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A comparative study of service quality between private and public hospitals: Empirical evidences from India
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Abstract

Significant growth along with higher purchasing power of Indian customers has led to stiff competition in Indian healthcare sector. Customer perception of service quality plays a significant role when choosing or preferring a particular hospital. The objective of this study is to find out customer preference for healthcare services delivered by both public and private hospitals in India. For this purpose 'SERVQUAL' instrument was used to measure patients' perception about service quality delivered by both public and private hospitals located in the capital city of India. An analysis covering 192 patients revealed gap between patients' expectations and perceptions across public and private hospitals with reference to quality of services delivered on selected parameters. In this article logistic regression analysis was used to forecast the probability of a patient to visit public hospital over private hospital and vice versa. The regression model used had a classification accuracy of 94.9%. Preference for a particular hospital across various clusters was identified using cluster analysis. The findings of the present study aims to provide hospital managers an insight for efficient resource allocation and mobilization based on patients' evaluation of service quality delivered by these hospitals.

Keywords

Service quality, patient expectation and perception, public hospitals, private hospitals

Introduction

The growth rate of Indian healthcare industry can be comparable to any sunrise industries such as telecom, biotechnology and information technology. A research report by PricewaterhouseCoopers[1] (2007) observed that: "Healthcare is one of India's largest sectors, in terms of revenue and employment, and the sector is expanding rapidly". During 1990s, Indian healthcare grew at a compound annual growth rate of 16%. Today the total value of this sector is more than $34 billion. India's healthcare sector is estimated to grow to US $20 billion by 2020 (http://www.sskinfoways. com/lifescience accessed on 17 Oct 2012). Therefore, it is imperative for Indian healthcare providers to deliver sustainable quality service in order to establish themselves in global healthcare arena. With higher purchasing power, Indian consumers are willing to pay more for a better quality service received from healthcare institutions, which are overtly committed to fulfilling their genuine healthcare needs. The relative importance of attributes such as physician and nursing care versus process attributes such as friendly staff and

availability of facilities has been a point of debate in healthcare industry.[2] While the focus of medical professionals has been on the outcome, lot more consideration needs to be given to the process of care and not just the outcome. Hence, it is vital to understand how patients evaluate the quality of healthcare delivered to them. An understanding of patient's evaluation criteria would facilitate decision-making process of healthcare industries in optimizing resources allocation to reduce wasteful expenditure.

Historically, medical profession was responsible to establish quality standards defined by the clinicians in terms of delivery of healthcare. There was a strong feeling that customer cannot really be considered a good judge of quality for complex issues such as

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healthcare, as their views may be too subjective. More recently in the advanced industrialized countries, patients' assessment of services quality in terms of their satisfaction or dissatisfaction has become an important area of inquiry. In India, customer's viewpoint is neither sought nor given any importance in strategy formulation; thus, very little is known about how 'patients' perceive about quality in healthcare services. Consumer's perception is the main indicator of quality in healthcare service.[3,4] As a matter of fact, service providers take satisfaction of customers as a major indicator in setting firms strategies.[5] Private hospitals seem to be an alternative when patients are dissatisfied with the level of service provided in the public hospitals.[6,7] Economic liberalization in early 1990s and incentives stand as the major reason behind the increase in the number of private hospitals in India.[8] The negative perception among Indian consumers about the service quality of public hospitals seems to be another factor directing consumers to the private hospitals.[6,8] In India, despite the fact that the private care services are preferred over public healthcare facility unfortunately; the healthcare delivery system in private hospitals is besieged with a variety of problems that signal an impending crisis. For example, even with the increased allocation of funds to healthcare sectors, access to the system continues to be problematic as is evident from a variety of indicators such as absence of critical staff, poor staffing quality, unavailability of essential supplies and facilities. Considering population growth rate resulting in additional demands, the capacity of the existing healthcare delivery system is clearly inadequate to provide proper healthcare services to its constituencies. What should be of greater concern, however, is that even if the problems of access were to be substantially alleviated, it would still not guarantee full utilization of the healthcare system if service quality is compromised. The outflow of patients to other countries indicates the fact that the quality of healthcare services has room for improvement both in public and private hospitals. Weitzman[9] defines healthcare quality in relationship to: the technical aspects of care; the interpersonal relationship between practitioner and patient; and the amenities of care. If patients are not convinced about the quality of services delivered by the hospitals, they will not hesitate to seek services within their means elsewhere from other countries. A long and healthy life is one of the three basic dimensions of human development. India has a low Human Development Index with a rank of 134 among 187 countries.[10] The per capita expenditure on health is around $80 in India compared to China with $230 and $6714 for the USA.[11] There are 60 doctors in India per 100,000 people, while Brazil has 115

doctors, Russia with 425 and China with 106.[12] The expenditure on healthcare is 0.9% of the gross domestic product (GDP). These statistics reflect a weak state of affairs of healthcare sector. Weak 'voice of the customer', for a high credence product category such as healthcare[5] makes it imperative to measure service quality from the customer's viewpoint.[13] The National Accreditation Board for Hospitals and Healthcare providers, a constituent of the Quality Council of India, are responsible to operate accreditation programs for healthcare organizations, yet most of the state governments are unable to get their hospitals accredited.[12] Although certain private sector hospitals like Apollo Group of Hospitals have quality assessments like the ISO Certification, yet, there is a gap relating to measuring the quality of healthcare services from the patient's perspective in the Indian context.[14] Although patient satisfaction in services is important for quality assurance, yet, there is a scarcity of empirical evidence on patient's acceptance of healthcare practices. In India, more than 50% of the total health expenditure comes from individuals, as against 30% contribution from the state level.

