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Managing Patient Centered Care

The Art of Finding and Keeping Loyal Patients



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CHAPTER

4 Research Methodology

This chapter includes discussion on the objectives, type of study, sample design, sample selection method, data collection method and data analysis methods used in the study. Hypotheses have been formulated based on theories considered within the literature review in preceding chapters. In addition the chapter deals with the theoretical basis behind the chosen model in research process to test relationship implied by research model and the hypotheses framed for the study.

OBJECTIVES OF THE STUDY

The objectives of the study were worked out based on the detailed understanding of the research problem, after thoroughly reviewing the relevant literature .The main purpose of this research was to ascertain the extent to which each determinant of customer loyalty viz trust, service quality and patient satisfaction play a role in developing patient loyalty in healthcare services.

Main Objective

To study patient loyalty and its relationship with various antecedents viz trust, service quality and patient satisfaction in healthcare sector.

Other Objectives

- To standardize measures for evaluating separately the trust, service quality, patient satisfaction and patient loyalty.
- To find out the underlying factors of trust, service quality, patient satisfaction and patient loyalty.
- To establish cause and effect relationship between trust as independent variable and patient loyalty as dependent variable.

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- To establish cause and effect relationship between service quality as independent variable and patient loyalty as dependent variable.
- To establish cause and effect relationship between patient satisfaction as independent variable and patient loyalty as dependent variable.
- To establish cause and effect relationship between service quality, trust and patient satisfaction as independent variables and patient loyalty as dependent variable.
- To test the model given below for its predictive capability using Smart partial least squares (PLS).
- To open new avenues of future research.

Research Design

The Study

The study was causal in nature. The variables trust, service quality, patient satisfaction and patient loyalty were measured and the relationships of independent variables viz. trust, service quality and patient satisfaction with the dependent variable patient loyalty were evaluated.

Survey

Survey allows the collection of large amount of data from a sizeable population in a highly economical way. A pilot test was conducted to evaluate the content validity of the questionnaires used for evaluating the four variables of the study. Survey method was used for collecting data for the study.

Sampling Design

Population

The population for the study included all the patients undergoing treatment (out patients and admitted both) in various clinics and hospitals at Gwalior and New Delhi.

The Sampling Frame

The study was conducted on the patients undergoing treatment at various hospitals located at Gwalior and New Delhi. Both, the admitted patients and the outpatients were included in the sample frame for the

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study. Therefore, the sample frame for the study included the patients undergoing treatment in various hospitals of Gwalior and New Delhi during the data collection phase of the study. Individual patients were used as the sampling elements for the study. The basic idea of sampling is that by selecting some of the elements in a population, researcher may draw conclusions about the entire population. There are several compelling reasons for sampling, including: lower cost, greater accuracy of result, greater speed of data collection and availability of population selection (Cooper and Schindler, 2003).

Sampling Element

Individual patients were used as the sampling elements for the study.

Sampling Technique

Nonprobability purposive sampling technique was used for identifying the respondents of the study. The study included proportionate representation on the demographic variables gender, educational qualification and income to ensure that the demographic variables did not affect the results of the study and also to ensure that the results of the study were suitable for drawing generalizations for Gwalior and New Delhi regions (Tables 4.1 to 4.3).

TABLE 4.1 Sample distribution based on gender

Males	*Females*
230	170

TABLE 4.2 Sample distribution based on educational background of the respondents

Nongraduates	*Graduates*	*Postgraduates and above*
148	192	60

TABLE 4.3 Sample distribution based on monthly income of the respondents

Monthly family income below 10,000	*Monthly family income 10,000–20,000*	*Monthly family income above 20,000*
148	192	60

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Sample Size

The overall sample size for the study was 400 patients. The sample was divided into demographic groups as discussed above:

TOOLS USED FOR DATA COLLECTION

The review of literature has indicated that all the four variables of the study have been extensively studied in the western context and therefore, standardized measures were available to evaluate all the variables (*Trust*: Nivel G Straten, Friele RD and Groenewegen PP, 2002, Anderson L and Dedrick R, 1990; *Service quality*: Babakus E, Mangold WG, 1992; *Patient satisfaction*: O'Connell B, Young J and Twigg D, 1999; *Customer loyalty*: Hayes BE, 2007). However, the availability of healthcare services in India differs significantly from the level of their availability in the western developed countries. Therefore, the expectations of the Indian patients from the healthcare units were likely to be different. Therefore, self-designed questionnaires based on the extensive survey of literature were prepared after discussions with the healthcare service providers, experts in the area of healthcare services and consultants working in the area of healthcare services to measures all the four variables of the study in Indian context. The standardized measures were also taken into consideration while framing the elements of the measures used for the study. Separate measures were developed to measure each of the four variables (service quality, trust, customer satisfaction and customer loyalty) of the study. The responses were obtained from the patients on a Likert type scale of 1 to 5 for all the variables. The measure developed to evaluate trust of patients on the doctors and hospital staff included 12 statements. Although in India healthcare is described as leading service industry, the quality of services offered to the patients that is, the characteristics that shape the experience of care beyond technical competence was rarely discussed in the medical literature. The review of related literature from both inside and outside healthcare led to the formation of the statements for service quality measure. The measure included 14 statements that seek to measure the quality of healthcare services.

Similarly, the statements for patient satisfaction and patient loyalty were also developed. Seventeen statements were framed to measure the level of satisfaction among the patients towards the healthcare services and seven items measured patient loyalty. In all the four measures

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included 50 items. The measures were administered personally by the researcher to ensure that the respondents understood each question clearly and the administrative errors were kept to minimum.

TOOLS USED FOR DATA ANALYSIS

Coding and Editing Data

First of all, the filled up questionnaires were screened for completeness and the ones in which the response to all the statements were complete were selected for further processing. The questionnaires incomplete in any respect were rejected at this stage. After that all the responses were scored and tabulated in MS-Excel. Five different excel sheets were prepared representing the responses of patients on each variable and the common sheet.

Reliability

To ensure that the research finds right answers to the main problem under study it is important to pay attention to two main aspects of the study: reliability and validity (Saunders et al. 2003). First of all internal consistency of all the four measures was established through item to total correlation. To check the internal consistency of the measures, Pearson correlation was calculated between the item scores and total scores of the four measures trust, service quality and patient satisfaction and patient loyalty separately. All the correlation values were significantly high at 0.01 level of significance (Fisher and Yates correlation table as sited by Gay and Diehl, 1992), indicating that all the statements in the four measures (trust, service quality, patient satisfaction and patient loyalty) contribute significantly to their respective totals.

The Cronbach's Alpha reliability of all the four measures was calculated using SPSS software. Reliability was computed to check whether data items measure the variables they were supposed to measure and that the measures were stable when used for repeat measurements. According to Yin (2003), "this test also has to do with demonstrating that the operations of a study such as data collection procedures can be repeated with the same results." The reliability analysis procedure available on SPSS calculates a number of commonly used measures of scale reliability and also provides information about the relationships between individual items in the scale.

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Validity

It is concerned with whether the findings are really about what they appear to be about (Saunders et al. 2000). Validity defined as the extent to which data collection method or methods accurately measure what they were intended to measure. Saunders et al. (2000) believe that validity refers to the extent to which a test measures what we actually wish to measure. There are two major forms: external and internal validity. The external validity of research findings refer to the ability of the results of the study being generalized across persons, settings and times. Internal validity is the ability of a research instrument to measure what is purposed to measure (Cooper and Schindler, 2003). Numbers of steps were taken during the course of the study to ensure high validity of the study.

- Survey question were selected based on literature review and frame of reference to ensure the validity of the measures.
- Content validity of all the four measures was established through a panel of judges before using the measures for collecting data for the study.
- Questionnaires were pretested before starting the survey
- Data has been collected personally by the researcher.

Discriminant Validity

The next step in the construct validation process was the assessment of discriminant validity. Discriminant validity reflects the extent to which the measure is unique and not simply a reflection of other variables (Peter and Churchill, 1986). Each dimension of a construct should be unique and different from the other even though each reflects a portion of that construct. There are several ways to evaluate discriminant validity. Using PLS, one can determine whether a construct shares more variance with its measures than it shares with other constructs in the model (Hulland, 1999). Average variance extracted is a common method of testing discriminant validity. Discriminate validity was evaluated using the average variance extracted (AVE) calculated using Smart PLS 3.0. This was achieved by conducting the following steps:

1. Calculating the square roots of the average variance extracted (AVE) values, which measure the average variance shared between a construct and its measures.
2. Calculating the correlations between different constructs. A matrix then constructed where the square root of AVE is in the diagonal and

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the correlations between the constructs are in the off-diagonal. For adequate discriminant validity, the diagonal elements should be greater than the off-diagonal elements in the corresponding rows and columns (Fornell and Larcker, 1981). The average variance extracted for all factors should be above the recommended cut-off of 0.5 (Fornell and Larker, 1981).

