



**Full Length Research Article**

**FACTOR ANALYSIS OF JACHO DIMENSIONS ON FDI CORPORATE HOSPITALS IN INDIA WITH  
SPECIAL REFERENCE TO DELHI AND NCR REGION-AN EMPIRICAL STUDY**

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**ABSTRACT**

While ever increasing demand for healthcare services after allowance of 100% FDI under automatic route in health care sector, on one hand, brings enormous opportunities and huge potentials for profits causing foreign players and non resident Indians to enter the Indian healthcare market. On another hand, this huge potential and profit making opportunities has been a constant pressure on health care providers and administrators to meet as well as to satisfy the ever increasing expectation of patients. Such challenging circumstances have an urgent call for a critical analysis of those factors/ dimensions which have direct or indirect bearing on profits, patient's satisfaction and the justification of the existence and growth of FDI Corporate Hospitals in India. Thus, the present study which is a part of a larger study ,is an attempt to document the various JACHO factors which are responsible measuring the quality in the corporate hospitals, Thus study will suggest the most prominent factors/dimensions to strengthen those underlying component variables which have favourable impact on the preference for these FDI corporate hospitals and will suggest corrective measures for those factors/dimensions which are hindering the expansion and growth of FDI corporate hospitals.

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**INTRODUCTION**

There is ample evidence that FDI is a key ingredient to sustainable economic growth (Sun, X.2002). Through FDI, foreign investors benefit from utilizing their assets and resources efficiently, while FDI recipients benefit from acquiring technologies and from getting involved in international production and trade networks. However, FDI does not come without pre-conditions, nor can host countries reap all the benefits of FDI automatically. Just like any other business people, foreign investors are driven by profits. They go to places where the net profitability is highest, not inevitably where costs are lowest; and they transmit best practice when it is advantageous for them to do so, not necessarily when host countries need it. In India, FDI Inflows to Hospital and Diagnostic Centres has been happening for the past few years. The reason for this new tempo is the potential that India offers to NRIs and multinationals. Moreover, a significant fraction of this growth can be attributed to the Foreign Direct Investment (FDI) received in this sector in recent years. Hospitals and diagnostics centres alone received FDI worth US\$ 1,597.33 million from 2000 - 2013 (March). (IBEF, 2013)

Healthcare Industry is among the fastest growing service sectors in India and is expected to grow at 15% YOY as per India Brand Equity Foundation. The major factor leading to these investments was the change in FDI related policy in Indian Healthcare Industry. Post January 2000, FDI up to 100 percent in hospitals is permitted under the automatic route. Hence no government approval is required as long as the Indian company files with the regional office of the RBI within 30 days of receipt of inward remittances and file the required documents along with form FC-GPR with that Office within 30 days of issue of shares to the non-resident investors. (Itumalla, Oct 2012).

Unlike the earlier image of the private sector, which mainly focused on nursing homes and polyclinics, the new market orientation is towards super specialty care. In this regard, although the pioneering efforts were made way back in 1983 by a group known as Apollo, a number of other companies have now entered the market. Notable among the latter include successful domestic and foreign companies like CDR, Wockhardt, Medinova, Duncan, Ispat, Escorts, Mediciti, Kamineni, Parkway, Jardine, Nicholas and Sedgwick. The entry of so many such companies has added towards

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corporatization of the healthcare industry with a focus on high profit-margin, super specialty and diagnostic care. On one hand, array of number of corporate hospitals has expanded the healthcare opportunities to Indian as well as foreign patients, on other hand, it has also created a kind of pressure on these corporate hospitals for delivering quality healthcare services at affordable prices to attract more and more domestic as well as foreign patients to justify their existence in a country like India which has been considered a more lucrative healthcare market by rest of the world. Backed by these lucrative opportunities many corporate hospitals chains like Fortis Healthcare, Wockhahdt Hospitals and Apollo Hospitals have been in headlines for their remarkable expansion plans in India and abroad.

