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Healthcare Quality: Waiting Room Issues

By

Vineeth Yeddula

A THESIS

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Healthcare Quality: Waiting Room Issues

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In today's hyper-competitive market, customers are faced with many different options when deciding on a specific healthcare provider. Due to the varying options, quality and service stand out as two essential elements that influence the selection process. If the quality is not met, the healthcare organizations have to face several issues such as customer retention, value, safety, litigation, and reputation. Patient satisfaction has emerged as an increasingly important parameter in the assessment of health care quality. Waiting time is considered to be an important determinant of patient satisfaction. As patients experience a greater squeeze on their time, short waits seem longer than even before. If the healthcare organizations can improve patients' perceptions of the time they spend waiting, then patients will experience less frustration and may feel more satisfied with the services.

This thesis examines patients' perceptions of waiting and investigates methods for making waiting more tolerable. The purpose of this study was to measure changes in patient's perceptions of waiting and overall satisfaction under specific conditions. The methods developed in this study were validated through a case study which was performed in a radiology department waiting room in a regional medical center in Grand Island, Nebraska. The study was conducted in three phases: the pre-intervention phase served as control. Regression analysis and ANOVA were performed to determine the effect of independent variables on the overall satisfaction and

the gap between perceived and actual waiting time; In the development of an intervention strategy phase, the independent variables that were found to be statistically significant in phase 1 were identified and manipulated; in the post-intervention phase, the analysis was performed in a similar way as pre-intervention phase.

It was found that as perceived waiting time increases, patient satisfaction tends to decrease. This study also confirmed that the post-intervention phase improved the overall satisfaction compared to the pre-intervention phase. In addition, it was found that the gap between the perceived and actual waiting times was not reduced from pre-intervention to post-intervention phases. It was also found that occupied patients (involved in an activity during their wait) had higher satisfaction levels and lower gap compared to that of unoccupied patients (sitting idle).

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Chapter 1

INTRODUCTION

1.1 Background

Health care quality is “the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with the current professional knowledge” (Institute of Medicine, 1990). Despite extensive research on defining and measuring health care quality, little attention has been given to patient’s perspectives of high-quality health care. Feedback collection is one of the prominent techniques that is used to measure the patient’s perspectives (Sugandhi, 2002). Feedback collection from the patient is essential for the provider to ascertain patient satisfaction and scope for improvisation. The benefits of customer loyalty to a provider of either services or products are numerous, and thus organizations are eager to secure as significant a loyal customer base as possible.

Patient satisfaction is a concept that has been receiving increasing attention reflecting an evolving focus in the service-oriented health care market (Umar, 2011). Understanding satisfaction and health care quality have been recognized as critical to developing many improvement strategies (ACHE, 2006). The inaugural quality work of Donabedian identified the importance of patient satisfaction as well as provided much of the basis for research in the area of quality in healthcare (Donabedian, 1980). In the healthcare sector, the importance of measuring patient satisfaction is well articulated and has been studied and measured extensively as a stand-alone construct and as a component of outcome quality. The concept of satisfaction is complicated, irrespective of the area in which it is studied. It is a multidimensional concept; not yet tightly defined; and part of an apparently yet to be determined complex model.

Historically, the health care sectors which are interested in obtaining high levels of patient satisfaction have focused on using knowledgeable, pleasant physicians and staff to deliver high quality care to the patients. In today's environment, this approach is insufficient. Changes in American lifestyles have profoundly altered patient's values. Timely delivery of the service with minimal waiting time has become one of the important predictor's of quality for the patients. The patients consider waiting as inactive, wasted or lost opportunity time (Katz 1991, Dansky 1997). To attain higher levels of patient satisfaction, the health care organizations need to focus on making the customers feel that they are wasting as little time as possible.

1.2 Scope of Thesis

This thesis examined patient's perceptions of waiting in a health care setting, and focused on methods for making waiting time more tolerable. The methods developed are validated through a case study. Rather than taking an operational approach, such as considering the effects of reducing actual waiting times on patient satisfaction, this paper focused primarily on "Perceptions Management". The premise is that manipulating patients' perceptions of the waiting experience can be as effective as reducing the actual length of wait.

1.3 Overview of the Chapters

The thesis is presented in the following chapters. Chapter 2 reviews the literature on the concepts of quality and its measurement, patient satisfaction and the different factors affecting it. Chapter 3 develops the rationale and methodology for this research. Chapter 4 presents the results obtained from the case study. Chapter 5 is a discussion of the results and conclusion for future research.

Chapter 2

LITERATURE REVIEW

2.1 Quality

The quality movement has its roots from the late 13th century. The birth of total quality in the United States came as a direct response to the quality revolution in Japan following the World War II. New quality systems have evolved from the foundations of Deming, Juran and the early Japanese practitioners of quality.

Quality is a difficult concept to define with any precision. The most fundamental definition of a quality product is one that meets the expectations of the customer. Gilmore (1974) defines quality as “conformance to specifications”. Juran (1979) describes it as “fitness for use”. Crosby (1979) describes quality as an elusive and indistinct construct. Often mistaken for imprecise adjectives like “goodness, or luxury, or shininess, or weight”. Parasuraman et al. (1985) defined it as “meeting and/or exceeding the customer expectations”. A number of scholars in the quality field defined quality regardless of the time and context in which it is examined. When a survey was conducted on quality, the executives ranked ‘improving service and product quality’ as the biggest challenge facing the United States businesses today (Zeithaml et al., 1990).

