



## Multiple Regression Analysis of Factors Predicting Patients Satisfaction on Perceived Healthcare Quality

L. T. Linimol<sup>1</sup> and B. Chandrachoodan Nair<sup>2</sup>

<sup>1</sup> Research Scholar, Dept. of Management Studies, Noorul Islam University Kanyakumari, Tamilnadu, India

<sup>2</sup> Professor and Director Dept. of Management Studies Noorul Islam University Kanyakumari, Tamilnadu, India

**Abstract:** The purpose of this quantitative study is to analyze the correlation between the patients attitudes towards satisfaction and the also the factors which influenced the service quality. In this regard, this research paper aims to analyze the influencing factors and their degree of correlation on healthcare quality using multiple regression analysis. Data analysis was based on 535 valid questionnaires. A descriptive analysis, the multiple regression and ANOVA were conducted. The study results indicate that service quality dimensions have a positive impact on patients' satisfaction. Data were submitted to multiple regression analysis using SPSS.

**Keywords:** Healthcare service quality, patient satisfaction, multiple regression analysis, patients perception.

### I. INTRODUCTION

The regression analysis is one among the most commonly used methods of statistical analysis in public health research. Its objective is to specify the relationship of a response with explanatory variables. To ensure the quality, it is essential to define an integrated system of indicators that can tell whether the organization is going in the right direction with good performance or not. In this respect, this paper tried to identify and analyze the patient satisfaction and healthcare quality, which are the main indicators that reveal performance of healthcare organization.

### II. PURPOSE OF THE STUDY

This quantitative, multiregression study is to investigate significant predictor variables of resources and outcomes. The targeted population includes 535 expatriate patients in Saudi Arabia. The geographic location for this study is the healthcare centers in Saudi Arabia.

### **III. RESEARCH QUESTION**

For this study, the focus is how well the predictor variables of outcomes, resources, and hospital characteristics predict the service quality in the healthcare settings.

Is there a significant relationship among patients attitudes towards satisfaction and the determinants of perceived service quality?

### **IV. RESEARCH DESIGN**

The quantitative method for this study provides an empirical approach to reveal associated relationships and predictor elements. Because healthcare research focuses on enhancing effectiveness and efficiencies of the delivery of service, quantitative methods are most appropriate in such inquiry (Bowling, 2009).  
1. A healthcare leader uses regression for statistical information and forecasting, which allows leaders to position resources in an advantageous manner (Bowling, 2009).

### **V. OBJECTIVES**

To investigate the impact of patients attitudes towards satisfaction on service quality.

### **VI. HYPOTHESIS**

Null Hypothesis: H<sub>0</sub>

There is no relationship between patients attitudes towards satisfaction and predictor variables namely medical aspects of care, service expectations, performance of services, infrastructure and settings and expectations of care to predict the healthcare service quality.

### **VII. LITERATURE REVIEW**

The significance of quality management in the healthcare sector, particularly hospitals has been emphasized since the 1980s (Kunst and Lemmink, 2000)[2]. The identification of patients attitudes is very important for hospitals in order to be able to meet their satisfaction (Evans, 2008)[3]. The motive of patient satisfaction research is to acquire information that can be used to make improvements in the nature of the industry. Therefore, it is meaningful to understand expectations and desires of patients in order to create a solid foundation, in which the healthcare organization knows how to best serve its patients.

Patient satisfaction can be determined by patient experience in the healthcare settings. In fact, patient experience compares what they expected to receive and what they actually received. Davis (2009)[4] indicated that patient satisfaction could be gained when a service provided a favorable level consumption related fulfillment with regard to patients expectations for that service.

### **VIII. METHODOLOGY**

The present study is descriptive in nature. A structured questionnaire was administered and data were collected from the sample expatriate Indians in KSA and secondary data were gathered from various articles, journals and websites relating to the topic.

## IX. SAMPLE DESIGN

Data were collected from 535 expatriates in KSA. The sample size was arrived at based on a pilot study. A simple random sampling method was adopted for the selection of the respondents. The respondents consisted of 390 males and 145 females. Likerts scale was mostly used as a scale of measurement of satisfaction. In this study, significant differences in the satisfaction levels of expatriate Indians with regard to three demographic variables, gender, marital status, job positions and healthcare spending, were studied.

## X. DATA ANALYSIS AND INTERPRETATION

Descriptive analysis was performed to describe attributes of sample and respondents. Correlation coefficients were used to determine the relationship between dependent and independent variables. In addition, multiple and simple linear regression, and ANOVA test were employed to test the hypotheses. The analysis has done with the help of software package using SPSS and AMOS.