Hence, it has become imperative to document the various factors responsible for corporatization of healthcare sector in India as well as factors responsible for attracting more and more Indian as well as foreign patients to these giant corporate hospitals chains considered capable in offering healthcare services in hi-tech manner without compromising for international healthcare standards. Through the present paper, researcher

### **Literature Review**

The researches so far conducted, either largely, related determinants of FDI in health care sector or related to patients satisfaction in health care. There are also some researches related to the factors responsible for the emergence of corporate hospitals in health care sectors. The studies related to the determinants of FDI in Health Care Sector are as follows:

John Dunning (1988) has developed paradigm of FDI to the health sector. According to him, a firm's reputation, the host country's market size, its social and physical infrastructure levels, trade and investment regulations and the potential for scale economies are the major factors affecting FDI incentives in healthcare. It mainly focuses on the significance of governance structures and the general business climate for investment in healthcare, similar to that in other parts of the economy. Globalisation and Liberalisation has made India more connected with the world, it is inevitable that private players are beginning to gain a stronghold in the medical industry. The investment environment is further enhanced with the governments taking initiatives to give concessions, like the Indian government offering to give 100% equity to foreign healthcare companies to invest. Baru (1998).

Studies related to the determinants of FDI in health care sector and the associated benefits and challenges was done by Chandra (2001, 2002a, 2002b, 2002c); Drager and Vieira (2002). These studies highlight that demographics, technological advancements and liberalization of health care sector are some factors which are largely responsible for growing potential for global FDI and trade flows in health services. Most of these studies emphasize on the importance of governance and regulations, availability of quality inputs, country risk and perception, supporting infrastructure and cultural distance in driving FDI flows in healthcare sector.

The existing literature on FDI in healthcare also suggests that the implications of foreign commercial presence may be mixed, on one hand there are improvements in health infrastructure and standards while on the other hand, the sector is having higher healthcare costs, greater dualism and inequities. An important point made by all the studies, however, is that this impact is largely the result of prevailing regulatory and structural conditions Adlung and Carzaniga, (2002); Chanda (2002a, 2002b, 2002c). According to Smith (2004) notes, the extent of commercialization has played more important role in shaping this impact than the nature of ownership. Outreville (2007) has thrown light on the relevance of OLI (ownership-specific advantages, location-specific advantages and market internationalization).

Studies related to the emergence of corporate hospitals have shown that Medical care is an enormous business, with the private sector being the most dominant in this industry, accounting for more than 70 per cent of India's urban healthcare service market Mudur (2003). This unequivocal dominance of the private sector has been headed by the emergence of the corporate hospitals in India, especially in the metropolises, where the middle class are multiplying in size and affluence Mathiyazhagan (2003b). The concessions given by the government have been relatively successful in triggering the expansion of these corporate hospitals in India. The Apollo Hospital Group definitely rode on this wave of government and private support, seeing that the group has expanded its network with 41 specialty hospitals and clinics and made multiple collaborations with other medical institutes worldwide Balakrishna (2007). Therefore the globalisation of healthcare has definitely allowed the corporate hospitals to strengthen its position, pushing the emergence of these hospitals even more.

Besides creating the perfect investment environment for the NRI doctors, the government also encouraged the development of other medical related industries, like pharmaceutical and medical equipment industries, to set up businesses in India. The government does it through the strengthening of the human and institutional support for these companies, like issuing India's industrial policy statement, which proclaimed that India gave no discrimination on foreign and Indian undertakings Balakrishna (2007). This gave the private sector more leverage in the hospital industry, since corporate hospitals are so dependent on the use of foreign-based and modern technologies and diagnostics with high obsolescence rate Purohit (2001). Thus, the development of the medical related industries lowers the cost of architecture tremendously, enhancing the emergence of the corporate hospitals further, Balakrishna (2007).

Therefore, it is right to conclude that the competitive globalised healthcare system of today has placed the Indian government in a nonnegotiable position to open up the healthcare sector to stay competitive, which inevitably provides even more support for the emergence of the corporate hospitals in the metropolitan in India. In conclusion, it is proven that healthcare seekers depend highly on the corporate hospital, since they provide a wider variety of services and are considerably more efficient. In fact, more than 50% of the urban population in Mumbai has expressed

their preference for the corporate hospitals for their higher efficiency Newbrander (1997). These corporate hospitals, with a rising demand, are attracting more business groups, like Apollo Tyres, to collaborate with medical institutions like, Artemis Health Institute, to form conglomeration of medical cities, like the Medi City in Bangalore Balakrishna (2007).