2.2 Why is Quality Important for a Business?

The basic model behind most organizations is to create products or services and sell them to customers for profit. The products or services produced must have a certain “quality” standard expected by the customers. If the quality is not met, there are several consequences that the

organizations have to face: customer retention, value, safety, litigation, and reputation. Therefore, satisfying the customers by producing quality products or services is very important for organizations. The following section gives a brief explanation and importance of customer satisfaction.

2.3 Customer Satisfaction

Customer satisfaction has been the subject of considerable research and has been defined and measured in various ways (Oliver, 1997). Customer satisfaction may be defined as the customer's fulfillment response to a consumption experience, or some part of it.

Feedback collection from the customer is essential for the supplier to ascertain customer satisfaction and scope for improvisation (Sugandhi, 2002). The benefits of customer loyalty to a provider of either services or products are numerous, and thus organizations are eager to secure as significant a loyal customer base as possible (Gefen, 2002; Reinartz & Kumar, 2003; Rowley & Dawes, 2000).

The business performance can be improved by enhancing customer satisfaction and driving up customer loyalty. Satisfaction increases because customer insight allows companies to understand their customers better, and create improved customer value propositions. As customer satisfaction rises, so does customer repurchase intention (Anderson, 1994). This in turn influences actual purchasing behavior, which has a significant impact on business performance. Figure 2 -1 shows the customer satisfaction model.

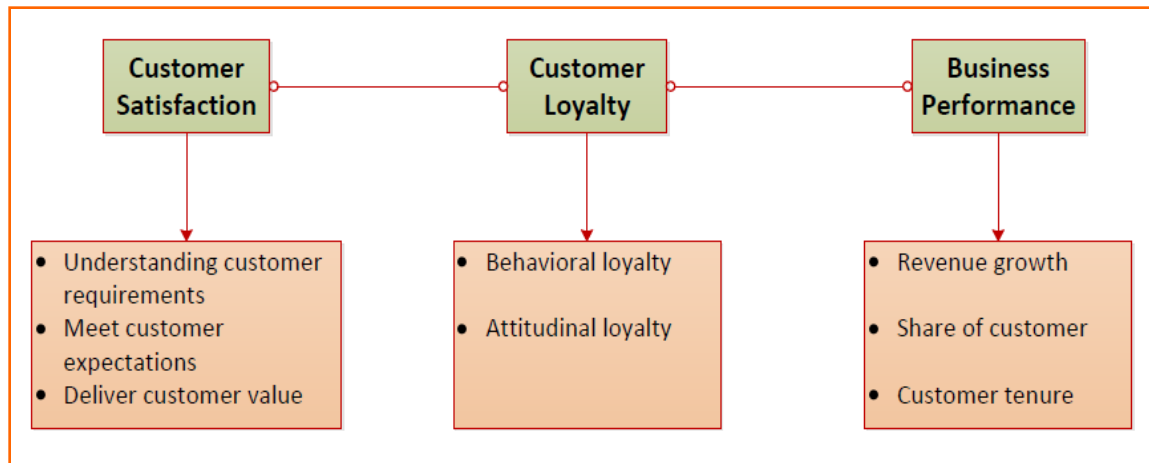


Figure 2-1 Customer Satisfaction Model (Buttle, 2004)

Studies conducted by Cronin and Taylor (1992) in service sectors such as: banking, pest control, dry cleaning, and fast food; found that customer satisfaction has a significant effect on purchase intentions in all four sectors. Similarly, in the health-care sector, McAlexander et al. (1994) found that patient satisfaction and service quality have a significant effect on future purchase intentions.

Therefore, for a business to succeed, a company has to offer higher quality level products or services than its competitor. Over the years, quality has moved beyond manufacturing into service, healthcare, education, and government sectors. Survey responses from 358 of the largest manufacturing and service corporations revealed that the quality management systems have been thoroughly developed by manufacturing firms relative to service companies (Charles & William, 1999). Therefore a lot of research on quality needs to be done in the service industries. The following section gives a brief idea about the importance of quality in service industries.

2.4 Importance of Quality in Service Industries:

Service industries are playing an increasingly important role in the overall economy of the United States (Koepp 1987; Bateson 1989). In fact, the proportion of the U.S population employed in the service sector increased from 30% in 1900 to 74% in 1984 (Bateson 1989). This sector is continuously increasing as 85% of the jobs created since 1982 have been in service industries (Koepp 1987). There even appears to be executive consensus in the United States that service quality is one of the most important problems facing management today (Blackiston 1988; Langevin 1988).

