Chapter – 3

Research Methodology

Research methodology is the process that includes detailed steps to conduct the research. This chapter briefs about the process of conducting research. Research begins with the formulation of problem. Problems lead to the objectives for the research and that make the researcher choose the appropriate research design. The chapter briefs about the types of research design and justifies. After conceptualization, in order to realization, data sources and data collection methods are identified and briefed. Sample can be taken using probability or non-probability sampling techniques. There are several sub methods for the same which are explained and justified, under this chapter. Details of pilot testing has been covered in the chapter. Finally the chapter explains about questionnaire – as a tool to collect the data. The collected data are edited to make them ready for statistical process.

The detailed steps of research process are as under:

1. Formulation of Research Problem
2. Identification of Research Objectives
3. Choice of Research Design
4. Sources of Data and Data Collection Method
5. Identification of Sampling Technique
6. Designing Data Collection Tool
7. Data Editing
8. Data Processing

Figure 3.1: Research Process
3.1 Formulation of Research Problem

Identifying the research problem requires understanding of the subject matter. To understand the subject matter, human being requires knowledge about it. Carper (1978) identified four fundamental ways of gathering knowledge named as Empirical (Factual knowledge from Science), Personal (understanding developed by personal belief, perception and experience), Ethical (attitude and understanding developed from moral quotient) and Aesthetic (based on past experience, reaction for some situation).

Beri (2007) had identified four methods of knowing, termed as:

i. Method of tenacity: It is a method which considers something as true because they are considered true since time immemorial
ii. Method of authority: This method says that human being accept truth as true because an authority (Social, Religious, Political etc.) says so.
iii. Method of intuition: In this method, truth is true because it is logical. It derives from reasoning but does not bear empirical support.
iv. Method of science: It is more reliable than others mentioned above. There is less chance of errors. It approaches learning as a series of small steps. Scientific approaches are limited to domains where relevant ideas can be quantified and objectively observed.

For the given study, method of science is applied to understand the research problems. To apply the method of science, a systematic review of relevant literature from science cited journals is carried out.

There is lower utilization of public health facilities in many developing countries (World Bank report, 2004). This lower utilization of facilities calls for assessment and assurance of healthcare service quality from user perspective. Though easy access to health facilities will not necessarily lead to appropriate utilization if people are not ready to make themselves available and use the healthcare facilities. If people are not satisfied, they will not use the facility. Therefore, without proper utilization and user satisfaction the effectiveness of the health service is strictly limited. Prior usage of the healthcare services is important which affects future behavior of the patient (Aday and Anderson, 1994). According to WHO (2000), user involvement is not only desirable, but also a social, economic and technical requirement.
There are studies that have used SERVQUAL and/or modified SERVQUAL model to measure service quality of healthcare services. Though SERVQUAL is considered to be a useful and valid instrument to measure service quality, it requires subsequent refinement of quality dimensions relevant to service considered (Curry, 1999). The factor structure/dimensions for the healthcare is not same in different countries (Cunningham, 1991: three factors in USA; Andaleeb, 1998: five factors in USA; Ovretveit, 2000: three factors in Sweden; Kilbourne et al., 2004: four factors in USA; Choi et al., 2005: three dimensions in South Korea; Vinagre and Neves, 2008: four dimensions in Portugal; Shaikh et al., 2008: five dimensions in Pakistan; Aagja and Garg, 2010: five dimensions in India; Padma et al., 2010: eight dimensions in India; Chahal and Kumari, 2010: three dimensions in India; Kumaraswamy, 2012: four dimensions in India; Aliman and Mohamad, 2013: five dimensions in Malaysia; Essain, 2013: five dimensions in Ghana; Shabbir and Malik, 2016: five dimensions in Pakistan Al-Neyadi et al., 2016: five dimensions in UAE; Lee, 2017: nine dimensions in South Korea).

It is suggested that the SERVQUAL model should be adapted as required (Parasuraman et al., 1988) and further testing and validation is required before any one factor structure has been accepted for the construct of the health care service quality (Aagja and Garg, 2010).

The studies (Aagja and Garg, 2010; Ahmed et al., 2017; Amin and Zahora, 2013; Behdioglu et al., 2017; Chahal and Kumari, 2010; Gupta and Rokade, 2016; Izadi et al., 2017; Lee, 2017; Owusu et al., 2017; Padma et al., 2010) that have used SERVQUAL model or modified SERVQUAL model lack measurement of only public healthcare service quality factors and considered public and private hospital service quality measurement or considered only private healthcare. There is also a need to consider rural and urban areas of the country for the measurement of public healthcare service quality as expectations and perceptions of people may differ based on the area of residence (Majumder and Upadhyay, 2004; Kamgnia et al., 2008).