In the case of public healthcare sector, the fund allocation has always been low in relation to the population of the country while private player operate basically with profit motive. In spite of lacunae in infrastructure, the future of Indian healthcare industry appears to be bright with the healthcare consumption expected to triple by 2015.[15] India is becoming the most preferred healthcare destination for neighboring countries due to low cost giving rise to the concept of 'medical tourism'. Hospitals that fail to appreciate the importance of quality service for customer satisfaction will possibly perish. Several researchers have emphasized service quality as influencer of satisfaction of buyers and also their purchase intentions. Moreover, Sahay[16] noted that although hospitals in India provide high-quality treatment, they are very poor in customer service. The Indian healthcare industry would face strong competition in the coming years from local corporate firms and foreign players in healthcare services. In order to sustain, Indian players have to improve their service quality standards on par with their international counterparts. Hence, it becomes imperative to understand why, how and where to improve service quality.

Literature review

Delivering superior quality services to the customers to sustain in tough competitive environment has been attracting, and will continue to attract considerable attentions of the research scholars around the globe.[17] Patients view services in terms of the entire

experience they undergo which may include successful surgery, hospital environment, cleanliness in rooms and wards, special attentions provided by physicians, nurses, supportive staff and excellent follow-up care. Otany and Kurtz[18] found admission process, physician care, nursing care, compassion to family/friends, pleasantness of surroundings and discharge process to be the key dimensions of service quality. Rose et al.[19] identified interpersonal aspect, patient education, cost, technical aspect, outcome of the care, access time, amenities and social support as the dimensions of service quality in the study carried for Malaysian hospitals. Studies[20,21] had been undertaken to gage the perception of beneficiaries of hospital services (consumers) regarding service quality. Pakdil and Harwood[22] studied patient satisfaction in a pre-operative assessment clinic. The study showed that patients were most dissatisfied with the waiting time. Rao et al.[23] concluded that availability of medicine, medical information, staff behavior and doctor behavior had significant positive influence on patient satisfaction while waiting time had negative impact on patient satisfaction. Baalbaki et al.[24] found that nursing was the most influential dimension in both in and out door and in emergency rooms with respect to patient satisfaction in Lebanon hospitals. Ramsaran-Fowdar,[25] in a study on private hospitals, found that "reliability, and fair and equitable treatment" was the most important service quality dimension influencing patient satisfaction in Mauritius healthcare services.

According to Hardiman and Raje,[26] in the public health system, doctors lacked accountability and public health workers took advantage of their position to run private practices making use of the public infrastructure. The Planning Commission's Steering Committee Report on health revealed that the average cost of private *healthcare* is nearly eight times the cost of public sector.[27] Moreover, nearly two-third of the population of the country reside in villages but most hospitals are in big cities. Patients who come to the city hospitals through referrals or on their own had to wait some times for months to undergo tests and surgeries. *Alt*hough the treatment in public hospitals is free, the patients have to pay for tests, and bear the incidental costs of boarding and lodging.[28]

Tucker and Adams[29] found significance of patient's demographic variables in moderating their satisfaction. On the contrary, Jabnoun and Khalifa[30] found that public hospitals have higher overall healthcare quality than private hospitals. Another study found that the patient's health quality assessment appeared to change with the introduction of patient's socio-demographic characteristics. Zanzo et al.[31] found that satisfaction acts as an antecedent to trust, and trust as an antecedent to affective commitment.

Moreover, they found that trust and affective commitment directly affect loyalty to the service providers as well. Although some researchers dispute the relationship between perceived service quality and satisfaction,[32] most commonly, the nature of this service quality and satisfaction link is viewed as linear, indicating that higher levels of service quality lead to higher levels of satisfaction.[33] Vinagre and Neves[34] study showed empirical evidence about the effect of service quality on patient's satisfaction with healthcare services. Their argument postulates that a positive association exists between patient satisfaction and patronage.[35] Naidu[36] found empirical support of the fact that patient's satisfaction is a multi-dimensional healthcare construct affected by many variables. Furthermore, he found that healthcare quality affects patient satisfaction, which in turn influences positive patient behaviors such as loyalty.

Despite these attempts, there seems to be absence of a comprehensive study specifically in the Indian context. Although the above-cited studies made an attempt to find out the dimensions of service quality or identified the components of hospital service not much research has been done to identify the gap between patient's expectation and experience of the service delivered to them more specifically across various public and private hospitals. In this context, this article makes an attempt to obtain the feedback about patient's experience of services quality provided by the public as well as private hospitals. The study aims to gage the gap between patient's expectations and experience regarding the quality of service provided by both private and public hospitals in Indian context. The finding of the study hopes to provide valuable insights to sensitize medical practitioner and policy makers to bring meaningful and systematic changes in the healthcare industries.

