AN INVESTIGATION ON IMPACT OF WORKPLACE EFFICIENCY ON QUALITY OF HEALTH SERVICES: A CASE OF TERTIARY HOSPITALS OF PUNJAB.

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Abstract:

Aim: This research focuses on studying the association between workplace efficiency and customer satisfaction in tertiary hospitals of Punjab. **Material and Methods:** Study to find efficiency was conducted with the help of data envelopment analysis. Data envelopment analysis focuses on finding efficiency through input /output-based model which follows linear mathematical formulas. Demand of health services are increasing but availability of health services is still big issue. In that case, it will become very important for hospitals to optimally utilize their existing resources with proper efficiency measurements. Hospitals of different sizes are selected and size is dependent upon bed strength of hospitals**. Results:** Result explains that efficiency is considered to be negative moderator between relation of number of specialized doctors and patient satisfaction. **Conclusion :**Results in research suggested that higher level of efficiency level of hospitals lessen the positive effect of specialized doctors on patient satisfaction In this study medical hospital efficiency applies a negative control between accessibility of specialists and patient satisfaction,. This study gives the proof that medical hospital size has a critical negative impact on efficiency of hospital   i.e. Present research indicates that smaller hospitals have a higher level of efficiency than larger and medium-size hospitals, smaller size hospitals average efficiency is .80. The average efficiency of medium size hospitals is .75 and the large hospital is .71.

Keywords: Hospital efficiency, Customer satisfaction, Negative moderator, Association

Introduction

This research focuses on studying the association between operational efficiency and customer satisfaction in tertiary hospitals of Punjab. Study to find association was conducted with the help

of analysis of data envelopment technique, which is used to find out the efficiency of tertiary medical hospitals considered for the study [1]. Data envelopment analysis focuses on finding efficiency through input /output-based model which follows linear mathematical formulas [2]. As the demand for healthcare services in India is increasing because of many reasons which include awareness for a preventive health checkup, Increasing population, Complexity of disease and availability are major contributors to this. Demand of health services are increasing but availability of health services are still big issue [3,4]. In that case, it will become very important for hospitals to optimally utilize their existing resources, Data envelopment analysis is technique which is formulated to find operational efficiency in form of logical and scale efficiency of organization and to decide their benchmark and operate according to benchmark or if there is no benchmark then set benchmark. Health and healthcare services are too different aspect which needs to be distinguished, Health is related to person and healthcare services does not only involve providing hospital services but also to provide preventive services and post medical checkup services also[5]. In the present circumstance, it has turned out to be difficult for hospitals in Punjab to guarantee increasingly productive methods for administrations. Under the current conditions, it is fundamental to discover the fitting asset blend and its use. The center point of this study is on surveying the hospitals in efficiency terms, for example, the perfect measure of inputs to deliver a given degree of output [6]. The other inspiration driving this investigation has been to see how to address a issue of benchmarking in hospitals. Data envelopment analysis utilizes an amazing procedure of linear programming to help in doing this [7,8]. The research of the study incorporates two different aspects one is to evaluate efficiency of hospitals considered for study and another is find satisfaction level of patients from these hospitals to find association among both these dimensions.Patient satisfaction is a significant pointer for estimating the quality of services of hospitals. Patient satisfaction influences hospital results [7]. Understanding satisfaction is hence an intermediary yet an exceptionally viable pointer to check the achievement of specialists and hospital [9,10]. Further, the patients who had been admitted to the medical hospitals for over at least one day and one-night corporate into the study, which is minimum criteria to be considered a patient as inpatient.

Materials and Methods
Target Population
This research incorporates two different aspects one is to evaluate efficiency of hospitals considered for study and another is finding satisfaction level of patients from these hospitals and to find association among both these dimensions, For calculating efficiency super specialty hospitals are considered from all three areas of Punjab Majha, Malwa and Doaba according to three different sizes of i.e. small Size hospitals is between more than 40 and 70, medium size between 70 to 100 and big size more than 100 based on number of beds. Inpatients getting treatment from these hospitals are considered for finding patient satisfaction level among patients for these hospitals. The selection of hospitals was made from the list of the hospitals being run by doctors registered with the Indian Medical Association [11]. Government and the private 48 tertiary level hospitals with bed strength more than 40 were chosen for study from each of the area selected for the study. . Further, the 960 patients who had been admitted to the medical

hospitals for over at least one day and one-night corporate into the study, which is minimum criteria to be considered a patient as inpatient .In this study has the data had been collected from 48 tertiary hospitals from cities of all the areas of Punjab, in particular, Majha, Malwa and Doaba and these are those hospitals which are considered as referral for those adjoin areas.960 Patients admitted to the chosen medical hospitals made the structure of the study. .Data is collected for time frame for year April 2017to April 2018.