Factor Analysis

In order to identify the underlying factors of service quality, trust, patient satisfaction, patient loyalty: exploratory factor analysis (EFA) on the software SPSS 16 was run using the principal components extraction method with varimax rotation. Among the several different types of factor analysis principal components analysis (PCA) was used because PCA reflects both common and unique variance of the variables. PCA is a variance-focused approach seeking to reproduce both the total variable variance with all components and to reproduce the correlations. Factor analysis was used to uncover the latent structure (dimensions) of a set of variables. The analysis was carried out to reduce a larger number of items to a smaller number of factors for modeling purposes. As such, factor analysis is integrated in structural equation modeling (SEM), helping confirm the latent variables modeled by SEM. However, factor analysis can be and is often used on a stand-alone basis for similar purposes. While conducting factor analysis the other statistical results were also considered; Bartlett's test for sphericity (Bartlett, 1954) and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (Kaiser, 1974). Bartlett's test of sphericity should be significant i.e. ($p < 0.05$) for factor analysis to be valid. Factor analysis further establishes the validity of the measures used for collecting data.

Z-test

Z-test was used to evaluate the significance of difference on demographic characteristics of the respondents' viz gender, education and income on the basis of the mean scores for all the variables (both independent and dependent).

Regression Analysis

On the basis of a review of the literature by de Furia (1996) one could argue that theoretical and empirical evidence for a particular sequential

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order of service quality, trust and satisfaction remains inconclusive in healthcare setting. Many researchers have suggested, direct effects of trust on satisfaction and, indirect on loyalty (Doney and Cannon, 1997) and exclusively direct effects of trust on loyalty (Moorman et al. 1992) and Patients' satisfaction (Gombeski et al. 1992; O'Connor, Shewchuk and Carne, 1994). The lack of consensus in the literature about the sequential order of satisfaction, trust and service quality had led the researcher to evaluate the relationships between different variables of the study without presumptions.

Hypothesis Framed

Various hypotheses were set-up to test the cause and effect relationship between various independent variables and the dependent variables. Linear regression was applied on the data collected from the respondents to evaluate the effect of service quality on trust; trust on patient satisfaction; effect of trust on patient loyalty; effect of service quality on patient satisfaction; effect of service quality on patient loyalty; and effect of patient satisfaction on patient loyalty.

The first phase relates the trust to patient satisfaction and then service quality to patient satisfaction. In this phase hypothesis one and three had been framed and tested. The second phase tests the relationship between service quality to patient loyalty and trust to patient loyalty. In this phase hypothesis two and four had been framed and tested. Finally, the combined cause and effect of all the three antecedents of loyalty was investigated. This phase was carried out through testing of hypotheses number six.

- *Ho (1) (Null hypothesis)*: There is no relationship between trust and patient satisfaction.
- *Ho (2) (Null hypothesis)*: There is no relationship between trust and patient loyalty.
- *Ho (3) (Null hypothesis)*: There is no relationship between service quality and patient satisfaction.
- *Ho (4) (Null hypothesis)*: There is no relationship between service quality and patient loyalty.
- *Ho (5) (Null hypothesis)*: There is no relationship between patient satisfaction and patient loyalty.
- *Ho (6) (Null hypothesis)*: There is no relationship between service quality, trust, patient satisfaction and patient loyalty.

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Extensive review of literature indicated that trust, service quality and customer satisfaction were closely related. Survey data obtained from patients are expected to be sensitive to multicollinearity. According to (Field, 2000) ordinary least squares (OLS) regression yields unstable results when data has small sample size, missing values and multicollinearity between predictors and increases standard error of their estimated coefficients. High multicollinearity increases risk of theoretically sound predictor to be rejected from regression model as nonsignificant variable**.** To evaluate the level of multicollinearity among the multiple independent variables the values of VIF were calculated and multiple linear regressions were applied only if the VIF values were smaller than ten.

Conceptual Model and Model Testing

The relationships between trust, service quality, patient satisfaction and patient loyalty have been conceptualized in Figure 4.1 after the extensive review of literature. This conceptualization helps to answer the study research question and also provided the guidance for data collection. This model has been used as a point of reference for PLS regression analysis and was tested for its predictive ability in the Indian context. The model presented in Figure 4.1 below was tested using model testing statistical method partial least squares (PLS 3.0).