According to Albrecht & Zemke (1985), an average customer who has had a problem will tell 9 or 10 others about it. Customers who have had complaints resolved satisfactorily will tell only about 5 others. Studies conducted by Technical Assistance Research Programs, Inc., revealed that:

- The average company never hears from 96 percent of its unhappy customers,
- For every complaint received, the company has 24 customers with problems, 6 of which are serious,
- Of the customers who make a complaint, more than half will do business again with that organization if their complaint is resolved, and
- If the customer feels that the complaint was resolved quickly, this figure jumps to 95 percent.

Considering all these factors, the interest in the measurement of service quality is thus understandably high. The service providers' wanted to position themselves more successfully in

the marketplace by delivering higher levels of service quality (Parasuraman, Zeithaml and Berry, 1986).

2.5 Service Quality

The importance of quality in services cannot be underestimated. Quality of a particular service is *whatever the customer perceives it to be*. Service quality as perceived by the customer may differ from the quality of the service actually delivered. According to Parasuraman et al. (2006), the service quality is defined as “the degree and direction of discrepancy between customers’ service perceptions and expectations”. Norman (1984) describes service as a “social act which takes place in direct contact between the customer and representatives of the service company”.

2.5.1 Dimensions of Service Quality

Garvin (1987) developed a list of 8 dimensions of product quality: performance, features, reliability, conformance, durability, serviceability, aesthetics and perceived quality. It was suggested that these dimensions are applicable to both products and services (Garvin 1987; Stevenson 1999; Chakrapani 1998). According to Victor et. al (2001), difficulties arise when one tries to use these dimensions as the service characteristics differ from product characteristics.

Evans and Lindsay (1999) proposed 8 dimensions for service quality: time, timeliness, completeness, courtesy, consistency, accessibility and convenience, accuracy and responsiveness. These dimensions represented an improvement over the application of Garvin’s product dimensions. However, no empirical basis has been provided for these dimensions.

Parasuraman et al. (1988) developed five dimensions of service quality: tangibles, reliability, responsiveness, assurance and empathy. These dimensions were developed and tested in a bank, credit card company, repair and maintenance company, and long-distance telephone company. These dimensions have been incorporated into the SERVQUAL instrument. However, Babakus (1992) and Cronin (1992) have identified potential difficulties related to the SERVQUAL instrument.

Chakrapani (1998) developed a simpler service quality model consisting of just three dimensions: aspects of the product/service, dependability and exceeding expectations. Simplicity and generalizability reduce the applicability of these dimensions.

Based on the above discussion, service organizations have special requirements that manufacturing systems cannot fulfill. It is clear that the unique features in service industries that determine quality differ from manufacturing. The quality measures in manufacturing such as scrap, rework, defects and output are easy to measure. Measuring of service standards, particularly those related to human behavior are often set judgmentally and difficult to measure. Customer perceptions are very critical and are very difficult to define for service industries.

Among all the service industries, the health care industry is one of the world's largest and fastest-growing industries. The national spending on health care has exceeded \$1 trillion (approximately 14% of the GDP) and is expected to increase over the next decade (Heffler, 2003). There is a lot of need to improve the quality in health care to improve the safety of the patients and reduce the growing costs.

2.6 Quality in Healthcare

Health care quality is “the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with the current professional knowledge” (Institute of Medicine, 1990). There is notable consumer dissatisfaction with the current health care system in U.S. According to recent results of the Consumer Assessment of Health Plans Study (CAHPS), 15 to 27% of health care consumers in the U.S. reported problems getting needed care (Leatherman, 2002). According to a study, it was found that “the adults receive the recommended medical treatment only 55 percent of the time” (Asch, 2006).

Medication safety has become a big concern in the recent years. Attention to medical errors escalated over the past few years with the release of a study from the Institute of Medicine (IOM), *To Err is Human* (2000), which found that between 44,000 to 98,000 Americans die each year in U.S hospitals due to preventable medical errors. Hospital errors rank between the fifth and eighth leading cause of death, killing more Americans than breast cancer, traffic accidents or AIDS. Study by Barker et al (2002) of 36 facilities (hospitals and nursing homes) found that the administration error rate averaged 19% (or nearly 1 of every 5 doses in the typical hospital and nursing home), and there were no statistically significant differences between hospitals and nursing home rates. Of the medication errors, about 7% were rated potentially harmful. In another study of a LTC facility, 68% of errors reported by nurses occurred at the administration stage (Handler et al, 2004). A study also estimated the costs of emergency room visits per preventable adverse drug event to be \$10,375 (Jha et al, 2001).

The problems in the health care quality are not simply the result of the deficiencies of a few health care providers; systems are responsible as well (IOM, 2001). Therefore, assessment is necessary to improve the quality in health care.

One way to assess and track quality of care is by using measures that are based on the latest scientific evidence. According to the Agency for Healthcare Research and Quality (AHRQ), quality measurement is critically important in health care as it can play a significant role in the:

- Outcomes of health care,
- Health care costs, and
- Consumer information and choice.

2.7 Quality Measurement

A quality measure is information which is obtained from a patient's record or an operational process that is converted into a rate, time or percentage that shows how well the providers are taking care of their patients.

Quality measurement is a relatively new science which requires a large amount of resources to develop and collect the information. Health care quality measurement and reporting activities have grown rapidly over the past few years. Measurement and reporting efforts are now supported by diverse stakeholders for many different reasons: government regulation, marketing, private accreditation, enhanced consumer and purchaser decision-making, increased accountability of providers, and quality improvement activities (Marshall et al., 2000).