Inputs and outputs from the hospital for data envelopment analysis to calculate hospital efficiency

Inputs include beds, number of doctors, Nurses specialized equipment's, and Outpatient department hours per week of working, laboratory hours per week and paramedical staff supporting staff doctors and operating equipment's. and administrative staff[12] .This data was collected from hospitals to calculate efficiency. Output for calculating efficiency are outpatient visits, Inpatients and laboratory cases, Maternal and child healthcare all these are types of cases treated and number of cases.

Table 1.Inputs and outputs to calculate efficiency

Inputs	*Type*	Outputs	Type
No. of beds.	Numbers	Outpatient visits	Cases treated
		Inpatients	Cases treated
Doctors	Numbers	laboratory cases	Cases treated
Nurses	Number	Maternal and child healthcare	Cases treated
Specialized equipment	Numbers		
OPD hours per week	Hours		
Laboratory hours per week	Hours		
Paramedical staff	Numbers		
Administrative staff	Numbers		

Questionnaire to find customer satisfaction

The questionnaire was developed to survey satisfaction among patients of 48 hospitals; the questionnaire was developed in two formats Punjabi language and English language. As target population were from Punjab that is why Punjabi language questionnaire was developed in this investigation, Five point Likert scale to find satisfaction has been utilized to quantify responses

of respondent's attitudes towards health-care services Patients experiencing explicitly eight sorts of tertiary-level healthcare illnesses have been considered as people who responded. In questionnaire questions consist of eight different dimension.

Results and discussion

In this part of the research, the emphasis is on analyzing data in three different orientation first of all data was analyzed to calculate the efficiency of hospitals decided for study. Secondly, satisfaction level of patients had been analyzed, To find satisfaction level of patient's questionnaire was framed and thirdly interpretation had been done to analyze relation and association between operational efficiency of hospitals and customer satisfaction.

Efficiency calculation and assessing   customer satisfaction

DEA Frontier coded by Professor Joe Zhu (Professor of Operational Research Foise Business College) for Data Envelopment Analysis (DEA) models. This computer programs is made subject to Professor Zhu's significant DEA teaching experience. The software is made by Professor Zhu with a ultimate objective to restrict the credibility of the presentation of DEA models during coding.

Table 2:Effeciency analysis

	Efficiency
Hospitals (Small Size) (n=16)	
Mean	0.8
Std. Dev.	0.15
Hospitals (Medium Size) (n=16)	
Mean	0.75
Std. Dev.	0.16

Table 3:Patient satisfaction analysis

	Patient Satisfaction
Small Size Hospitals (n=16)	
Mean	0.93
Std. Dev.	0.05
Medium Size Hospitals (n=16)	
Mean	0.88
Std. Dev.	0.07

Hospitals (Large Size) (n=16)	.		Large Size Hospitals (n=16)	.
Mean	0.71		Mean	0.85
Std. Dev.	0.15		Std. Dev.	0.07

In `first stage efficiency of hospitals were analyzed, data envelopment analysis was utilize here to analyze and evaluate the efficiency of the hospital. Present research indicates that smaller hospitals have a efficiency more than larger size and mid-size medical hospitals as demonstrated in above table smaller size hospitals average efficiency is .80. The mean efficiency of medium size hospitals is .75 and large hospital is .71. As per outcomes, small size medical hospitals are generally more efficient and have higher patient satisfaction   compared with different kinds of hospitals. To find satisfaction level among patients two questionnaires separate for inpatients and outpatients are developed in English and Punjabi language. Target is to get questionnaire filled from 25 inpatients each hospital to make total to 1200 responses. But almost 30 responses are collected from each hospital to compensate the loss of incorrect and inappropriate filled questionnaire and 20 responses conceded for study collectively count up to 960 responses. Then patient satisfaction level of tertiary hospitals of small size (0.92) is more than other two types of hospitals (0.88, 0.85, separately) This study shows surveying satisfaction of patients is basic, simple and financially savvy route for assessment of hospital benefits and has helped finding that indoor patients conceded in tertiary Hospitals of Punjab were progressively happy with Conduct of specialists yet issue lies with the accessibility of essential areas and disappointment was seen as additional as to in the toilets and the wards. Bed sheets, drinking water, fans accessibility ought to be a few earnest issues requiring concern. Time to arrive at labs is likewise an issue is to be concerned by management for better understand patient needs.