The above studies lack either Indian context (Amin and Zahora, 2013; Izadi et al., 2017; Lee, 2017; Owusu et al., 2017), or true measurement as different customers were studied even though they have not spent at least one night at hospital (Chahal and Kumari, 2010; Behdioglu et al., 2017), or stand alone impact of public healthcare facilities (Padma et al., 2010; Kalepu, 2014; Owusu et al., 2017), or rural healthcare facilities (Aagja and Garg, 2010; Lee, 2017).
3.2 Identification of Research Objectives

Study objectives define the specific aims of the study and should be clearly stated in the introduction of the research protocol. Research objectives are framed based on the research problem identified and research questions aroused. To study the above research problems, the research focuses on the following objectives for healthcare facilities, Surat, India:

- To study factors contributing to the healthcare service quality
  a. To identify factors contributing to the healthcare service quality
  b. To confirm factors contributing to the healthcare service quality
- To study the impact of service quality perceptions on patient satisfaction and behavioural intention
- To study significance of length of stay at healthcare facility on service quality gaps
- To identify and compare the service quality gap independently for urban and rural respondents

3.3 Choice of Research Design

A research design is the detailed blueprint used to guide a research study towards its objective (Aaker et al., 2008). Research design constitutes detailed procedures for the collection, measurement, and analysis of data.

The classification of research design is as under:

![Diagram of Research Design]

Figure 3.2: Types of Research Design
**Exploratory Research Design**

Exploratory research focuses on discovery of ideas and insights. Research process is flexible and generally unstructured under this method. It focuses more on qualitative information. It is conducted to provide a better understanding of a situation. It is also known as theory building research design. An exploratory design is conducted about a research problem when there are few or no earlier studies to refer to. The focus is on gaining insights and familiarity for later investigation or undertaken when problems are in a preliminary stage of investigation (Cuthill, 2002; Taylor et al., 2002). It generally uses methods like Expert Survey, Case study, Focus group survey etc.

**Descriptive Research Design**

Descriptive research is usually concerned with describing a population with respect to important variables. Descriptive research is very common in business and other aspects of life. In fact, most of the marketing research we’ve heard about or participated in can be categorized as descriptive research. Descriptive research designs help provide answers to the questions of who, what, when, where, and how associated with a particular research problem; a descriptive study cannot conclusively ascertain answers to why. Descriptive research is used to obtain information concerning the current status of the phenomena and to describe "what exists" with respect to variables or conditions in a situation.

Based on time spent for gathering observation/responses, descriptive study is divided in two parts termed as longitudinal study and cross sectional study. Longitudinal study takes long time to collect response from the same respondent (for example measuring effect of medical treatment for acidity on patient). While cross sectional study takes short time as respondent need to visit once or twice to collect data (Malhotra et al., 2003).

**Causal Research Design**

Sometimes managers need stronger evidence that a particular action is likely to produce a particular outcome. Casual research design establishes cause and effect relationship. According to Beri (2007), there are mainly three methods of cause and effect relationship.
These are (1) Method of Agreement (2) Method of disagreement and (3) Method of Concomitant Variable.

Research design details the procedures necessary for obtaining the information needed to structure or solve research problems. The study uses Cross sectional Descriptive Research Design. Dimensions of healthcare service quality are studied through structured questionnaire and factors contributing to healthcare service quality are extracted using factor analysis. Relationships between service quality factors and patient satisfaction as well as behavioral intention have been studied through multiple regression. Significance of length of stay at healthcare facility on service quality gaps is measured through analysis of variance and post hoc analysis. Also, service quality gaps between urban and rural responses are identified through GAP score analysis and Leven’s test and Student’s t test.

3.4 Sources of Data and Data Collection Method

There are mainly two sources of data known as Primary source of data and Secondary source of data (Cooper and Schindler, 2008). Primary data are originated by a researcher for the specific purpose of addressing the problem at hand (Malhotra and Das, 2009). Primary data can be collected through mainly three methods such as Survey Method, Observation method and Experiment method.

Survey can be conducted using three methods personal survey, telephonic survey and mail survey (Internet based). While under observation method there are mainly three types of relationship that respondent and researcher have namely direct observation, concealment and participation. Direct observation is used when sample under study need to act naturally and need not to be part of data collection. In case of concealment method, sample under observation is unaware that he/she is observed. Whereas, third method is most widely used in developed nations under which sample participate in observation treatment itself (Cooper and Schindler, 2008).