Many public and private groups are working to improve and expand health care quality measures. The goal is to make these measures more reliable, uniform, and helpful to consumers in making health care choices. There are several analytic frameworks that have been endorsed nationally to improve the quality measures in healthcare. The analytic framework is briefly described below.

2.7.1 Donabedian's Model

The measures that are used to assess and compare the quality of health care organizations are basically classified into three types: structure, process and outcome. This three-component approach known as the Donabedian model was named after the physician and researcher who formulated it (HCS, 2006).

Donabedian's model proposes that each component has a direct influence on the next, as represented by the arrows in the schematic diagram below (Donabedian, 1980).

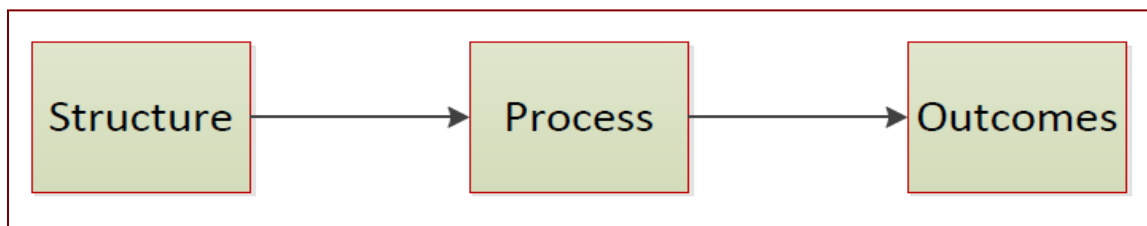


Figure 2-2 Donabedian's Model (Donabedian, 1980)

2.7.1.1 Structural Measures

Structural measures give a sense of the health care provider's physical equipment and facilities. This includes the provider's capacity, systems and processes to provide high – quality care. The examples are listed below.

- The number of board certified physicians,
- Number of licensed beds in a hospital, and
- Whether the organization uses electronic medical records.

2.7.1.2 Process Measures

According to Agency for Healthcare Research and Quality (AHRQ), “Process measures indicate what a provider does to maintain or improve health, either for healthy people or for those diagnosed with a health care condition”. The examples are listed below.

- The percentage of heart failure patients who received discharge instructions,
- The percentage of eligible patients for whom blood culture was performed in the Emergency Department (ED) prior to initial antibiotic received in hospital,
- Antibiotic Timing (Median) for pneumonia patients, and
- The percentage of patients that receive aspirin on arrival.

Process measures help the consumers to know what kind of medical care that they may expect for a given medical condition. The majority of quality measures that are being used for public reporting are process measures.

2.7.1.3 Outcome Measures

Outcome measures are the results of the health care services or intervention on the health status of the patients. The examples are listed below.

- The rate of surgical complications or hospital-acquired conditions, and
- The mortality rate of a hospital.

According to Schoebaum (1995), both outcome measures like mortality rates and process measures are very useful for improving the quality of care. Even though, the outcome measures seem to represent the “bottom line”, there are several factors, many beyond to providers’ control that contribute to the mortality.

2.7.2 IOM’s Six Aims

In the report, *Crossing the Quality Chasm: A New Health System for the 21st Century* (IOM, 2001), the Institute Of Medicine (IOM) documented the quality shortcomings in the U.S healthcare system. The report also recommends the following six aims for improvement as follows:

- **Safe** – avoiding injuries to patients,
- **Effective** – providing services based on scientific knowledge,
- **Patient-centered** - providing care that is respectful,
- **Timely** - reducing waits and sometimes harmful delays,
- **Efficient** - avoiding waste, and
- **Equitable** - providing care that does not vary in quality because of personal characteristics.

2.7.3 CMS’s Priority Chronic Conditions

Several organizations like Centers for Medicare & Medicaid Services (CMS), Agency for Healthcare Research and Quality (AHRQ), Food and Drug Administration (FDA), and other stakeholders recently identified 10 priority conditions: *Ischemic heart disease; cancer; chronic obstructive pulmonary disease/asthma; stroke, including hypertension; arthritis and*

nontraumatic joint disorders; diabetes mellitus; dementia, including Alzheimer's disease; pneumonia; peptic ulcer/dyspepsia; and depression and other mood disorders that account for the majority of the disease burden and service utilization for the population aged older than 65 (AHRQ, 2004). There has been a lot of research that is being done across the nation to investigate the effectiveness of interventions targeting these conditions (Sprangers 2000, Cieza 2004).

2.7.4 Patient Satisfaction

Patient satisfaction has emerged as an increasingly important parameter in the assessment of health care quality (Umar, 2011). In today's hyper-competitive market, individuals are faced with many different options when deciding on a specific healthcare provider. Due to the varying options, quality and service stand out as two essential elements that influence the selection process. The issue of patient satisfaction has gained increasing attention from the executives across the healthcare industry. The measurement of patient satisfaction through patient satisfaction surveys has helped organizational leaders incorporate patient perspectives as a way to create a culture where service is deemed an important strategic goal for healthcare facilities. However, despite their many efforts and successes with satisfaction measurement, evidence shows that more work in this area is still needed (ACHE, 2006).