Service quality

Service quality got considerable attention and interest from both practitioners and researchers during the last couple of decades in the literature of service quality.[17,37,38] Generally, service quality is assumed to be the difference between customer expectations and experience.[39,40] Although service quality is a topic of discussion for the last couple of decades by both academician and researchers a comprehensive definition has not yet emerged.[38] According to Gefen,[41] it is a comparison made by the customers between the quality of services they want to receive from the service provider and what they actually receive. Nitin et al.[42] used 19 models of service quality to conduct a comprehensive study for measuring service quality in different service environment; however, 'SERVQUAL'

model of Parasuraman et al.[40,43] is perhaps considered to be the most commonly accepted model to measure service quality.[37]

Service quality in health sector

Patients' perceptions about the services provided by a particular healthcare organization significantly affect their behavior in terms of their loyalty and word-of-mouth communication.[44] With patients' increased expectations about service quality, healthcare service providers are realizing the need to identify the key determinants of patient's satisfaction in order to reduce time and money involved in handling patient's complaints.[22] In healthcare literature 'SERVQUAL' is considered as one of the most reliable and valid measurement of perceived service quality[21,45] The importance of implementing service quality has been recognized as it escorts the organizations to increase organizational performance, customer satisfaction and loyalty.[46–48] The present study uses 'SERVQUAL' instrument to measure patient's perception about service quality delivered by public and private hospital in India.

Motivation for the current study

In developing countries, resources in healthcare industries are not in proportion to the demands and the possibility of increasing the resource in short run is quite difficult. Therefore, there is an urgent need to increase the effectiveness of the healthcare system by efficient management of hospitals. India has become a preferred medical destination, providing cost-effective treatment to the patients from all over the world contributing 5.2% of the India's GDP. Patient involvement in healthcare decision making is increasing with the increase in the number of healthcare service providers.[49,50] Decision relating to healthcare is a high-involvement decision making, hence an understanding of patient satisfaction regarding healthcare services would provide tremendous insights to hospital management staff.

The future appears bright for the growth of Indian healthcare industry, as the consumption of healthcare is expected to triple by 2015.[15] In service industry, production and consumption occur simultaneously, therefore it becomes more important to integrate customers perspectives into the healthcare delivery system and process.[51] Sahay[16] noted that though hospitals in India provide high-quality treatment, they are very poor in customer service. Hence, it becomes imperative to understand where and how to improve functional and emotional aspects of healthcare services.

Research methodology

The present study tries to find the most evident gap between patient's expectation and experience of service quality across public and private hospital. Data were collected from the patients in public and private hospitals in Delhi, the capital city of India. Patients were selected based on the criteria that they should have been admitted in a public or a private hospital within the previous six months period when the study was conducted. Patient should have stayed in the hospital for at least two days (considered a reasonable period for experiencing all hospital-related processes). For this study, the availability of time and accessibility to the hospitals were considered for deciding the sample size. Hence, in this study data were collected from in-patients, who underwent treatment in the hospitals in Delhi. As it was tedious to obtain permissions and approvals from all hospitals in Delhi, this study made use of convenience sampling method to gather patient's responses from both public and private hospitals that allowed their patients to respond to the survey. A sample size of 200 respondents was considered for the present study, for which 100 public and 100 private hospitals were contacted. The responses were obtained through the use of a five-point Likert scale ranging from very high to very low as recommended for healthcare surveys.[52,53] Questionnaire was pre-tested several times to ensure that the words used, format, length, sequencing of questions and the range of the scales were appropriate. A pilot test of the questionnaire was done to test its face validity. The instrument was administered to a panel of experts drawn from academia and hospital sectors (such as administrator, doctors and patients) to examine the exhaustiveness of the instrument. With a few exceptions, the panel of experts and respondents felt that all questions were clear, and that the language and scale used were appropriate and suitable. Out of the 200 responses, eight were considered problematic due to excessive missing data, or 'don't know' or N/A answers. The data from these surveys were not included for data analysis. Thus, a total of 192 surveys were analyzed. Part A of the questionnaire consist of demographic profile and patients choice of the hospital while part B had the distribution of items under the dimensions, as tangibles (five items), reliability (five items), responsiveness (five items), assurance (four items), empathy (four items), accessibility and affordability (three items).

The internal consistency is commonly measured by Cronbach's[54] α coefficient. Cronbach's value equal to or above 0.60 is generally agreed upon lower limit for exploratory research.[55,56] The items in the current study were chosen from the existing literature and

views of experts consisting of industry practitioners, physicians and hospital administrators and academicians. Further, the scale was refined based on patient's feedback who participated in the pilot study. All these steps ensure that the instrument possesses face and construct validity.

Discussion of findings

As evident from Table 1 the results of paired *t*-test revealed a gap between patient's expectation and experience regarding service quality for public hospitals. Patient felt that the medical facilities and equipment were not well maintained and up-to-date. The environment of the hospital lacked proper directional signs and was not clean and comfortable. There was no privacy during treatment, services were not provided promptly and at appointed time, patients were made to wait for long hours. They were not treated with dignity and respect as the staff/doctors were not friendly and courteous and had no idea about patient's specific needs. Patients were also not briefed on their medical conditions. The services were neither affordable nor available for 24 hours the hospitals had no feedback system.

As evident from Table 2 the results of paired *t*-test revealed a gap between patient's expectation and experience regarding service quality for private hospitals. Patient felt that the medical facilities and equipment were not well maintained and up-to-date. Services were not provided promptly and at appointed time, patients were made to wait for long hours. They were not treated with dignity and respect as the staff/doctors were not friendly and courteous and had no idea about patient's specific needs. Patients were also not briefed on their medical conditions. The hospitals had no feedback system. There was no consistency in service charge and services were neither affordable nor accessible for 24 hours.

