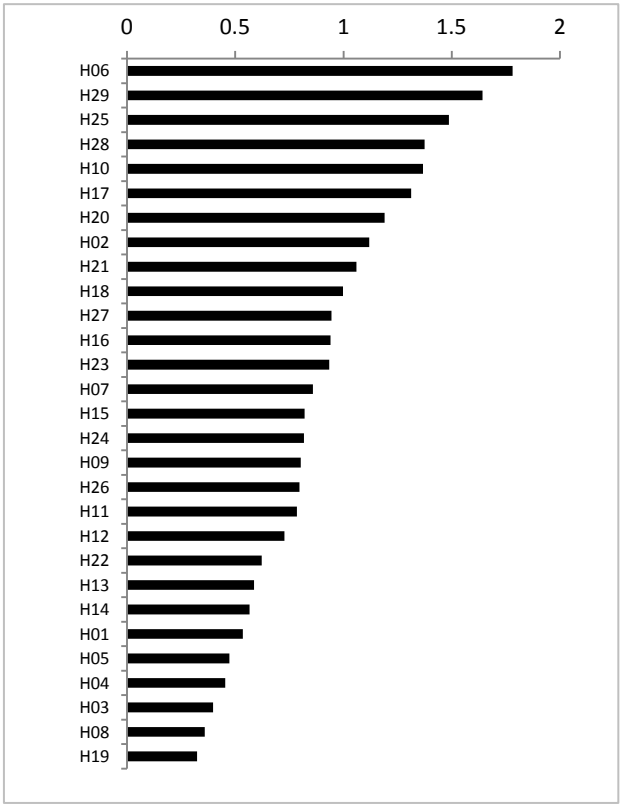

Figure 12: Ranking of hospitals using super efficiency model

Slacks in inputs and outputs oriented CRS model shows that there is highest slack moment in administrative staff that is around 58% hospital have slack moment in administrative staff. Nearly 38% hospitals contain slack moment in nursing staff and although around 31% hospital has bed slack but the slack number is found to be low in case of beds.

In case of output, very few hospitals have low inpatient flow with respect to their capacity but in the case of outpatient flow, around 38% hospitals have insufficient outpatient flow.

3.3 Patient Survey Analysis

A total of 272, out of 317 patients approached, participated in the inpatient survey (response rate of 85.8%). Data were analyzed using SPSS 16.0 for Windows. The mean age of the participant in the survey is 41 years with the range of 3 to 90 years. About half (54%) participant are female. Around 68% participants are Kathmandu valley residence. The patient survey statistics is shown in Table 2.

Table 2: Demographic Characteristic of Patient Survey

Characteristic	(N=272)	(n%)
Age		
<18	19	6.99%
18-35	121	44.49%
36-53	56	20.59%
54-71	47	17.28%
>71	29	10.66%
Mean	41.02	
Gender		
Female	147	54.04%
Male	125	45.96%
Patient Residence		
Inside Valley	185	68.01%
Outside Valley	87	31.99%

Exploratory factor analysis was used to assess the underlying factor structure of the questionnaire. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was used to compare the magnitudes of the observed correlation coefficients in relation to the magnitudes of the partial correlation coefficient. Since, both acceptances (KMO and Bartlett's) test was satisfied, it suggests that the items in the questionnaire were suitable for factor analysis test.

Table 3: Measure of sampling adequacy

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.836
Bartlett's Test of Sphericity	Approx. Chi-Square	534.19
	df	55
	Sig.	0

Table 3 shows the Kaiser-Meyer-Olkin measure of sampling adequacy along with Bartlett's Test of Sphericity. The Varimax rotation method was used to simplify the structure of the analysis, so that each factor will have nonzero loadings for only some of the variables without affecting the communalities and the percent of variance explained. Table 4 shows the result of factor analysis.

Table 4: Factor analysis

Rotated Component Matrix					Reliability Statistics	
	Component				Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items
During this hospital stay,	1	2	3	4		
I1. how often did nurses treat you with courtesy and respect?	0.14	**0.75**	0.29	0.011	0.691	0.692
I2. how often did nurses listen carefully to you?	0.151	**0.837**	0.033	0.188		
I3. how often did nurses explain things in a way you could understand?	0.406	**0.553**	0.139	0.137		
I4. how often did doctors treat you with courtesy and respect?	**0.768**	0.175	0.215	0.095	0.794	0.796
I5. how often did doctors listen carefully to you?	**0.807**	0.176	0.14	0.057		
I6. how often did doctors explain things in a way you could understand?	**0.797**	0.144	0.118	0.252		
I7. how often were your room and bathroom kept clean?	0.051	0.303	**0.622**	0.055	0.53	0.531
I8. how often was the area around your room quiet at night?	0.227	0.061	**0.659**	0.294		
I9. how would you feel about the security system of the hospital?	0.171	0.06	**0.727**	0.032		
I10. how often was your pain well controlled?	0.067	0.071	0.155	**0.838**	0.613	0.613
I11. how often did the hospital staff do everything they could to help you with your pain?	0.239	0.172	0.089	**0.772**		