For present study, primary data has been collected through structured questionnaire. The secondary data has been collected from journals, books, websites, reports of Government, thesis/dissertation work etc.
3.5 Identification of Sampling Technique

According to Malhotra et al., (2003) there are mainly two sampling techniques and a few sub techniques as under:

**Non Probability Sampling**

Nonprobability sampling is arbitrary and subjective (Cooper and Schindler, 2008). When we choose subjectively, we usually do so with a pattern or scheme in mind. Here, samples are gathered in a process that does not give all the individuals in the population equal chances of being selected. In any form of research, true random sampling is always difficult to achieve. Most researchers are bounded by time, money and workforce and because of these limitations,
it is almost impossible to randomly sample the entire population and it is often necessary to employ another sampling technique, the non-probability sampling technique.

Convenience sampling

It is most commonly used out of all available techniques. In this method, the samples are selected because they are accessible to the researcher. Subjects are chosen simply because they are easy to recruit. This technique is considered easiest, cheapest and least time consuming.

Quota sampling

The logic behind quota sampling is that certain relevant characteristics describe the dimensions of the population. If a sample has the same distribution on these characteristics, then it is likely to be representative of the population regarding other variables on which we have no control.

Judgement sampling

It is also known as purposive sampling. The subjects are selected with a specific purpose in mind and by researcher makes judgment about which samples are more fitted to the study compared to other individuals/items.

Snowball sampling

In the initial stage of snowball sampling, individuals are discovered and may or may not be selected through probability methods. This group is then used to refer the researcher to others who possess similar characteristics and who, in turn, identify others.

Probability Sampling

Probability sampling is based on the concept of random selection – a controlled procedure that assures that each population element is given a known nonzero chance of selection (Cooper and Schindler, 2008). The selection process is completely randomized and unbiased. It guarantees accuracy of the statistical methods after experiment. It is reliable method to remove sampling bias.
**Simple random sampling**

The unrestricted, simple random sample is the purest form of probability sampling. All probability samples must provide a nonzero probability of selection for each population element. The simple random sampling is the special case where each population element has a known and equal chance of selection.

**Systematic sampling**

In this approach, every $k^{th}$ element in the population is sampled, beginning with a random start of an element in the range of 1 to $k$. The $k^{th}$ element is determined by dividing the population size by sample size.

**Stratified sampling**

In this technique, the population is divided into non-overlapping sub groups named as strata. The basis of separation can be gender, social class, education level, religion, etc. The elements of each stratum are mutually exclusive in nature. Then the population is randomly sampled within each stratum.

**Cluster sampling**

Cluster sampling involves dividing up the population into clusters and assigning each element to one and only one cluster, in other words, an element can’t appear in more than one cluster and then selecting same no. of elements from each cluster.

The present study uses non-probability convenient sampling technique.

**Sample size calculations**

According to Nargundkar (2010), following formula could be used for sample size calculation for continuous or interval scaled variables.

$$n = \frac{z^2 \cdot s^2}{e^2}$$

Where, $n$ = sample size
\[ z = \text{the abscissa of the normal curve that cuts off an area } \alpha \text{ at the tails (} 1 - \alpha \text{ equals the desired confidence level, e.g., 95%), The value for ‘} z \text{‘ is found in statistical tables which contain the area under the normal curve.} \]

\[ e = \text{the desired level of precision (error)} \]
\[ s = \text{standard deviation} = \text{Range/6} \]

The \( z \) value represents \( z \) score from the standard normal distribution for the confidence level desired by the researcher. Generally 90 or 95 percent confidence is adequate for most marketing studies. For 95% confidence level, \( z = 1.96 \).

The ‘s’ represents standard deviation for the variable which is to be measured from the study. As samples are not taken yet, it is the unknown quantity. So, a rough estimate of ‘s’ as suggested by Nargundkar (2010) could be used. According to him \( s = \text{range/6} \). For the present study, as five point likert scale is being used, the range can be calculated as \( (5 - 1) = 4 \). So, \( s = 4/6 = 0.67 \).

The term ‘e’ is the level of precision or tolerable error and can be decided by the researcher. The lower the tolerance, the higher the sample size. Keeping this in mind, the current study considered ‘e’ as 0.05.

\[
\text{So required sample size } n = \frac{z^2s^2}{e^2} = \frac{(1.96)^2(0.67)^2}{0.05^2} = 689 \text{ (considered as 910)}
\]

3.6 Designing Data Collection Tool

Based on research design and sampling required, the data collection tool needs to be designed. There are commonly three tools used, known as Questionnaire, Personal Interview and Focus Group.