### Statement of the Problem

Given rising demand for world-class healthcare services and huge investment needs in healthcare sector due to growing size of middle class population in India, increased size of ageing population of India, the changed life style of Indian people, the demand for corporate hospital has increased over the time. The demand for these hospitals have increased as the corporate hospitals are often believed to be capable of meeting international standards and offer the treatment in hi-tech and fast manner. Moreover, the corporate hospitals armed with new and advanced technology, are offering their services comparatively at lower cost than that of other foreign countries and have become the preferred destination for international health seekers. As a result the private sector, over the years, has increased its stake in healthcare delivery. This, in recent years, has caused not only domestic but also foreign players and non resident Indians to enter into the Indian healthcare market to grab the opportunities being offered by this sector in form of market crowded with national, international health seekers requiring huge investment. Thus, with this, corporate hospitals are becoming more and more prominent in the Indian market

On close inspection of literature it has been observed that most of the research used the Parasuram Zeithal and Berry's(1988) find quality dimension. While a major step forward these dimensions were developed and tested in the industries quite different from health care industry (i.e. Bank, repair and maintenance, education, telecommunication etc.). Carmen (1990), and Ford, Batch and Fottler(1997) suggested that the service would need to be added to five quality dimension (developed by Parasuram Zeithal and Berry's) to address completely the quality definition from the patients point of view.

Coddington and Moore (1987) suggested five quality dimensions namely warmth, caring and concern, medical staff, technology-equipment, specialization and scope of services available and outcome while the Joint Commission on Accreditation of Health Care Organization (JACHO) identifies nine quality dimensions specifically for hospitals. The list of nine JACHO quality dimensions are more comprehensive and suitable for health care sector as these nine JACHO quality dimensions are closely related to Coddington and Moore's quality dimension and Parasuraman et.al. service quality dimensions (Refer Table-1).

Hence, it becomes imperative to test empirically these JACHO quality dimensions as corporate hospitals are becoming more and more prominent in the Indian market and it becomes even more imperative to know how to retain as well as how to enhance impact of Foreign Direct Investment on the corporate hospitals in India. Hence via the present study researcher is trying to test empirically all the JACHO Quality Dimension via Factor analysis to reveal the most significant item under each JACHO Quality Dimension to help the corporate hospital sector in retaining, as well as attracting more and more patients from abroad as well from domestic market. Moreover the past few studies focused mainly on the determinants of FDI in Healthcare Sector and on the performance of the Health Care Sector as a whole. Trakroo<sup>4</sup> described some of the factors which affect the satisfaction level of patients utilising

outpatient services. They include unusually long time at Registration, irritable behaviour of registration clerk, lack of facilities for toilet, drinking water, lack of proper space for waiting, too long waiting time for doctor's consultation, undesirable behaviour of doctors and communication gap between doctor and patient.

### MATERIALS AND METHODS

To elicit the patient's response regarding the factors which are responsible for satisfaction in the concerned hospitals an empirical study has been undertaken. The JACHO quality dimension has been empirically tested.

**Table 1. Quality Dimension's**

Quality Dimension's		
Parasuraman <i>et al.</i> 's SERVQUAL Quality Dimension	Coddinton's Dimension	JCHACO Quality Dimension
Tangibles	Warmth/ Caring/Concern	Efficacy
Reliability	Medical Staff	Appropriateness
Responsiveness	Technology- Equipment	Efficiency
Assurance	Specialization/ Scope of Services Availability	Respect and Caring
Empathy	Outcome	Safety
		Continuity
		Effectiveness
		Timeliness
		Availability

**Table 2. Status of Questionnaire Filled**

S. No.	Name of the Hospital	Number of questionnaires to be filled	No. Of Incomplete Questionnaires	No. Of complete Questionnaires
1.	Indraprastha Apollo Hospital	250	15	235
2.	Fortis Escorts	65	5	60
3.	Fortis Hospital	110	10	100
4.	Max Healthcare	150	20	130
5.	Rockland Hospital	100	6	94
Total	5	675	56	619

For this purpose exploratory in-depth individual and focus group interviews were conducted into five corporate hospitals with more than 600 healthcare stakeholders including healthcare providers, managers, policy-makers, and payers to identify factors affecting the quality of healthcare services provided in Indian healthcare organisations situated in Delhi and NCR regions.

### Data Collection

The structured questionnaire meant for patients to check their frequency of seeking treatment in FDI Corporate Hospitals (FCHs) has been distributed among patients for the purpose of final data collection.