The factor analysis revealed that the first three items(I1,I2,I3) falls on factor 2 and are related to Doctors' Care with eigenvalue 1.103, which explains 16.234% of the total dispersion. The second three items (I4,I5,I6) falls under factor 1 and are related to Nursing Care with eigenvalue 3.987, which explains 20.263% of the total dispersion. Items Nos. I7, I8 and I9 were found to be loaded on factor 3 and are related to Physical Environment with an eigenvalue of 1.064 and the variance explained by this factor was 14.236 %. The remaining last two items I10 and I11 was found to be loaded on factor 4 which is related to Pain Management with an eigenvalue of 0.946 and total variance explained by this factor was 18.814%.

Reliability was assessed by Cronbach's alpha, inter-item correlation, and item discriminant validity. Among the four factor extracted , the highest Cronbach's alpha coefficient was found for the item I4, I5 and I6 which were related to doctor's care.

In order to find out whether the patients are satisfied with the efficient hospitals, the patient survey data of five efficient hospitals out of the nine was analyzed. The overall score of four factors are shown in figure 13.The result of the question item asking the patient to rate the hospital with number from 0 to 10 (where 0 is the worst hospital possible and 10 is the best hospital possible) is shown in figure 14 and figure 15.

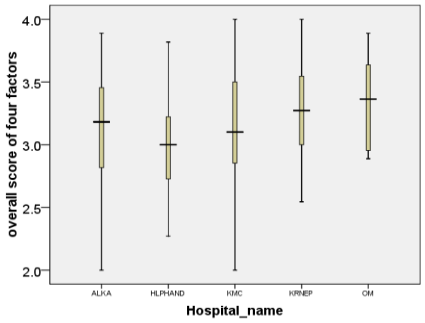

Figure 13: Overall Scores of five efficient hospitals

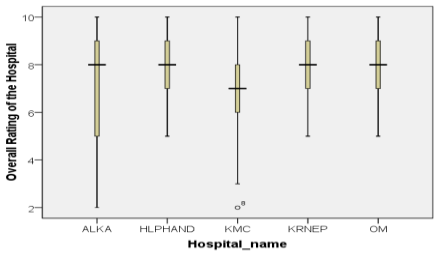

Figure 14: Overall rating of hospitals

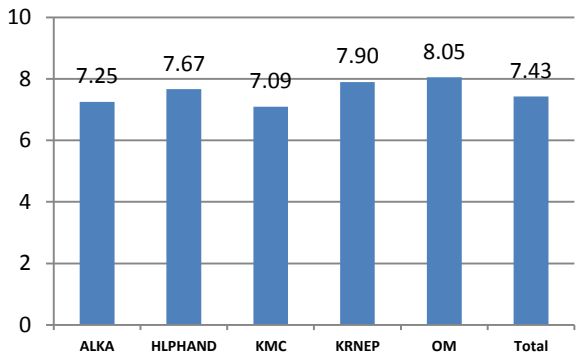

Figure 15: Mean Overall rating

Form the above results it can be interpreted that the overall satisfaction level of efficient hospitals are also satisfactory but still there is a place to increase their service satisfaction level.

4. Conclusion

In this paper, the comparative efficiencies of general hospitals in Kathmandu valley were assessed using Data Envelopment Analysis. Since the hospitals included in this study were different in scale of operation and size, both Constant Return to Scale (CCR Model) and Variable return to scale (BCC Model) were used. Further super efficiency model was used to rank the hospitals.

The result of CRS efficiency score shows that around 31% hospitals in the Kathmandu valley lies in the efficient frontier and around 69% hospital have to improve their efficiency to place themselves in efficient frontier. The analysis shows that few hospitals in Kathmandu valley are in dire condition with the comparative efficiency score of less than 0.5.The average of Input and Output oriented scale efficiency of the hospitals is found to be 0.862, implying that about 14% of total inefficiency arose from hospitals not operating at optimal scale.

In the health care sector, patient satisfaction is also another equally important factor that hospital should achieve along with efficiency of the hospital. So the survey with question items related to four factors, (Nursing care, Doctors' care, Physical Environment and Pain management) was carried out in this study and the result revealed the average score of 3.139 out of 4 points Likert-type scale and the overall rating of the efficient hospital was found to be 7.42 out of 11 scale points. This shows that the patient satisfaction levels of efficient hospitals are also satisfactory but still there is space to improve the satisfaction level.

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