Figure 1 indicates the results of paired *t*-test indicating the gap between expectation and experience for public and private hospitals on 13 variables listed in Tables 1 and 2.

As evident from Table 3 the results of paired *t*-test revealed a gap between expectation and experience for public and private hospitals for patient belonging to below 40 years age group. Patient's felt that the medical facilities and equipment were not well maintained and up-to-date. The environment of the hospital was not comfortable and clean and lacked proper directional sign. Services were not provided promptly at appointed time nor carried out properly. Patients were made to wait for long hours. They were not treated with dignity and respect as the staff/doctors were not friendly and courteous and had no idea about patient's specific needs and interest. Patients were also not briefed on their medical conditions. Services were not affordable and no feedback system existed in the hospitals.

As evident from Table 4 the results of paired *t*-test revealed a gap between expectation and experience for public and private hospitals for patient belonging
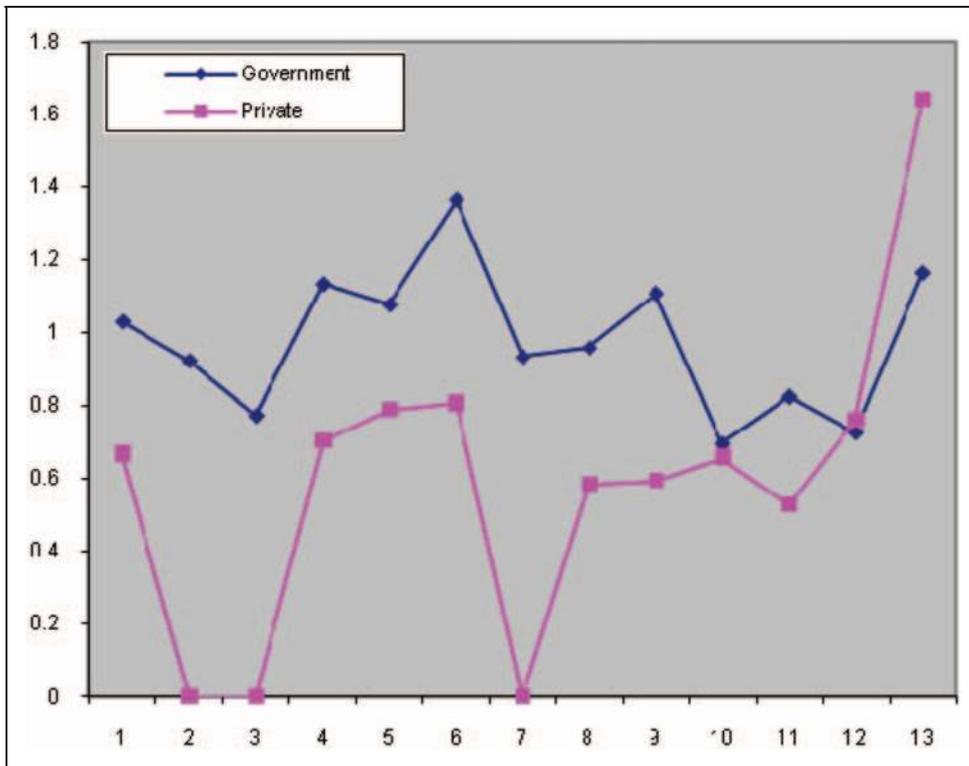
Table 1. Paired *t*-test for public hospitals

Attribute	Items	Mean	Std deviation	*t*	df	Sig.
Tangibility	Up-to-date and well-maintained medical facilities and equipment	1.03	1.15	12.49	194	0
	Clean and comfortable environment with good directional signs	0.92	1.21	10.66	194	0
	Privacy during treatment	0.77	1.31	8.27	194	0
Reliability	Services should be provided at appointed time	1.13	1.19	13.35	194	0
Responsiveness	Patients should be given prompt services	1.08	1.23	12.21	194	0
	Waiting time of not more than one hour	1.36	1.31	14.53	194	0
Assurance	Friendly and courteous staff/doctors	0.93	1.07	12.18	194	0
	Patients should be treated with dignity and respect	0.96	1.17	11.4	194	0
	Explain thoroughly medical condition to patients	1.11	1.34	11.57	194	0
Empathy	Obtain feedback from patients	0.70	1.09	8.92	194	0
	24-hours service availability	0.83	1.14	10.08	194	0
	Doctors/staff should understand the specific needs of patients	0.73	1.08	9.41	194	0
Affordability	Affordable charges for services rendered	1.16	1.34	12.06	194	0

df: degree of freedom.

Table 2. Paired *t*-test for private hospital

Attribute	Items	Mean	Std deviation	*t*	df	Sig.
Tangibility	Up-to-date and well-maintained medical facilities and equipment	0.67	0.98	7.10	107	0
Reliability	Services should be provided at appointed time	0.70	0.99	7.40	107	0
	Consistency of charges	0.73	1.29	5.91	107	0
Responsiveness	Patients should be given prompt services	0.79	0.95	8.63	107	0
	Waiting time of not more than one hour	0.81	1.11	7.57	107	0
Assurance	Friendly and courteous staff/doctors	0.71	0.99	7.51	107	0
	Patients should be treated with dignity and respect	0.58	1.01	6.03	107	0
	Explain thoroughly medical condition to patients	0.59	1.08	5.72	107	0
Empathy	Obtain feedback from patients	0.66	1.09	6.29	107	0
	24-hours service availability	0.53	0.96	5.71	107	0
	Doctors/staff should understand the specific needs of patients	0.76	1.04	7.59	107	0
Accessibility	The location should be accessible	0.70	1.14	6.43	107	0
Affordability	Affordable charges for services rendered	1.64	1.35	12.62	107	0

df: degree of freedom.