Hospitals have traditionally focused on delivering quality medical care according to some set of standards that are established internally and by several organizations like Joint Commission on Accreditation of Healthcare Organizations (JCAHO), Agency for Healthcare Research and Quality (AHRQ), Institute for Healthcare Improvement (IHI) etc. However, it is

recognized that patients' perceptions on quality are equally important. Maister's (1985) proposes a formula for satisfaction in service encounters called as "First Law of Service":

$$\text{Satisfaction} = \text{Perception} - \text{Expectation}$$

According to Maister (1985), "If you expect a certain level of service, and perceive the service reviewed to be higher, you are a satisfied client. If you perceive the same level as before, but expected higher, you are disappointed and, consequently, a dissatisfied client".

2.8 Factors Affecting Patient Satisfaction:

There are several factors affecting patient satisfaction: getting attention from doctors, time taken to get appointments, opening hours, waiting time, costs, convenience, treatment quality, pain management, and nurse communication (Nana 2010, Kane 1997, Swan 1985, Tengilimogulu 1999). The literature on patient satisfaction with primary care indicates that key attributes of health care valued by patients are patient-centered, including time spent with the physician, willingness of the physician to listen to the patient, and expectations for treatment (Brody 1989, Peck 2001, Anderson 2002, Leddy 2003). Sahin (2006) conducted research on the factors affecting patient satisfaction. The following five dimensions were found to be statistically significant: doctor competency, provision of information, quality of care, waiting time, and hospital quality.

A source of dissatisfaction with healthcare, often noted by patients, is the amount of time they wait during their clinic visit. For example, in a survey reported by Medical Economics, patients were asked to list their three important expectations regarding medical care. Forty eight percent of respondents replied that being able to get an appointment quickly was important to

them, and 44% noted that going to a doctor who spends enough time with them was critical. Thirty four percent respondents listed a short waiting time in the doctor's office as one of their three most important requirements (Murray, 1995). Several studies have documented the relationship between waiting for service and the overall satisfaction (Katz, 1991; Leddy, 1993; Dansky, 1997; Taylor, 2004; Febian, 2006).

2.8.1 Relationship Between Wait Time and Patient Satisfaction

The patients consider waiting as inactive, wasted or lost opportunity time. It was found that the patient satisfaction decreased with longer waiting times (Katz 1991, Dansky 1997). The strength of the correlation between waiting time and the patient satisfaction varies across the literature. A study conducted from the responses of a national cross-sectional, online survey of patient's satisfaction revealed that longer waiting times were associated with lower patient satisfaction (Anderson, 2007). Camacho (2006) found that the increased waits decreased willingness to return for service (odds decrease by 2% per minute).

Majority of the research conducted was in the emergency departments where the level of patient discomfort may be high (Mowen 1993, Thompson 1995, Trout 2000, Boudreaux 2004, Taylor 2004). According to Febian (2006), the results obtained from the emergency department may not be applied to the primary and specialty care settings due to the differences in the care. However, most of the studies that were conducted in primary care outpatient settings find a detectable relationship between waiting times and patient satisfaction (Huang 1994, Probst 1997, Zoller 2001, Bar-Dayyan 2002, Leddy 2003, Van Uden 2005). According to a study conducted in 18 primary and specialty care clinics, it was found that reducing waiting time may lead to increased patient satisfaction and greater willingness to return (Camacho et. al., 2006).

Therefore, to attain higher levels of patient satisfaction, the health care organizations should focus on making the customers feel that they are wasting as little time as possible. This can be majorly accomplished through operations management and perceptions management.

2.9 Operations Management Approach

Traditional operations management theory focuses on physically reducing the length of the wait in line. The concept of operations management of waiting lines (queues) has received a great attention from academic researchers and the results have been successfully applied in various settings. *“What has been relatively neglected, however, is much substantive discussion of the experience of waiting”* (Maister, 1985).

Most of the work accomplished in this area deals with the objective reality of various techniques: effects of the wait time by adding more servers, altering the queue discipline, and improving the customer times (Maister, 1985). This can be achieved by increasing the productivity and or by increasing the staffing levels. Increasing the staffing levels can prove to be very expensive particularly in tough economic situations like this. One of the characteristics of services is that they cannot be carried or stored in the inventory and that demand may be unpredictable (Zeithmal, Parasuraman and Berry 1985). The factors discussed above limits the usage of operations management approach in services.

2.10 Perceptions Management Approach

An alternate way to improve patient satisfaction is to directly manipulate the customer perceptions of waiting. When it comes to the patient’s perception of waits in a hospital, the staff’s opinion – even if backed up by hard data doesn’t hold much affect. The logic behind

perceptions management approach is that customer's perception is their reality and this is because experiences are subjective. A major advantage of this approach is that it is often economical to implement. Previous studies in perceptions management approach focused on customer perceptions of the wait and how this can be affected by several factors. Maister (1985) proposed eight principles which organizations can use to influence the customers' satisfaction with waiting times. The eight principles are listed below.