**Table 1**  
**Sample Distribution According to Demographic Variables**

<i>Characteristics</i>	<i>Categories</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Gender	Male	390	72.9
	Female	145	27.1
Age group (Years)	20-30	105	19.6
	31-40	137	25.6
	41-50	166	31
	High school		27.5
Educational qualification	Diploma	112	20.9
	Bachelor	141	26.4
Marital status	Single	71	13.3
	Married	464	86.7
Occupational Status	Professionals	356	66.5
	Non professionals	105	19.6
	Laborers/Technicians	74	13.8
Monthly income	Below 3000	104	19.4
	3001-7000	206	38.5
	7001-10000	148	27.7

Descriptive statistics, including mean and standard deviation, for each variable were computed. This preliminary analysis helped to better understand the underlying variables in this model. The mean and standard deviation of opinion of the respondents on determinants of satisfaction of healthcare services are given in Table 2.

**Table 2**  
**Mean and S. D. of Respondents**

	<i>Mean</i>	<i>SD</i>
Medical Aspects of Care	37.62	5.11
Service Expectations	42.9	4.58
Performance of Service	35.69	4.6
Infrastructure and Setting	37.33	5.33
Expectations of Care	46.18	3.33
Patients' Attitudes towards Satisfaction	35.36	5.05

Based on mean score, Expectations of care (46.18) is the most important determinant on satisfaction of expatriates towards patient satisfaction, followed by Service expectations (42.90), Medical aspects of care (37.62), Infrastructure and settings (37.33), Performance of service (35.69), and the least factor is Patients attitudes towards satisfaction (35.36). The difference in accessibility and availability of medical care decides each patients attitudes towards satisfaction, and it varies from person to person.

Research Paradigm of multiple regression analysis shows correlation between dependent and independent variables as follows:

In this study, dependent variable is Patients attitudes towards satisfaction; independent variables are Medical aspects of care, service expectations, Performance of service, Infrastructure and settings and Expectations of care.

Dependent variable: Patients attitudes towards satisfaction (Y) Independent variables:

- 1) Medical Aspects of Care (X1 )
- 2) Service Expectations (X2 )
- 3) Performance of Service (X3 )
- 4) Infrastructure and Setting (X4 )
- 5) Expectations of Care (X5 )

**Table 3**  
**Multiple Regression Analysis**

dd

**Table 4**  
**Multiple Regression Model Summary**

dd

**Table 5**  
**ANOVA**

dd

Impact of overall service quality on patients' satisfaction. A multiple regression analysis was conducted to assess the collinearity of independent variables with the analysis of Variance (ANOVA), model summary and coefficients.

- Predictors: (Constant), Expectations of care, Performance of service, Service expectations, Medical aspects of care, Infrastructure and setting.
- Dependent variable: Patients attitudes towards satisfaction.

The null hypothesis was that there is no significant relationship between patients attitudes towards satisfaction and predictor variables namely medical aspects of care, service expectations, performance of services, infrastructure and settings and expectations of care to predict the healthcare service quality. The complete regression model was able to significantly relate between patient satisfaction and predictor variables through  $F(234.725)$ ,  $p < 0.001$ ,  $R^2 = 0.686$ , suggesting the complete model was predictive for perceived healthcare quality.

The multiple R value is 0.830 which measures the degree of relationship between the actual values and the predicted values of the Patients attitudes towards satisfaction. Because the predicted values are obtained as a linear combination of Medical aspects of care ( $X_1$ ), Service expectations ( $X_2$ ), Performance of service ( $X_3$ ), Infrastructure and setting ( $X_4$ ) and Expectations of care ( $X_5$ ), and it designates that correlation between Patients attitudes towards satisfaction and the five independent variables is quite strong and positive.

The R squared value is 0.686 which means that about 68.6% of the variation in patients attitudes towards satisfaction is clarified by the estimated SRP that uses medical aspects of care, service expectations, performance of service, infrastructure and setting and expectations of care as the independent variables and R squared value is significant at 1percent level. Using unstandardized co-efficients for the independent variables, the multiple regression equation is constructed. It is as follows:

$$Y = -10.755 + 0.251X_1 + 0.205X_2 + 0.215X_3 + 0.342X_4 + 0.160X_5$$

Here the coefficient of  $X_1$  is 0.251 denotes the partial effect of medical aspects of care on Patients attitudes towards satisfaction, holding the other variables as steady. The coefficient of  $X_2$  is 0.205 denotes the partial effect of service expectations on Patients attitude towards satisfaction, holding the other variables

as stable. The coefficient of  $X_3$  is 0.215 represents the partial effect of performance of service on Patients attitudes towards satisfaction, holding the other variables as permanent. The coefficient of  $X_4$ , 0.342, signifies the partial effect of infrastructure and setting on Patients attitudes towards satisfaction, holding the other variables as unchanging. The coefficient of  $X_5$  is 0.160 and it symbolizes the partial effect of expectations of care on Patients attitudes towards satisfaction, holding the other variables as changeless. The estimated positive sign infers that such effect is positive that patients attitudes towards satisfaction score would increase by 0.251, 0.205, 0.215, 0.342 and 0.160 for every unit increase in medical aspects of care, service expectations, performance of service, infrastructure and setting and expectations of care respectively and this value is significant at 1percent level.