Figure 1. Paired *t*-test results for private and public hospitals.
Note: Nos. 1–13 represent 13 variables listed in Tables 1 and 2.

to above 40 years age group. It is evident from Table 4 that patient's felt that the medical facilities and equipment were not well maintained and up-to-date. The environment of the hospital was not clean and comfortable and lacked proper directional sign. There was no privacy during treatment, services were not provided promptly and patients were made to wait for long hours. They were not treated with

Table 3. Paired *t*-test for below 40 years age group

Attribute	Items	Mean	Std deviation	*t*	df	Sig.
Tangibility	Up-to-date and well-maintained medical facilities and equipment	0.99	1.08	10.27	125	0
	Clean and comfortable environment with good directional signs	0.97	1.21	8.96	125	0
Reliability	Services should be provided at appointed time	1.11	1.15	10.81	125	0
	Services should be carried out right the first time	0.72	1.05	7.74	125	0
	Consistency of charges	0.63	1.13	6.32	125	0
Responsiveness	Patients should be given prompt services	1.07	1.23	9.75	125	0
	Waiting time of not more than one hour	1.29	1.28	11.31	125	0
Assurance	Friendly and courteous staff/doctors	0.93	1.13	9.26	125	0
	Patients should be treated with dignity and respect	0.87	1.14	8.61	125	0
	Explain thoroughly medical condition to patients	1.10	1.41	8.75	125	0
Empathy	Obtain feedback from patients	0.63	1.06	6.62	125	0
	24-hours service availability	0.72	1.11	7.32	125	0
	Doctors/staff should have patients' best interests at heart	0.77	1.24	6.97	125	0
	Doctors/staff should understand the specific needs of patients	0.56	1.02	6.18	125	0
Affordability	Affordable charges for services rendered	1.12	1.39	9.04	125	0

df: degree of freedom.

Table 4. Paired *t*-test for above 40 years age group

Attribute	Items	Mean	Std deviation	*t*	df	Sig.
Tangibility	Up-to-date and well-maintained medical facilities and equipment	1.10	1.28	7.18	68	0
	Clean and comfortable environment with good directional signs	0.84	1.21	5.78	68	0
	Privacy during treatment	0.96	1.27	6.28	68	0
Reliability	Services should be provided at appointed time	1.17	1.25	7.81	68	0
Responsiveness	Patients should be given prompt services	1.09	1.23	7.32	68	0
	Waiting time of not more than one hour	1.49	1.36	9.14	68	0
Assurance	Friendly and courteous staff/doctors	0.94	0.97	8.08	68	0
	Patients should be treated with dignity and respect	1.12	1.23	7.53	68	0
	Explain thoroughly medical condition to patients	1.13	1.21	7.75	68	0
Empathy	Obtain feedback from patients	0.83	1.14	6.04	68	0
	24-hours service availability	1.01	1.19	7.06	68	0
	Doctors/staff should understand the specific needs of patients	1.03	1.12	7.60	68	0
Accessibility	The location should be accessible	0.83	1.07	6.41	68	0
Affordability	Affordable charges for services rendered	1.25	1.28	8.11	68	0

df: degree of freedom.

dignity and respect as the staff/doctors were not friendly and courteous and had no idea about patient's specific need. Patients were also not briefed on their medical conditions. Services were neither affordable nor accessible and were not available for 24 hours. There was no feedback system available in the hospital.

As evident from Table 5 the results of paired *t*-test revealed a gap between expectation and experience for public and private hospitals among female patients.

Table 5. Paired *t*-test for female patients

Attribute	Items	Mean	Std deviation	*t*	df	Sig.
Tangibility	Up-to-date and well-maintained medical facilities and equipment	1.12	1.07	9.11	75	0
	Clean and comfortable environment with good directional signs	0.99	1.25	6.89	75	0
	Privacy during treatment	0.82	1.36	5.22	75	0
Reliability	Services should be provided at appointed time	1.09	1.36	7.01	75	0
	Services should be carried out right the first time	0.80	1.18	5.94	75	0
Responsiveness	Patients should be given prompt services	1.11	1.25	7.71	75	0
	Responsiveness displayed by doctors/staff	0.84	1.18	6.23	75	0
	Waiting time of not more than one hour	1.51	1.40	9.42	75	0
Assurance	Friendly and courteous staff/doctors	0.99	1.06	8.08	75	0
	Patients should be treated with dignity and respect	0.89	1.30	5.99	75	0
	Explain thoroughly medical condition to patients	1.25	1.46	7.46	75	0
Empathy	24-hours service availability	0.82	1.33	5.33	75	0
Affordability	Affordable charges for services rendered	0.79	1.28	5.38	75	0

df: degree of freedom.