- Unoccupied time feels longer than occupied time.
- Pre-process waits feel longer than in-process waits.
- Anxiety makes waits seem longer.
- Uncertain waits are longer than known, finite waits.
- Unexplained waits are longer than explained waits.
- Unfair waits are longer than equitable waits.
- The more valuable the service, the longer the customer will wait.
- Solo waits feel longer than group waits.

Studies have investigated the effects of waiting time fillers on consumer perceptions of waiting times (Katz, 1991; Pruyn & Smidts, 1998; Taylor, 1994). The research done by Katz (1991) is based on the idea of changing the waiting time into experienced time by "entertaining, enlightening and engaging" the consumer. Hui and Tse (1996) reported positive effects of information about expected duration on wait evaluations. There were some positive effects reported when entertainment, such as television programs and music was provided (Hui, Dube, & Chebat, 1997; Pruyn & Smidts, 1998). Majority of the research in this area primarily revolves around three factors: actual waiting time, perceived waiting time, and the gap between them.

2.10.1 Actual Wait, Perceived Wait and Gap

It is clear from the research that many organizations have tried the obvious approach of managing actual wait time through operations management. Some of the examples are modifying the service delivery systems (Shostack, 1987), conducting maintenance at night, or differential pricing to shift demand (Maister, 1985; Taylor, 1994, 1995). According to McDonnell (2002), if the organization cannot control the actual duration of the wait, it should consider how it might manipulate the perceived waiting time. According to Katz et al (1991), the customer satisfaction typically decreases as the perceived waiting time increases. The perceived waiting time is often different from actual waiting time (Taylor, 1994). This means identifying and improving the variables that influence the perceptions of waiting could improve patient's perceptions regarding wait time.

Frédéric (2007) found that the determinant of customer waiting satisfaction includes the perceived waiting time, providing information in case of delays and the waiting environment. Many studies revealed that the consumers overestimate the time that they spend waiting (Hornik, 1984; Katz, 1991; Larson 1987). According to Becker (2008), the patients tend to overestimate shorter waiting times and underestimate the longer waiting times. Wasseem (2003) conducted a study in an urban pediatric emergency department (ED) and found that majority (84%) of parents' overestimated waiting time in the ED. Both actual and perceived wait times that exceeded 2 hours were associated with parental dissatisfaction. A retrospective study of 50,000 patients attending emergency department revealed that there is a considerable difference between perceived and actual waiting times (Sherif, 2011).

A study conducted in ambulatory healthcare services examined two management techniques to alter perceptions of waiting. Regression analysis revealed that ‘informing patients how long their wait would be’ and ‘being occupied’ were significant predictors of patient satisfaction (Dansky, 1997). Anita (2009) investigated the factors that influence the gap between caller’s perceived and actual waiting time in a corporation’s call center. It was found that the satisfaction decreases as the gap increases.

2.11 Summary of Literature Review

Patient satisfaction is a concept that has been receiving increasing attention in the past few years. Waiting time is considered to be an important yet understudied determinant of patient satisfaction. Over the years, wait management has been studied by researchers as an important aspect. It has been well recognized as a factor influencing satisfaction in many other service industries like banks, restaurants etc. but not as frequently in health care. This is an important subject because of the increasing value of time for patients. As they experience a greater squeeze on their time, short waits seem longer to them than ever before. Therefore, to attain higher levels of patient satisfaction levels, the hospitals need to focus on making patients’ feel that they are wasting as little time as possible.

Many firms have tried the obvious approach to the problem, which is managing the actual wait time through operations management. But, the experience of waiting is relatively less studied. In the perceptual wait management literature, some studies have investigated waiting times for different services (Hornik, 1984; Katz, 1991; Pruyn and Smidts, 1991; Taylor, 1994, Dansky, 1997; Anita, 2009). In these studies, researchers generally have been focused more on the relation between actual and perceived waiting times and their effect on customer satisfaction.

Furthermore, studies have investigated the effects of waiting time fillers on customer satisfaction and perceived waiting times (e.g. Katz, 1991; Taylor, 1994). These studies are based on the idea of changing waiting time into experienced time by “entertaining, enlightening and engaging” the customer (Katz, 1991). The waiting time fillers that were provided in the previous studies include: music (Baker, 1996; Chebat, 1993), ambient scent (McDonnel, 2002), duration information (Katz, 1991), television (Hogan, 1978; Pruyn and Smidts, 1998), and News (Katz, 1991).

2.12 Critique of the Literature

- Although there has been a considerable research conducted to “fill up” the wait time in a constructive way, it is difficult to leverage these into all the service sectors. There can be circumstances where a service firm may choose to fill the time with an unrelated activity. For example, providing weighing machines, eye charts might help to fill up the wait time in a clinic but not in a bank. This suggests that the activity provided to ‘fill time’ should be related, in some way, to the following service encounter.
- Neither of the waiting time studies reviewed explicitly focused on studying the activities in the waiting area in a hospital setting. They mainly focused on one or two particular activities such as music and television. The literature on waiting time and the gap between perceived and waiting times on the patient satisfaction is muddled at best and hence that is the focus of this study.