Questionnaire

Questionnaires have special strengths and weaknesses. They are useful in describing the characteristics of a large population and make large samples feasible. In one sense, these surveys are flexible, making it possible to ask many questions on a given topic. This also provides flexibility in the analysis of the responses. On the other hand, standardized
questionnaire items often represent the least common denominator in assessing people’s attitudes, orientations, circumstances, and experiences. By designing questions that will be appropriate for all respondents, it is possible to miss what is most appropriate to many of the respondents (Babbie, 1992).

**Personal Interview**

The interview is an alternative method of collecting survey data. Rather than asking respondents to fill out questionnaire, interviewers ask questions orally and record respondents’ answers. This type of survey generally decreases the number of “do not know” and “no answer” responses, compared with surveys using questionnaire. Interviewers also provide a guard against confusing items. If a respondent has misunderstood a question, the interviewer can clarify, thereby obtaining relevant responses (Babbie, 1992).

**Focus Group**

Another method of collecting information is the focus group. Focus groups are useful in obtaining a particular kind of information that would be difficult to obtain using other methodologies. A focus group typically can be defined as a group of people who possess certain characteristics and provide information of a qualitative nature in a focused discussion.
For the present study, to develop the construct and measure it, it is decided to develop a survey questionnaire. A five point likert scale has been used to measure hospital service quality, patient satisfaction and behavioral intention. The statements/items are taken from the existing pool of studies (Carman, 1990; Rust and Oliver, 1994; Johnston, 1997; MBNQA, 2007; Duggirala et al., 2008; Aagja and Garg, 2010; Chachal and Kumari, 2010; Padma et al., 2010; Amin and Zahora, 2013) undertaken for measuring service quality dimensions for healthcare services. Statements related to patient satisfaction have been borrowed from several studies (Fornell et al., 1996; Lee, 2000; Badri et al., 2009; Choi and Kim, 2013; Rao and Panda, 2015; Murti et al., 2013a; b). Behavioral intention was captured and presented by earlier researches and borrowed for the present study (Woodside et al., 1989; Zeithaml et al., 1996; Yim et al., 2008; Badri et al., 2009; Li et al., 2011; Murti et al., 2013a; b).

The questionnaire has been divided into four parts. First part contains demographic details of the respondents. Part two and three contain statements of expectations and perceptions respectively, regarding specific aspects of healthcare services. Fourth part contains statements related to satisfaction and behavioral intention. Response was captured on above dimensions using five-point likert scale (1 being strongly disagree and 5 being strongly agree). Statements used in the present study were selected based on the review of similar existing studies in the field of healthcare service quality measurement. The following table details the same.

Table 3.1: Variables Identified for the study

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Items/Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carman, 1990; Aagja and Garg, 2010; Amin and Zahora, 2013</td>
<td>Prompt Admission, Polite admission handling employees, Handling emergency situations well, Well-functioning ambulance services</td>
</tr>
<tr>
<td>Aagja and Garg, 2010; Amin and Zahora, 2013</td>
<td>Knowledgeable and experienced physicians, nurses and staff members, Precautions to prevent hospital - acquired infection to the patient.</td>
</tr>
<tr>
<td>Source</td>
<td>Items</td>
</tr>
<tr>
<td>--------</td>
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</tr>
<tr>
<td>Aagja and Garg, 2010; Amin and Zahora, 2013</td>
<td>Visually appealing materials associated with the service (such as pamphlets or statements), Visually attractive and comfortable facilities, Clean washrooms and wards, Sincere interest in solving patients’ problems, Dependable service providers, Prompt service to patients, Willing to help patients, Never be too busy to respond to patient’s request, Patient’s best interests at heart, Explanation of precautions to be taken by patients after discharge (medicines to be taken, diet restrictions, etc.)</td>
</tr>
<tr>
<td>Carman, 1990; Aagja and Garg, 2010; Amin and Zahora, 2013</td>
<td>Prompt discharge, Explanation of the discharge process, Employees handling discharge know the needs of patients, Explanation of precautions to be taken by patients after discharge (medicines to be taken, diet restrictions, etc.)</td>
</tr>
<tr>
<td>Johnston, 1997; MBNQA, 2007; Duggirala et al., 2008; Padma et al., 2010</td>
<td>Providing equal treatment to everyone, A sense of responsibility, i.e. they should be regular, punctual, sincere.</td>
</tr>
<tr>
<td>Fornell et al., 1996; Lee, 2000; Badri et al., 2009; Choi and Kim, 2013; Rao and Panda, 2015; Murti et al., 2013a; b</td>
<td>Satisfied with the decision to visit the center/hospital, Having good experience, Satisfaction with the services with respect to expectation, Overall satisfaction with the services</td>
</tr>
<tr>
<td>Woodside et al., 1989; Zeithaml et al., 1996; Yim et al., 2008; Badri et al., 2009; Gaur et al., 2011; Li et al., 2011; Murti et al., 2013a; b</td>
<td>Intention to return to the center/hospital when need arises, Feel comfortable recommending the center/hospital to friends, Would recommend the center/hospital to the family</td>
</tr>
</tbody>
</table>