The results show that efficiency of hospitals is having positive relation with patient satisfaction. It means in efficient hospitals patients are more satisfied as compared to inefficient hospitals .As in results of this study small scale hospitals are more efficient as compared to large scale hospitals so the patient of small scale hospitals are also more satisfied as compared to patients of large scale hospitals .Overall efficiency is positively effecting satisfaction but as discussed earlier efficiency cannot be increased to some specific limit which will effect quality now very important another question is how hospital efficiency changes the relationship between patient satisfaction out the and specialist doctor's[5]. To find answer to this question following model is used:

$Y=B_0+B_1X_1+B_2X_2+B_3X_3$ Model 1

In this model1 patient satisfaction is represented by Y, X1 is represented by several specialized doctors, X2 is represented by hospital efficiency and X3 is represented by hospital size

$Y=B_0+B_1X_1+B_2X_2+B_3X_3+B_4X1X2$ Model 2

Model 2 B4X1X2 represent the moderator effect of hospital efficiency on the relationship between patient satisfaction and the availability of specialized doctors
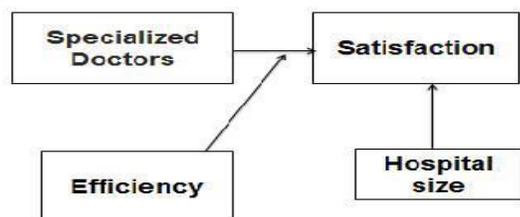
Fig 1: Model to find the association of patient satisfaction and efficiency

When regression is applied on first model following results are following results are obtained

Table 4: Coefficient equation of model 1

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.553	.259		13.737	.000
size	-.33	.001	-2.186	-5.675	.002
doctors	.186	.006	1.802	4.476	.000
Efficiency	4.061	5.051	.420	-2.531	.065

This model is significant at $p<.05$ level here the number of specialized doctors increases patient satisfaction providing support to hypothesis H1 b2=.186.However, hospital size is harming patient satisfaction b3=--.033. But efficiency is not having a significant effect on patient satisfaction there might be the case indirect relation between hospital efficiency and patient satisfaction .one of our major research question is how efficiency the form of relationship between no of specialized doctors and patient satisfaction to evaluate this second-stage regression analysis is done with moderator effect. For that second model is tested for regression to find relationship.

When regression is applied for second model following results are obtained

Table 5 Coefficients model 2

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.481	.288		12.099	.001
size	-.314	.001	-2.196	-5.406	.002
doctors	.030	.008	2.089	3.710	.044
Efficiency	.531	1.233	-.486	-2.499	.237
Interaction term	-.068	.456	-.281	-.776	.002

Thus, hospital efficiency variable exerts a negative moderation between doctors and patient satisfaction. The second model is also significant and regression analysis result explains that efficiency is considered to be negative moderator between relation of number of specialized doctors and patient satisfaction, Results in table suggested that higher level of efficiency level of hospitals lessen the positive effect of specialized doctors on patient satisfaction In this way, medical hospital productivity variable applies a negative control between accessibility of specialists and patient satisfaction, as we theorized.

To further prove this that medical hospital size has a critical negative impact on patient satisfaction research analysis is which also proves that high level of hospital efficiency lessen the positive effect of specialist doctors on patient satisfaction .For conducting this research hospitals are divided on basis of size into different parts high efficient and low efficient hospitals[5] .

Table 6 Regression analyses of low and high efficient hospitals

Low efficient hospitals	Parameter Estimate	Standard Error	Significance
Specialized doctors	0.172	0.051	0.048
Hospital efficiency	-0.019	0.028	0.958
Hospital size	.-.314	0.001	0.153
High efficient hospitals			
Specialized doctors	0.026	0.036	0.246
Hospital efficiency	-0.068	0.049	0.525
Hospital size	-0.299	0.001	0.03

Results of table shows that more efficient hospitals decrease the positive effect of specialized doctors on patient satisfaction. In highly efficient hospitals result of specialized doctors on satisfaction is less and non-significant. While on less efficient hospitals comparatively there is stronger effect of specialized doctors on patient satisfaction.

Conclusion

Presently medical hospital administration has a decision. They can decide to overlook satisfaction simply center on accomplishing highest efficiency [5]. Now an ideal arrangement may be "ideal care.", " could be accomplished by considering a "balance" between efficiency and quality and Integrated approach of Quality, Efficiency and Accessibility of healthcare services is required For situation where population is very high, Medical hospital directors likewise concentrate on the hidden reasons for low patient satisfaction coming about because of the effectiveness before reconfiguring their entire consideration structure. So it is not easy to work with hundred percent efficiency but hospitals must need to maintain minimum benchmark. Basically when DEA will be applied organization will come to know about their return to scales and present efficiency. Slack value will provide proper value in inputs need to be achieve target value.

Ethical clearance: This study is limited to studying the association between workplace efficiency and customer satisfaction in tertiary hospitals of Punjab. Also necessary approvals has been taken from hospital authorities as per guidelines.

Conflict of interest:

There is no conflict of interest

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