**Table 3. Demographic Profile of the Respondents and Other Details of FDI Hospitals**

Demographic Profile of the Respondents and Other Details of FDI Hospitals			
Variables	FDI Hospitals Elements	Frequency	Percent
Name of Hospitals	Indrapratha Apollo Hospital	235	37.96
	Escort Fortis Hospital	60	9.69
	Fortis Heath Care	100	16.16
	Max healthcare	130	21.00
	Rockland Hospital	94	15.19
	Total	619	100
Age(s) in Year	Less than 18	51	8.24
	Between 18-28	42	6.79
	Between 28-38	141	22.78
	Between 38-48	264	42.65
	Between 48 -58	56	9.05
	Above 58	65	10.50
Total	619	100	
Length of Stay(In days)	Less than 5 Days	75	12.12
	Between 5-10 Days	293	47.33
	Between 10-15 Days	230	37.16
	More than 15 Days	21	3.39
Total	619	100	
Type of Patient	Medical	49	7.92
	Surgical	504	81.42
	Pediatric	51	8.24
	Any Others	15	2.42
Total	619	100	
Name of Disease	General Medical Care	49	7.92
	Orthopedics and Joint Replacement	101	16.32
	Cardiology	124	20.03
	Nephrology	114	18.42
	Neurology	79	12.76
	Gastroenterology and Endoscopy	14	2.26
	Oncology	41	6.62
	Aesthetic and Reconstructive Surgery	6	0.97
	Obstetrics and Gynecology	24	3.88
	Pediatrics	51	8.24
	Pulmonology	16	2.58
	Total	619	100
Gender	Male	427	68.98
	Female	192	31.02
	Total	619	100
Marital Status	Married	554	89.50
	Unmarried	65	10.50
	Total	619	100
Education	Under Graduate	94	15.19
	Graduate	305	49.27
	Post Graduate	144	23.26
	Any other	76	12.28
	Total	619	100
Occupation	Wage earners	30	4.85
	Agriculturists	4	0.65
	Salaried	121	19.55
	Self-employed	235	37.96
	Others	229	37.00
Total	619	100	
Annual Income (In Lakhs)	Less than 2 Lakhs	31	5.01
	Between 2-5 Lakhs	128	20.68
	Between 5 - 10 Lakhs	242	39.10
	Between 10-15 Lakhs	20	3.23
	Between 10 -15 lakhs	2	0.32
	Above 15 Lakhs	196	31.66
Total	619	100	
Nationality	India	531	85.78
	Other than India	88	14.22
	Total	619	100

The data was collected by the researcher herself from 5 of Delhi region during the month of June and July. The status of questionnaires distributed among the five FCHs. The details of questionnaires completion are shown in Table-2.

### Respondent's Characteristics

The respondent's demographic profile like age, gender, marital status, education, occupation, annual income, nationality and other details like length of stay, type of patient, type of diseases these patient are seeking in the FCHs as well as are the important variables to conduct the research study have been shown by the Table-5 and Table-6 respectively as follows:

**Table 4. KMO Value Degree of Common Variance**

0.90 to 1.00	Marvellous
0.88 to 0.89	Meritorious
0.70 to 0.79	Middling
0.60 to 0.69	Mediocre
0.50 to 0.69	Miserable
0.00 to 0.49	Unacceptable

The Patient's demographic profile like age, gender, marital status, education, occupation, annual income, nationality and other details like length of stay, type of patient, and type of diseases are the some significant variables to address objectives of the research. All the statistics related to these variables have been presented in the Table-3.

The collected data was tabulated to facilitate analysis and interpretations. Table-2 is showing the demographic profile of respondents/ patients of FCHS hospitals. Table is showing the Frequencies of various variables in FCHs. This table indicates the frequency of patients from indoor and outdoor country, age, and type of patient which reflect the contribution of FCHs in meeting the demands of patients. The result shows that the patients having the age between 28-48 are under the treatment of FCHS hospitals while only 8 percent of the patients are less than 18. Regarding the length of stay in the hospitals most of the patients takes the treatment between the 5-15 days. On analysing the table-2 it was found that patients prefer FCHS corporate hospitals regarding the surgical and paediatric treatments (81% and 8% respectively over non FCHS hospitals 33.5% and 6.9% respectively). Patients prefer FCHS hospital for orthopaedic and joint replacement, for cardiology, nephrology, and neurology while patients prefer non FCHS hospitals for general medical care (54.6% over 7.9%).

There is no big difference is found regarding gender. Wage earners and agriculturist patients has a very less percentage in FCHS hospitals while self employed patient have greater preference to FCHS hospitals. On analysing the table-2 it was found that the annual income has a very good impact on the patients visiting to FCHS hospitals. Mostly income group above 10 lakhs annual income prefer FCHS hospitals while patients having less than 5 lakhs annual income prefer non FCHS hospitals. Regarding nationality foreigners prefer FCHS hospital.