It is evident from Table 4 that there was a gap between perception and experience. Female patients felt that the medical facilities and equipment were not well maintained and up-to-date. The environment of the hospital was not clean and comfortable and lacked proper directional sign. There was no privacy during treatment, services were not provided promptly and patients were made to wait for long hours. They were not treated with dignity and respect as the staff/doctors were not friendly and courteous and had no idea about patient's specific need. Patients were also not briefed on their medical condition; there was no feedback system in the hospital. Services were neither affordable nor accessible and were not available for 24 hours.

As evident from Table 6 the results of paired *t*-test revealed a gap between expectation and experience for public and private hospitals among male patients. It is evident from Table 5 that there was a gap between expectation and experience. Male patients felt that the medical facilities and equipment were not well maintained and up-to-date. The environment of the hospital was not clean and comfortable and lacked proper directional sign. Services were not provided promptly and patients were made to wait for long hours. They were not treated with dignity and respect as the staff/doctors were not friendly and courteous and had no idea about patient's specific need. Patients were also not briefed on their medical conditions. Services were neither affordable nor accessible and were not available for 24 hours. There was no feedback system available in the hospital.

The paired *t*-test indicated that there exists a distinct difference between expectation and experience on 13 variables. Figure 2 indicates the results of paired *t*-test indicating the gap between expectation and experience for public and private hospitals across various demographic groups (that is age and gender) on 13 variables listed in Tables 3 to 6.

The 13 variables are listed below:

1. lack of up-to-date and well-maintained medical facilities and equipment;
2. lack of clean and comfortable environment with good directional signs;
3. no privacy during treatment;
4. service not provided at appropriate time;
5. no prompt service provided;
6. long hours of waiting time;
7. staff/doctors not friendly and courteous;
8. patients not treated with dignity and respect;
9. patients were not detailed about their health condition;
10. lack of patient feedback system in the hospital;
11. 24-hours service facility not available;
12. doctor had no understanding or idea about patient's specific needs;
13. services rendered were neither affordable nor accessible.

In this study an attempt was made to find out whether the decision to visit a private or public hospital can be forecast based on the patient's expectation and experience on the above distinctive parameters and also to forecast the probability that a patient is likely to prefer private or public hospital. In this study, the decision to visit private or public hospital was taken as dependent variable while the above mentioned (13 parameters

Table 6. Paired *t*-test for male patients

Attribute	Items	Mean	Std deviation	*t*	df	Sig.
Tangibility	Up-to-date and well-maintained medical facilities and equipment	0.98	1.20	8.84	118	0
	Clean and comfortable environment with good directional signs	0.88	1.19	8.11	118	0
	Privacy during treatment	0.75	1.27	6.39	118	0
Reliability	Services should be provided at appointed time	1.16	1.07	11.88	118	0
	Consistency of charges	0.62	1.13	5.98	118	0
Responsiveness	Patients should be given prompt services	1.06	1.22	9.44	118	0
	Waiting time of not more than one hour	1.27	1.25	11.10	118	0
Assurance	Friendly and courteous staff/doctors	0.90	1.08	9.11	118	0
	Patients should be treated with dignity and respect	1	1.09	10.02	118	0
	Explain thoroughly medical condition to patients	1.02	1.25	8.88	118	0
Empathy	Obtain feedback from patients	0.78	1.04	8.18	118	0
	24-hours service availability	0.83	1.01	8.98	118	0
	Doctors/staff should understand the specific needs of patients	0.76	0.99	8.44	118	0
Affordability	The location should be accessible	0.75	1.12	7.27	118	0
	Affordable charges for services rendered	1.40	1.34	11.40	118	0

df: degree of freedom.
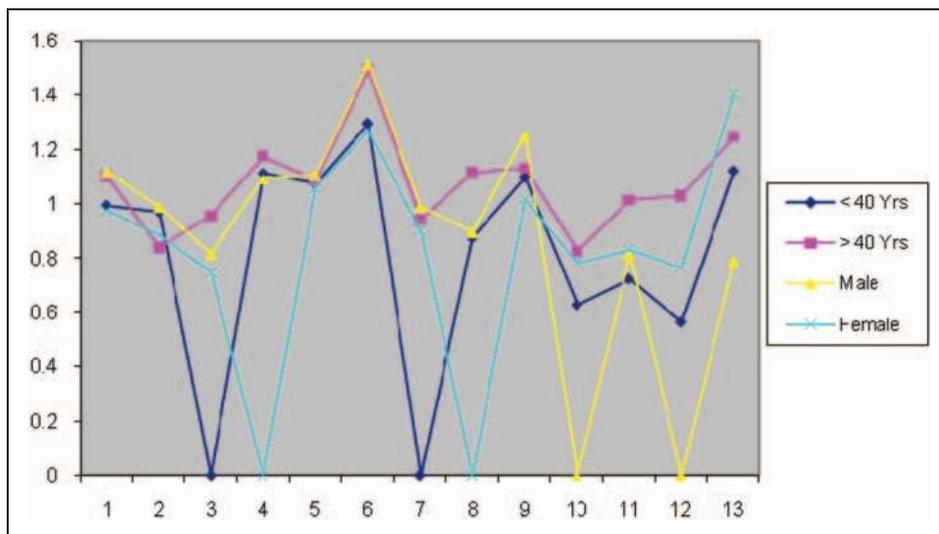
Figure 2. Paired *t*-test results for private and public hospitals across demographic profile (gender and age).
Note: Nos. 1–13 represent 13 variables listed in Tables 3 to 6.

that influenced this decision) were the causative (independent) variables.