2.13 Objectives

The specific objectives of this research are:

1. To improve the patient satisfaction by reducing the gap between perceived and actual waiting times, and
2. To evaluate the effect of filled wait time on patient satisfaction and the gap between perceived and actual waiting times.

Chapter 3

DEVELOPMENT OF METHOD

This chapter aims to deliver some insight on the research design and approach used. It also reflects on methods of data collection and analysis used throughout the study.

3.1 Purpose

The main purpose of this research is to carry out a study to measure changes in patient's perceptions of waiting, gap between perceived and actual waiting time, and overall patient satisfaction under specific conditions. This study is designed to test the following hypothesis.

- As the perceptions of waiting time increase, patient satisfaction decreases, and
- Increased distractions reduce the perceptions of waiting time, increase patient interest level and may improve the patient satisfaction.

3.2 Actual Method

The study would take place in three phases, with the first phase serving as control. A survey questionnaire would be designed for phase 1 to measure the actual and perceived waiting times and patient satisfaction levels. The data would be then collected by observing and surveying the patients. Regression analysis and Analysis of Variance (ANOVA) would be performed to determine the effect of independent variables on the overall satisfaction and the gap (between perceived and actual waiting times). In Phase 2, the variables (which could be manipulated) that could have an effect on the patient satisfaction levels and the gap in Phase 1 would be explored in detail. Based on the results from the phase 2, the variables that were

believed to alter the gap and satisfaction levels would be manipulated. In phase 3, the data would be then collected using the same survey questionnaire which was designed for phase 1. Then analysis would be performed in a similar way as phase 1. The intent of this phase would be to improve the patient satisfaction levels and decrease the gap by manipulating the variables that were found to be significant in phase 1.

3.3 Rationale

The method will need a hospital / clinic environment for the study where patients wait and where there are some techniques to keep the patients busy because of the following conditions.

- The method has to determine existing relation among overall Satisfaction, gap between the perceived and actual waiting times and the activities the patients would be doing while they wait,
- The method has to determine improvement ways based on the data that would be collected from the above analysis, and
- Improvements need to be made based on the results from the preliminary data.

Chapter 4

CASE STUDY

This chapter provides methodological approach to the case study. This chapter will also present the details of the data collection and analysis followed by the results obtained in the case study.

4.1 Site Selection

The case study was carried out in a regional medical center in Grand Island, Nebraska. Radiology department was chosen for this study. This department is a large, busy area with high patient volumes. In addition to its heavy traffic level, the department was chosen because of its willingness to participate in the study and the high level of dedication and competence of its staff. The data collection for this project took place between September 2010 and June 2011. Due to the nature of a real world setting, there were times when some patients did not wish to participate. No patient participated more than once during the same phase. However, since the radiology department had recurring patients, some patients participated in more than one phase of the study.

4.2 Data Collection

The actual waiting time of the patients was measured using a time stamp. The activities performed by the patients during their wait were also observed and recorded. Demographics (Age, Gender, Race), stress – levels, perceptions of waiting, patient satisfaction levels were measured by personal interviews. The questions related to demographics and the stress-levels were asked before the patient waited. Perceived waiting time and patient satisfaction levels were

measured at the end of the wait. Perceived waiting times were obtained by asking the patients to specify how long they thought they waited before they were called for the exam. Patient stress-level was measured in a five point scale, with end points ranging from relaxing to very stressful. Patient satisfaction was measured by asking the patients to rate the overall level of service they received at the department on the survey date. Ratings were on a five point scale, with end points ranging from completely dissatisfied to completely satisfied (Yeddula, 2011).

4.3 Results

In Yeddula's (2011) case study, 172 personal interviews were conducted with the patients of which 66 were conducted during the phase – 1 (pre-intervention), 52 during the phase – 2 (development of an intervention strategy), and 54 during the phase -3 (post-intervention). The results from Yeddula's (2011) case study were primarily divided into four sections – Pre-intervention analysis, development of an intervention strategy, post-intervention analysis and overall analysis. The key findings of these sections are listed below.

4.3.1 Pre-Intervention Analysis

- On average, the patients who were surveyed actually waited for 9.92 minutes but thought that they have waited for 10.56 minutes. Patients overestimated the waiting time by 6.45%.
- Majority of the patients (60.60%) were involved in some kind of an activity (like reading magazine, talking with other person etc.) and the remaining 26 patients (39.39%) were sitting idle.
- ANOVA results showed that there is no statistical difference between the different groups in age, gender, and race to the overall patient satisfaction, stress – level and the gap.

- Linear regression showed that the Perceived waiting time, stress – levels and the time of arrival were significant predictors of the overall patient satisfaction. Overall, 28.8% of the variance in overall satisfaction was explained by the predictors ($p < .05$).
- Linear regression showed that the activity was a significant predictor of the gap between perceived and actual waiting time. Overall, 22.4% of the variance in the gap was explained by the predictors ($p < .05$).

It was found that the activity performed by the patients during their wait was the most significant factor that affects the gap. This means gap between the perceived and actual waiting time could be influenced by manipulating the activities that the patients were doing while they were waiting.