**Table 5. KMO and Bartlett's Test for JACHO Dimension**

KMO and Bartlett's Test for JACHO Dimension		
Respect and Caring		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.908
Bartlett's Test of Sphericity	Approx. Chi-Square	8634
	df	136
	Sig.	0
Continuity		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.741
Bartlett's Test of Sphericity	Approx. Chi-Square	2179
	df	15
	Sig.	0
Appropriateness		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.813
Bartlett's Test of Sphericity	Approx. Chi-Square	3534
	df	36
	Sig.	0
Timeliness		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.802
Bartlett's Test of Sphericity	Approx. Chi-Square	3437
	df	28
	Sig.	0
Efficiency		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.815
Bartlett's Test of Sphericity	Approx. Chi-Square	4623
	df	91
	Sig.	0
Effectiveness		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.767
Bartlett's Test of Sphericity	Approx. Chi-Square	1489
	df	21
	Sig.	0
Safety		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.725
Bartlett's Test of Sphericity	Approx. Chi-Square	687.72
	df	6
	Sig.	0
Availability		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.797
Bartlett's Test of Sphericity	Approx. Chi-Square	2245
	df	15
	Sig.	0

Table 6. Factor Analysis of JACHO Quality Dimensions

Factor Analysis of JACHO Quality Dimensions									
Factors' Name	Items	Factor's Loadings							
		1	2	3	4	5	6	7	8
	Cronbach's Alpha	0.95	0.87	0.9	0.86	0.86	0.81	0.83	0.89
Respect and Caring	Staff handled my request in a very friendly way.	0.774							
	Overall the staff went out of their way to help me.	0.868							
	The staff fulfilled my needs before I asked.	0.791							
	The hospital staff appeared to be interested in me.	0.78							
	The staff was very enduring in attending my quick needs.	0.675							
	The staff showed me the things I would have needed during my stay in hospital.	0.874							
	The staff was very reassuring and supporting.	0.817							
	My personal privacy was sufficiently taken care of.	0.73							
	I know name of my caregiver in the hospital.	0.579							
	Caregiver's gave me information I needed during my stay in the hospital.	0.737							
	I did not wait long at the time of check in.	0.844							
	When I had a complaint, it was handled by them quickly.	0.77							
	Overall the hospital staffs were pleasant to deal with.	0.625							
	Overall the staff treated me with respect and dignity.	0.534							
	The Staff had a positive attitude towards my problems.	0.538							
	Doctors treat patients with dignity and respect.	0.723							
	The staff members are from different cities/countries/cultures.	0.889							
	I was able to stay in contact with hospital after my discharge from the hospital.		0.856						
	They handled me gently and kindly.		0.838						
	continuity	At the time of my discharge, I was told about the necessary Home-Care.		0.77					
When being discharged, they considered well what I could do.			0.666						
All preparations for discharge were handled well and quickly.			0.839						
I was taken care sufficiently when I moved home.			0.727						
The places for convenience were very neat and clean.				0.782					
I did not have to fill-out too many formalities at the time of check-in.				0.752					
My personal possessions were suitably taken care of.				0.72					
The cleanliness and sanitary condition was quite good and satisfactory.				0.852					
The arrangements for lights, ventilation etc. was appropriate and satisfactory.				0.798					
Every patient and his family members have ease of access to telephone.				0.785					
Appropriateness	Overall the food services were quite good and satisfactory.			0.796					
	Meals were served at appropriate temperature making food edible willingly.			0.586					

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Time liness	I was given all required information quickly and within expected timed by hospital staff.	0.762
	Patients are timely informed about the quarries they have, all required information are explained in proper way and make them less anxious and worried.	0.827
	The doctors informed me the outcome of the procedure of treatment.	0.915
	Hospital staff told everything to my family members what they needed to know about me and my treatment.	0.833
	Meal was served on appointed time.	0.715
	Unused and dirty dishes were removed promptly by the caregivers.	0.749
	As soon as complaint is received from the patient or their family members it is resolved timely and quickly.	0.822
	At the time of treatment doctors, make eye contact, call patients by name to create a healthy relationship.	0.378
	The doctors are experienced enough in securing confidentially and privacy as they watch themselves at what they say, where they say and to whom they say.	0.515
	Doctor's kind gestures and polite words make patients comfortable and relaxed.	0.724
	Doctors encourage patients to tell their problem and answer their questions	0.773
	Overall my hospital bill was handled well and promptly.	0.455
	My bill was in line with the services provided to me i.e. it has not surprised me and my family members	0.534
	I was able to understand my medical bill.	0.709
	Efficiency	A staff member was available to explain my bill to me in such way that we could understand the bill.
The doctors, nurses were efficient and expert enough in their task.		0.478
With the help of efficient and modern equipment I was treated in an effective manner.		0.76
I was discharged from the hospital in lesser period than I expected.		0.463
At the time of discharge, I was feeling ok and enough healed.		0.826
Overall the Hospital was efficient in terms of services, charges and expertise.		0.829
My first contact with staff made me restful and relaxed.		0.447
The first look at the interior of the hospital was pleasing and effective.		0.695
The procedure for complaint handling was efficient.		0.793
The staff members were looking very promising and talented.		0.777
Effectiveness	Overall the hospital – staff was very professional.	0.616
	Overall the hospital staff had expertise and proficient in their work.	0.67