Decision to visit a particular hospital = Function of influencing parameters

In situations where there are two groups, the modeling options considered could be either groups discriminant analysis or logistic regression (LR; binary logistic also known as logit function). This study used the LR function, as it was considered superior due to the following reasons:

a. Discriminant function is a linear function while LR is a non-linear function with higher forecasting accuracy.

b. We can forecast probability of an individual through LR, which is not possible in discriminant analysis.

c. Using LR, an appropriate cut-off probability can be decided above which an individual may be said to be likely to belong to any one of the 2 groups. This would enable to plan out suitable actions emanating from the research.

LR concept

To forecast the probability of a patient to visit a particular hospital, this probability would range from 0 (Private) to 1 (Public). Hence, forecast is bounded (Min $= 0$; Max $= 1$). This forecast is made based on a set of variables that could range from 0 to a very high number (infinity). Hence there is a need to transform the probability to an unbounded form ranging from 0 to ∞ (infinity). This is done by using the concept of odds. Odds of an event occurring is defined as

Odds (event occurring) = Probability (event occurring)/
  Probability (event not occurring)
i.e. Odds = P/(1 − P)
where P = Probability of the event occurring.
Conversely, P = Odds/(1 + Odds)

One may note that the odds would range from 0 to ∞. Now, to increase the forecasting accuracy, a non-linear transform of odds is used, which is LN (Odds) i.e. the natural logarithm of odds as the dependent variable. This variable is forecast using a linear composite of the causative (independent) variables. The binary logistic option in SPSS creates a relationship between LN (Odds) on one side and a linear composite of the independent variables on the other side.

In model terms, the generalized form of this relationship would be

$$LN\,(odds\,(Pub\,hospital)) = k + a_1x_1 + a_2x_2 + \cdots + a_nx_n$$

From this model, we can calculate Odds (Pub.) as follows:

$$Odds(Pub) = Exponent\,(LN(Odds\,(Pub)))$$
$$= Exponent\,(k + a_1x_1 + \cdots + a_nx_n)$$

From the above, the Probability (Pub.) can be calculated as follows:

$$P(Pub) = Odds(Pub)/(1 + Odds(Pub))$$

This probability figure can now be compared to a pre-decided cut-off value to classify an individual as likely to visit a public hospital or not.

Based on the above data for public as well as private hospital visited, an LR analysis was run to forecast for each individual patient:

1. LN (Odds (Pub.))
2. From the above Odds (Pub.)
3. From the above Probability (Pub.).

The LR model obtained was

Ln(Odds(Pub.)
  $= -0.668(e\_modern\_facility)$
  $+ 1.265(e\_clean\_comf\_env)$
  $+ 0.374(e\_privacy) + 0.693(e\_time)$
  $- 0.002(e\_prompt\_service) + 0.829(e\_waiting\_time)$
  $- 0.07(e\_staff\_friendly) + 0.477(e\_treatmt\_dignity)$
  $- 0.43(e\_detld\_explanation)$
  $+ 0.711(e\_patient\_feedback)$
  $- 0.134(e\_service\_24\,hours)$
  $- 2.287(e\_dr\_ustand\_sp\_needs)$
  $- 0.081(e\_charges\_affdble)$
  $- 0.947(p\_modern\_facility)$
  $- 1.045(p\_clean\_comf\_env) - 1.068(p\_privacy)$
  $- 0.234(p\_time) + 1.272(p\_prompt\_service)$
  $- 1.25(p\_waiting\_time) - 0.297(p\_staff\_friendly)$
  $- 0.517(p\_treatmt\_dignity)$
  $- 1.79(p\_detld\_explanation)$
  $+ 0.938(p\_patient\_feedback)$
  $- 1.146(p\_service\_24hours)$
  $+ 0.004(p\_dr\_ustand\_sp\_needs)$
  $+ 2.189(p\_charges\_affdble) + 10.741$

The variables starting with *e* are for experience while the variables starting with *p* are for expectation. The above model was run on the existing dataset. Using a cut-off value of 0.50, a classification accuracy of 94.9% was obtained using the above model i.e. 94.9% of the respondents were correctly forecast as preferring public or private hospitals. LR was carried out for classification accuracy. The above model was able to forecast whether a respondent is likely to opt for private or public hospital. Based on the 13 parameters where a gap existed between expectation and experience, the model was able to forecast whether a respondent will opt for private or public hospital in 95% of the case with 95% accuracy

Cluster analysis was carried out to find the cluster grouping. The groups identified were: Cluster 1 constituted mostly female patients of younger age group having preference for public hospital. Their major concern was that services should be provided at appointed time.

Cluster 3 consisted of mostly male patients of older age who preferred private hospital. They preferred to be treated with privacy dignity and respect. They preferred for a prompt services provided at appointed time, with less than one hour of waiting time. They preferred friendly and courteous staff/doctors, who would be able to explain them about their medical conditions. They also had preference for up-to date and well-maintained medical facilities and equipment, clean and comfortable environment with good directional signs.

Cluster 2 consisted of middle age group patients belonging to both genders who had mixed preference for both private and public hospital.