Based on standardized coefficients, Infrastructure and set- ting (0.361) is the most important factor to extract patients attitudes towards satisfaction score, followed by Medical as- pects of care (0.254), Performance of service (0.196), Service expectations (0.186), and Expectations of care (0.106). Because the Saudi healthcare system spends much on facilities and infrastructure.

From table 1, the ANOVA test value shows  $F = 234.725$ ,  $p\text{-value} = 0.000$ , ( $p = <0.05$ ),  $H_0$  formulated in this regard is rejected. This shows the fact that there is significant correlation between patients attitudes towards satisfaction and medical aspects of care, service expectations, performance of services, infrastructure and settings and expectations of care. This clearly shows that the patients attitudes towards satisfaction dependent on MC, SE, PS, IS and EC as it is clearly evident from the adjusted R-squared value of 68.6 percent.

The adjusted R Squared value in this case is 68.6 percent- age which explains the fact that the independent variables in the model namely MC, SE, PS, IS and EC account for 68.6 percentage variance in the dependent variable patients attitudes towards satisfaction. This highlights the fact that the above model is considered to be a good fit.

The t-value for medical aspects of care is found to be 7.724; service expectations is 6.613; performance of service is 5.242; infrastructure and setting is 10.626 and expectations of care is 3.993 and the p-value for all is 0.000, ( $p = <0.05$ ),  $H_0$  formulated in this regard is rejected. This shows that there is a significant relation of the patients attitudes towards satisfaction over medical aspects of care, service expectations, and performance of services, infrastructure and settings and expectations of care. This means that the multiple regression equation for the above analysis may be utilized for the future modifications to make the healthcare system more effective.

## **XI. FINDINGS**

The findings of the multiple regression analysis revealed that the healthcare quality directly relates to the patients attitudes towards satisfaction which relates significantly to the medical aspects of care, service expectations, performance of service, infrastructure and setting and expectations of care. These five factors are directly correlated. Results of this study showed that adjusted R-squared value is 68.6 percentage which describes the fact that the independent variables account for 68.6 percent variance in the dependent variable. This highlights the fact that the above model is considered to be a moderate fit. This clearly shows that the patients attitudes towards satisfaction is dependent on medical aspects of care, service expectations, performance of services, infrastructure and settings and expectations of care as it is clearly evidenced from the adjusted R-squared value of 68.6 percentage.

## **XII. CONCLUSION AND IMPLICATIONS**

The identification of significant predictors can help determine the correct intervention to enhance the healthcare quality and satisfaction. This paper has tried to emphasize the importance of the healthcare quality and multiple regression analysis of factors has done contributing to overall healthcare quality.

In conclusion, comprehending how patients perceive healthcare quality can benefit management of healthcare organizations. Although each modeling procedure has its limitations for finite, sub-population data, the multiple regression provided an appropriate sample, established standard errors, answered regression assumptions, and provided analyses relevant to the research question. The problem and purpose statements for this quantitative, multiple regression study support the need to examine how well predictor variables of outcomes and hospital characteristics predict healthcare quality.

## **SCOPE FOR FUTURE RESEARCH**

Despite the fact that this study revealed a relevant correlation between patient satisfaction and determinants of service quality, yet there are other factors that need to be addressed to enrich the patient satisfaction and healthcare service quality.

The scope of this study excluded healthcare outside Saudi Arabia. The study was not generalizable internationally or relatable to healthcare entities outside the hospital setting. Additional research including a global perspective or varying datasets may aid researchers in the assessment of other health conditions or resources.

## **REFERENCES**

- Bowling, A. (2009), *Research methods in health: Investigating health and health services*. Maidenhead, England: McGraw-Hill International.
- Kunst, P., & Lemmik, J. (2000), Quality management and business performance in hospitals: A search for success parameters, *Total Quality Management*. Vol. 11, No. 8, pp. 1123-1132.
- Evans, L. (2008), *Using SERVQUAL to determine veteran healthcare service quality profile with recommendations*, PhD. Dissertation, H.Wayne Huizenga School of Business and Entrepreneurship, Nova Southeastern University.
- Davis, K. (2009), *Examining levels of acculturation on Mexican Americans service expectations and perceptions in dental offices*, PhD. Dissertation, Graduate Faculty of the School of Business and Technology Management, North central University.