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Safety	Provisions of safety are quite well and assuring.	0.744
	At the time of my stay in the hospital I and my family member's belongings were safe.	0.737
	Security arrangements in the hospital were excellent.	0.733
	Overall the Hospital had everything which could be expected from a class hospital.	0.738
	All the required services were appropriately and sufficiently available.	0.74
Availability	The hospital had everything I could have needed during my stay in the hospital.	0.892
	The hospital has an appropriate complaint handling mechanism.	0.854
	Patient's family members feel free to the staff members for any query.	0.798
	The hospital has a number of suggestion boxes where the patient can drop their suggestion and feedback for the improvement of the hospital.	0.782

### Sample Size

Upon closer examination of the literature, a general opinion has emerged, suggesting that ratio criteria do not offer an accurate guidance (Guadagnoli and Velicer, 1988; Hogarty, Hines, Kromrey, Ferron and Mumford, 2005; MacCallum, Widaman, Preacher and Hong, 2001; Osborne and Costello, 2004; Zhao, 2009). Guadagnoli and Velicer (1988) suggest, what has been widely accepted in the related literature, that the required sample size is provisional upon the overall strength of the factors and the underlying items under each factor this providing for a new criterion operationalising these relationships. If the factors have four or more items with loadings of .60 or higher, then the size of the sample is not relevant.

If the factors have 10 to 12 items that load moderately (.40 or higher), then a sample size of 150 or more is needed to be confident in the results. Finally, if factors are defined with few variables and have moderate to low loadings, a sample size of at least 300 is needed. Fabrigar *et al.* (1999) and MacCallum *et al.* (2001), further supported that if three or four underlying items (comprising a factor) having loadings more than .7 or more, stable solutions can be reached with samples as low as 100, suggesting that weaker relationships need a larger sample size.

Further, a strong solution, made up of stable factors, reduces the influence of the sample size; however, a larger sample size decreases sampling error resulting in more stable solutions (Hogarty *et al.*, 2005). In the present study, the sample size is more than 600 satisfying the minimum criterion to reduce sample error. The study includes Indraprastha Apollo Hospital, Fortis Escorts, Fortis Hospital, Max Healthcare and Rockland Hospital. All the five hospitals are corporate hospitals and having almost identical facilities. Structured questionnaires were prepared for outpatients of the above mentioned hospitals which were pilot tested. The sample respondents were drawn through simple random sampling. The outpatients were taken based on the average number of patients per day for each hospital.

### Determinant of the Matrix

To check determinant of the correlation matrix is an additional assessment of factorability of the data. The determinant of a matrix is a single value assessing the strength of the items relationships and telling factorability of the items

### Bartlett's Test of Sphericity

This tests the null hypothesis that the correlation matrix is an identity matrix. An identity matrix is matrix in which all of the diagonal elements are 1 and all off diagonal elements are 0. You want to reject this null hypothesis. Bartlett's Test of Sphericity is used to evaluate whether determinant value is statistically different from zero, the null hypothesis of Bartlett's test states that the observed correlation matrix is equal to the identity matrix, suggesting that the observed matrix is not factorable (Pett *et al.*, 2003). In the present study, Bartlett's test produced a significant test result, rejecting the null hypothesis. Bartlett's Test provides evidence that the observed correlation matrix is statistically different from a singular matrix, confirming that linear combinations exist.

### Kaiser-Meyer-Olkin Test of Sampling

This measure varies between 0 and 1, and the values closer to 1 are better. The Kaiser-Meyer-Olkin Test of Sampling Adequacy (KMO) is a measure of the pooled variance in the items. Kaiser, Meyer, and Olkin have suggested the following guideline (Refer Table 4) for assessing the measure (1974, cited in Dziuban and Shirkey, 1974).