Conclusion

Naidu[36] in his study found socio-demographic variables such as age, education, health status, race, marital status and social class to have a positive relationship with patient satisfaction. Thi et al.[57] found that men tended to be more satisfied than women and women tended to complain more often than men do. Priporas et al.[58] found that males and young patient tend to rate satisfaction a little higher than females and older patients. It is consistent with other studies, for instance, the study by Andaleeb[44] found that tangibles such as comfort and clean environment played a crucial role in patient satisfaction. Many other studies indicated the importance of intangible dimension as a critical indicator of the customer satisfaction.[59] However, the findings of the present study indicate that while the private sector has an edge over the public sector, the differences in service evaluations were not great. The most obvious service quality gap found in this study across both the hospitals was patient experience of the medical facilities and equipment not been well maintained and up-to-date. Patients were of the opinion that the environment of the hospital was neither clean nor comfortable and lacked proper directional sign. They were also of the opinion that services were neither affordable nor accessible and were not available for 24 hours. There was no privacy during treatment, services were not provided promptly and that patients were made to wait for long hours. They were not treated with dignity and respect as the staff/doctors were not friendly and courteous and had no idea about patient's specific need. Patients were not briefed about their medical condition. The hospital had no feedback system.

Managerial implications

Clearly, both public and private hospitals have room to improve and must strive to achieve higher scores on all the above-stated variables. In order to alleviate the service quality problems, it becomes imperative to address the quality challenge vigorously and methodically in India to meet the expectations of patients. The population of India, which currently stands at 1.2 billion approximately, is one of the major drivers of growth in the healthcare sector. India is expected to overtake China as the world's most populous nation by 2030 and the population of India is expected to cross the 1.6 billion mark by 2050. It is estimated that by 2025, over 180 million Indians will be at least 60 years of age, and the growing aged population is expected to place a massive burden on India's healthcare infrastructure and thus increase the need for further provision of healthcare facilities. The new healthcare consumer, who is well-informed, quality conscious, and is more able to afford the best, is likely to benchmark international hospitals known for service excellence.

Medical tourism is being widely promoted by the Indian Government. India is gaining the advantage of being the low cost destination for healthcare services. In addition, there are a large number of international visitors, including NRIs who come to India for other purposes, but use wellness systems, such as Ayurveda/Yoga or Spiritual Healing. However, the healthcare industry needs to prove that the low cost services offered by them are comparable with any developed nations. Quality certification /accreditation of medical institutions definitely would play a great role in attracting foreign nationals to Indian hospitals for treatment. Once certified/accredited, it will be critical for medical institutions to maintain the quality levels required to retain the certification/accreditation to sustain.

The government has supported the healthcare industry with policies that enable it to function effectively, for example, liberalization of entry norms in the healthcare industry for private players in 1990s, opening of health insurance market in 2000, provisions in National Health Policy 2002 and increased health spending in public domain to 3% of GDP by 2012. However a Public Private Partnerships (PPP) is expected to play a greater role in the running of hospitals in India. At present, the level of PPP in the Healthcare Services Sector in India is low and different models of PPP for activities across the value chain need to be explored.

Staff and employees working in these hospitals need to be motivated and provided with formal training on how to be compassionate while dealing with patients and their friends/relatives. Medical staff should be groomed on interpersonal skills, customer orientation and ability to understand customer requirements and specifications. Performance-based incentives can be introduced for healthcare personnel in hospitals based on the feedback received from patients. Evaluations must be conducted at regular intervals and compared against a benchmark. Such evaluation would send a strong message to the hospitals that are slow to respond to 'customer' need. A stream of service quality assurance studies should be open to public scrutiny, so as to influence complacent healthcare providers to respond to the standards of service that the public expects. Service quality index can be incorporated in the hospitals balance scorecard and communicated to public. Effective dissemination of healthcare information must be envisaged to focus on the extent to which service quality standards are being met by both public and private hospitals. Ranking or rating mechanisms prevalent in developed countries could be established in the healthcare sector at least the prominent public and private hospitals to begin with. These evaluations should be widely available and easily accessible through various information centers. Those hospitals that earn low ratings consistently should be targeted by regulatory agencies for appropriate action. Benefits including promotion, transfer, training, study leave, etc. could be tied to performance evaluation mechanism that needs to match with expected deliverables of healthcare industry. Such incentives should also be carefully designed by looking at evolution and up-gradation of healthcare delivery system in India. Periodic monitoring of the extent and direction of change in the overall quality of services in the hospitals should be given utmost importance. The outflow of long-neglected patient to foreign countries in search of better healthcare facilities might affect the economy of the country. Government needs to invite foreign capital, investment and expertise to create more competition and to strengthen healthcare practices in the country that would force both public and private players to become more quality oriented. This does not mean that public hospitals would be phased out or de-emphasized as they play an important role in making healthcare available to a wider section of the society who cannot afford private healthcare facilities.

As is evident from the findings of this study patients want to be cured through care. Therefore, emphasis on both functional and emotional benefits needs to be incorporated to delight patients by offering an enriching health services experience.

Recommendations for future research

This research is based on the SERVQUAL instrument based on seven service quality dimensions. A more comprehensive study may be conducted by adding more dimensions. Secondly, this study is limited to only one city. The sample size restricted to only one city gives a partial outlook; therefore, a wider scope of the study would make the generalization of the findings stronger.

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Conflict of interest

The authors declare that they do not have any conflicts of interest.

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