Based on comparison by reading, repetitive items were excluded and a comprehensive list of items to measure the construct was prepared for semi structure feedback. Under semi structure feedback, the items were administrated by two experts involved with healthcare sector and two experts from academic/research field. A rough draft of questionnaire with 24 statement was prepared for measuring public healthcare service quality, on the basis of existing literature and...
semi structured feedback from experts. Two bilingual experts in English and Gujarati (local language) translated it in Gujarati in order to capture true responses from the respondents.

To test face validity, the questionnaire was pilot tested by 77 respondents. According to Polit et al. (2001), a pilot study can be used as a trial run or small scale version of the whole study. Principally, it is used to pretest a research instrument (Baker, 1994). According to respondents, the questions were clear and language used was appropriate. As the study excludes patients from emergency department, and the patients have not used ambulance services and emergency services, two of the items related to these services were found to be irrelevant and removed from the questionnaire. The final questionnaire consists of 22 statements to measure service quality, four statements to measure patient satisfaction and three statements to measure behavioral intention for public healthcare facilities in Indian context.

The final questionnaire with 22 statements for measurement of healthcare service quality, four statements to measure patient satisfaction and three statements to measure behavioral intention was used to collect data. The present study uses non-probability convenient sampling technique. The sampling unit was the patients who received inpatient services and stayed at least overnight in the healthcare facility (health center/hospital). The permission has been taken from the center/hospital authorities to conduct a survey at their premises. Patients were approached and have been explained purpose of the study. A verbal consent of patients has been taken before asking questions regarding the services. A structured questionnaire was used for data collection and it was translated into Gujarati language. Currently, there are fourteen CHCs (Community Health Centers), fifty one PHCs (Primary Health Centers) and 3 public hospitals in the district of Surat (Ministry of health and family welfare report, Government of Gujarat, 2015). From rural area, ten Community Health Centers (CHC) and twenty eight Primary Health Centers (PHC) and from urban area two public hospitals are considered to collect data. A total of 1090 questionnaires were distributed (of which 510 questionnaires to urban and 580 questionnaires to rural respondents) and total 933 respondents have responded to the same. Response rate of 85.6% is achieved, probably, due to personal touch of the researcher and constant follow ups.
3.7 Data Editing

Editing is the process of checking and adjusting the data gathered for omissions, legibility and consistency. Mainly data are edited to maintain consistency and completeness. Coding involves assigning numbers or other symbols to answers so the responses can be grouped into limited number of classes or categories. The classifying of the data into limited categories sacrifices some data detail but is necessary for efficient analysis.

The collected data used to be edited for the following reasons: (1) To remove partially filled questionnaire (2) To remove questionnaire with improper filling (Like duplication of filling, non-readable hand writing in case of open ended question, improper tick marking, multiple ticking, incomplete responses etc.).

Out of 933 responses, after deleting 23 (17 from rural and six from urban respondents) erroneous responses (ambiguous and/or missing responses and/or multiple ticking), a total of 910 (415 from rural area and 495 from urban area) responses are considered for data analysis.

3.8 Data Processing

Data processing means nothing but applying necessary statistical tools and techniques to generalize the results. Data processing helps to understand the nature of the data and extracts the information required for generalization. The collected data are processed using Statistical Package for Social Science (SPSS) version 21.0 and Analysis of a Moment Structures (AMOS) version 21.0. The various statistical techniques applied for the data are charted as under:
Figure 3.5: Data Processing Methodology

- **Objectives of the study**
  - To study factors contributing to the healthcare service quality
    - **Statistical Tools used for analysis**
      - Exploratory Factor Analysis
      - Confirmatory Factor Analysis
  - To study the impact of service quality perceptions on patient satisfaction and behavioral intention
    - Multiple Regression Analysis
  - To study significance of length of stay at healthcare facility on service quality gaps
    - Analysis of Variance (ANOVA) and Post-Hoc Analysis
  - To identify and compare the service quality gap independently for urban and rural respondents
    - GAP score analysis
    - Levene's test and Student's t test