Refer to Table 5 the KMO value for JACHO Dimensions 'Respect and Caring', 'Appropriateness', 'Timeliness', 'Efficiency' is 0.908, 0.813, 0.802, 0.815 respectively, which is 'marvellous', and the KMO value for others JACHO quality Dimensions namely 'Continuity', 'Effectiveness',

'Safety' and 'Availability' is 0.741, 0.767, 0.725, and 0.797 respectively which is 'middling'.

### Factor Analysis and Interpretation

Factor Analysis (FA) is a data reduction technique that uses correlations between data variables. It assumes that some underlying factors exist that explains the correlations or inter-relationships among observed variables (Chatfield and Collins 1992). It has been used widely in the various spheres of psychology, econometrics, marketing, sociology, and education (Bollen 1989; Doll, Xia, Torkzadeh 1994; Li, Tan, and Xie 2002). The main focus of the present study is not the identification of prominent factors but the identification of those variables or items which explain the each JACHO Quality Dimension in best manner. Hence the Principal Component Factor Analysis with var-imax rotation has been applied to detect those variables with high loadings more than 5. This was performed on all the 71 items (Table 5). On the criteria for selecting factor loading, usually factor loading above 0.6 is considered high while factor loading greater than or equal to 0.3 is considered moderately high (Klien, 2005). Therefore the cut-off for analysing factor loading was  $0.50 \pm 0.03$  for which each JACHO Quality Dimension.

The number of items under each dimension has been extracted by evaluating the scree test and the Eigen value scores that were more than one. Moreover, extracting too many factors may pose undesirable error variance but extracting too few factors might leave valuable common variance unanswered. Hence, selection of right criterion is utmost desirable. The Eigen-values and Scree test (i.e., scree plot), Number of non-trivial factors (Trivial factors are usually defined as those that do not have two or three variables loading above the cut-point), Priori Criterion (number of factors based on replication of previous research) and percentage of cumulative criterion rare used to determine how many factors/items to retain.

One criterion that can be used to determine the number of factors to retain is Kaiser's criterion which is a rule of thumb. This criterion suggests retaining all factors that are above the Eigenvalue of 1 (Kaiser, 1960). Another criterion is based on Jolliffe's criterion which recommends retaining factors above .70 (Jolliffe, 1986). It is easier to concentrate on some key items rather than having to consider too many items that may be trifling, and so factor analysis is useful for placing variables/items into meaningful categories. Many other uses of factor analysis include data transformation, hypothesis-testing, mapping, and scaling (Rummel, 1970). For any variable/ items to be labelled as a factor it should have at least 3 variables, although this depends on the design of the study (Tabachnick and Fidell, 2007). To determine the number of factors/items to retain, you will need to pick the solution that provides the most desirable rotated factor structure. Factors that have less than three variables, many complex variables and item loadings that are less than .32 are generally viewed as undesirable. (Tutorials in Quantitative Methods for Psychology, 2013). The recommended sample size is at least 300 participants, and the variables that are subjected to factor analysis each should have at least 5 to 10 observations (Comrey and Lee, 1992).

The steps involved herein included Exploratory Factor Analysis (EFA) and subsequent regrouping of items on the basis of the analysis. EFA is a method that aims at extracting maximum variance from the dataset within each factor (Chatfield and Collins, 1992). JACHO Quality Dimension has been tested using EFA. Each of the Quality Dimension is easily interpretable. However, the number of JACHO Quality Dimension are nine but in the process of empirical testing one JACHO Quality Dimension namely Efficacy has been eliminated as only two respondents responded on this quality dimension. The factor analysis of JACHO quality dimensions is given in the table-6.

The first JACHO Quality dimension is 'Respect and Caring'. There are 17 variables under this dimension related to treatment of staff, attitude of the staff, waiting time, quick complaint handling procedure etc. All the variables have minimum loading of 0.5 and maximum is more than 0.8 which is sufficient to validate a quality dimension thoroughly. The second JACHO Quality Dimension is 'Continuity'. It contains 6 variables having a minimum loading of 0.6 and maximum is more than 0.8 which is sufficient to validate a quality dimension thoroughly.