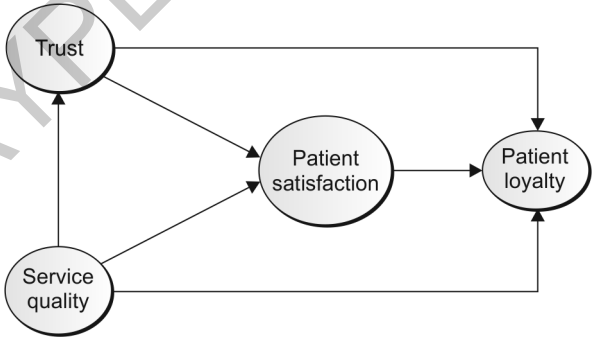

FIG. 4.1 Structural model showing the relationship between variables of the study

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Partial Least Square

Partial least squares (PLS) analysis is a multivariate statistical technique that allows comparison between multiple response variables and multiple explanatory variables. Partial least squares is one of a number of covariance-based statistical methods which are often referred to as structural equation modeling or SEM tools. Partial least squares is a regression method that allows for the identification of underlying factors, which are a linear combination of the explanatory variables or X (also known as latent variables) which best model the response or Y variables (Talbot, 1997). Although similar to principal components analysis (PCA), regression and canonical analysis and alternating least squares, it is considered to be a better alternative to multiple linear regression and PCA regression methods since it provides for more robust model parameters that do not change with new calibration samples from the population (Falk and Miller, 1992, Geladi and Kowalski, 1986). Furthermore, partial least squares is an improvement on PCA since the solution derived from partial least squares is constrained to the part of the covariance matrix that is directly related to the experimental manipulation or that relates to behavior (McIntosh, Chau and Protzner, 2004). Partial least squares is sometimes called soft modeling because while ordinary least-squares (OLS) regression makes hard assumptions such as no multicollinearity in the independent variable, soft modeling refers to softening of these assumptions. Partial least squares optimal linear relationships are computed between latent variables and can be interpreted as the best set of predictions available for a study given all the limitations (Falk and Miller, 1992). Some of the advantages of partial least squares are its ability to model multiple dependent as well as multiple independence variables and can handle multicollinearity in data, robust despite data noise and missing data.

Structural Equation Modeling

Partial least square regression analysis was performed using partial least squares (PLS) modeling. PLS is a structural equation modeling (SEM) technique that assesses the psychometric properties of the scales employed to measure the theoretical constructs and estimates the hypothesized relationships among said constructs (Barclay et al. 1995; Chin et al. 1998). While other SEM tools exist, the choice to use PLS for this work was driven by several factors. PLS was developed to handle

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both formative and reflective indicators whereas other SEM techniques do not permit this. The existence of this ability enables the designation of the type of relationship that the researcher believes to exist between the manifest variables and the latent constructs. Secondly, PLS does not make the assumption of multivariate normality that the structural equation modeling (SEM) techniques LISREL and AMOS do and being a nonparametric procedure, the problem of multicollinearity is not an issue. Finally, PLS requirement on sample size is lower than the other SEM techniques (Chin, 1999).

Hence, in order to test the hypothesized relationships between variables, structural equation modeling was employed using Smart PLS 2.0.M3. All general hypothesized paths were included in the model depicted in Figure 4.1. Validation of the structural model was achieved using Smart PLS 2.0.M3. The model was designed in PLS as per the guidelines given in the Smart PLS Guide (Ringle et al. 2005). Following Chin (1998), bootstrap resampling method was employed to estimate the theoretical model and hypothesized relationships. The results of the structural model with all hypothesized paths revealed a model with adequate fit in smart PLS. There are two parts in PLS path model: A measurement model relating the observable variables to their own latent variable also called the outer model and the structural model the inner model (Tenenhaus et al. 2005). All R-Square values, should exceed the 50 percent threshold for adequate fit of the model. Smart PLS calculated the R-square and t-values for the full structural model and all path t-values met the required cut-off value (1.645). Smart PLS presents the path coefficient, means, standard deviations and t-values.

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Managing Patient Centered Care

The Art of Finding and Keeping Loyal Patients

Through the patient's eyes, the book provides insights into how hospitals can become more patient-centered by measuring, and improving the experience of care. The book is an attempt to interlink between key drivers of marketing of healthcare services, i.e. service quality, trust and patient satisfaction to patient loyalty. The chapters discuss in detail how quality of services, trust of patients in healthcare setting play an important role in developing patient satisfaction and patient loyalty and are strategically relevant for healthcare services. Presently, an increasing trust, service quality and satisfaction level of the patients will be more important for improving the outcomes in healthcare settings.



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