The third JACHO Quality Dimension is 'Appropriateness'. It contains 9 variables having a minimum loading of 0.5 and maximum is more than 0.8 which is sufficient to validate a quality dimension thoroughly. The fourth JACHO Quality Dimension is 'Timeliness'. It contains 8 variables having a minimum loading of 0.7 and maximum is more than 0.9 which is sufficient to validate a quality dimension thoroughly. The fifth JACHO Quality Dimension is 'Efficiency'. It contains 14 variables having a minimum loading of 0.4 and maximum is more than 0.8 which is sufficient to validate a quality dimension thoroughly. The sixth JACHO Quality Dimension is 'Effectiveness'. It contains 7 variables having a minimum loading of 0.4 and maximum is more than 0.7 which is sufficient to validate a quality dimension thoroughly.

For the purpose of identification as an quality dimension of factor it should contain at least three to five items with significant loadings (Costello and Osborne, 2005). Hence, the seventh JACHO Quality Dimension 'Safety' which contains 3 variables having a minimum loading of 0.7 and maximum is more than 0.7 is sufficient to validate a quality dimension thoroughly. The eighth JACHO Quality Dimension is 'Efficacy'. It contains only 1 variable for which KMO test is not applicable. The ninth JACHO Quality Dimension is 'Availability'. It contains 6 variables having a minimum loading of 0.7 and maximum is more than 0.8 which is sufficient to validate a quality dimension thoroughly.

### Conclusion

The present study reflex the empirical test of JACHO Quality Dimensions which is not largely has been tested. The JACHO Quality Dimensions are key quality characteristics specifically meant for health care sector in comparison to other quality dimensions developed for service sector. Hence, the result obtained in the present study can be used as means of identifying the prominent variables as well as those

variables needing improvement within the health care sector and to increase the patient intake in the corporate hospitals.

## REFERENCES

- Bollen, K. A. 1989. Structural Equation with Latent Variables, John Wiley and Sons, New York, NY.
- Carmen, J. 1990. Consumer Perceptions of Service Quality: An assessment of the SERVIQUAL Dimensions. *Journal of Retailing*, 66, no. 1, pp. 33-35.
- Chatfield, C. and Collins, A. J. 1992. Introduction to Multivariate Analysis, Chapman and Hall, London.
- Comrey, L.A. and Lee, H.B. 1992. A first course in factor analysis (2nd ed.). Hillside, NJ: Lawrence Erlbaum Associates.
- Costello, A.B. and Oshome, J.W. 2005. Best Practices in exploratory factor analysis: four recommendations for getting the most from your analysis. pp. 10-19.
- Doll, W. J., Xia, W. D. and Torkzadeh, G. 1994. A confirmatory factor analysis of the end- user computing satisfaction instrument. *MIS Quartely*, December, pp. 453-461.
- Donabedian, A. 1980. Explorations in quality assessment and monitoring, National Center for Health Services Research. *Health Administration Press*, Mich.
- Ford, R., Bach, S. and Fottler, M. 1997. Methods of Measuring Patient Satisfaction in Health Care Organizations. *Health Care Management Review*, 22, no.2, pp. 74-89.
- Johansson, P., Oleni, M. and Fridlund, B. 2002. Patient satisfaction with nursing care in the context of health care: a literature study. *Scand J Caring Sci.*, 16(4), pp. 337-44.
- Laschinger, H.S., Hall, L.M., Pedersen, C. and Almost, J. 2005. A psychometric analysis of the patient satisfaction with nursing care quality questionnaire: an actionable approach to measuring patient satisfaction. *J. Nurs. Care, Qual.* 20(3), pp. 220-30.
- Li, Y. N., Tan, K. C. and Xie, M. 2002. Measuring Web-based Service quality”, *Total Quality Management*, Vol. 13 No. 5, pp. 686-699.
- Merkouris, A. 2008. Nursing Management. Ellin, Athens 356.
- Parasuraman, A., Zeithaml, V. and Berry, L. 1988. SERVIQUAL: A Multiple Item Scale for Measuring Consumer Perceptions of Service Quality”, *Journal of Retailing*, 61, no. 1, pp. 12-40.
- Sun, X. 2002. Foreign direct investment and economic development: What do states need to do?”, mimeo, The World Bank, summarizes the main benefits and the potential negative impacts of FDI on host economies, Washington, D.C.
- Tabachnick, B. G. and Fidell, L. S. 2007. Using multivariate statistics (5th ed.). Boston, MA: Allyn and Bacon.
- Trakroo, P.L. 1977. Reaction of the patients toward the evening O.P.D. Services in hospital of Delhi, *Journal of Hospital Administration*, 14(2), pp. 213-21.
- Vuori, H. 1987. Patient satisfaction--an attribute or indicator of the quality of care? *QRB Qual Rev Bull.* 13(3), pp. 106-8.

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