4.3.2 Development of an Intervention Strategy

- A list of activities that could be done while the patient would wait was brainstormed by a focus group consisting of radiology department director, manager, technologist, transcriptionist, clerk, and an industrial engineer.
- It was found that majority of the respondents wanted to read (52%) and solve puzzles while they wait (17%).
- When a list of activities that could be done with the current conditions in the waiting room was developed, it was found that there were no puzzle books in the waiting room and also the magazines present were restricted just to health and fitness.
- Based on the survey results, majority of the activities that the patients have asked for were added in the waiting area. Some of the activities such as music and a bigger T.V were not added due to the operational issues in the waiting area.

4.3.3 Post - Intervention Analysis

- The data collection and analysis were performed in a similar way as pre-intervention analysis in order to assess the impact of the new activities that were implemented in the waiting room.
- On average, the patients who were surveyed waited for 9.11 minutes but thought that they have waited for 9.68 minutes. Patients overestimated the waiting time by 6.25%.
- Majority of the patients (74.07%) were involved in some kind of an activity and the remaining 14 patients (25.92%) were sitting idle.
- ANOVA results showed that there is no statistical difference between the different groups in age, gender and race to the overall patient satisfaction, stress – level and the gap.
- Pearson correlation coefficients for the overall satisfaction was found to be negatively correlated with actual and perceived waiting time and the stress – level.
- Linear regression showed that the perceived waiting time, stress – levels and the time of arrival were significant predictors of the overall patient satisfaction. Overall, 35.5% of the variance in patient satisfaction was explained by the predictors ($p < .05$).
- Linear regression showed that the activity was a significant predictor of the gap between perceived and actual waiting time. Overall, 24.8% of the variance in the gap was explained by the predictors ($p < .05$).

4.3.4 Overall Analysis

- The post-intervention analysis patients (mean = 4.685) reported significantly higher levels of satisfaction levels than the pre-intervention patients (mean = 4.379). 2-sample t

test revealed a statistically significant difference between the two phases ($t = -2.30$, $df = 117$, $p < 0.05$).

- The occupied patients (mean = 4.65) reported significantly higher levels of satisfaction levels than the unoccupied patients (mean = 4.25). 2-sample t test revealed a statistically significant difference between the two groups ($t = -2.62$, $df = 65$, $p < 0.05$).
- The average gap between perceived and actual waiting time for pre-intervention analysis and post-intervention analysis were 0.64 and 0.57 respectively. A 2-sample t test revealed that there was no significant difference between the two phases ($t = 0.08$, $df = 116$, $p > 0.05$).
- The gap between the perceived and actual waiting times were compared between the patients who were involved in some kind of an activity (occupied) to that of the patients who were sitting idle (unoccupied). The occupied patients (mean = -0.787) perceived the waiting time to be significantly lesser than the unoccupied patients (mean = 3.40).

Chapter 5

RESULTS AND DISCUSSION

5.1 Results

The objective of this study was to improve the patient satisfaction by reducing the gap between perceived and actual waiting time and also to evaluate the effect of filled waiting time on the patient satisfaction and the gap. From the case study, the following are apparent.

- The gap between the perceived and actual waiting time was not a significant predictor of the patient satisfaction.
- The patient satisfaction improved significantly with the addition of new activities in the waiting room.
- There was no statistical significance found in the gap when the new activities were added in the waiting room.

5.2 Discussion

This study has several implications for managers as well as for future research. First, process improvement that reduces the actual waiting time may not lead to increased patient satisfaction. If improving the patient satisfaction was the ultimate objective, there should be more focus on reducing the perceived waiting time, especially when there are significant costs associated with the process change. Therefore, if we need to improve the patient satisfaction, we should not just focus on the operational measures such as actual waiting time. Psychological measures such as perceived waiting time are sometimes more important indicators of patient satisfaction.

Second, although there were several models in the literature that identify the factors that influence perceived waiting time, e.g., Baker, 1996, there was no comprehensive model that addressed the relationship between perceived waiting time and patient satisfaction. This study did show a significant relationship between them. This model helps to better understand the role of perceived waiting time in process improvement.

Third, the principal focus of the research was to investigate whether simple changes in the waiting area where a service is being delivered affect patient's evaluation of service. This study showed that adding the new activities in the waiting area did make the patients remain interested and entertained which further improved the overall satisfaction. The addition of the new activities used in this study proved to be an effective tool for managing perceptions. It was inexpensive, easy to operate, and did not disrupt normal operations. The essence is, if you must make the patients wait, you can at least make it entertaining.

5.3 Research Limitations

Although this study revealed several enlightening points concerning the management of the perceptions of waiting, there were some limitations in our research.

- There are other possible determinants of patient satisfaction that were not analyzed.
- The actual waiting time experienced by the majority of the patients was not excessive. It is possible that there is some critical threshold above which the actual waiting time becomes an independent predictor of patient satisfaction.

5.4 Directions for Further Research

Future research should involve replicating the method presented here to other service settings to determine the conditions under which the addition of the distractions (activities) in the

waiting area would lead to improved customer satisfaction. Another research direction involves developing a comprehensive model of patient satisfaction that includes perceived waiting times as well as other process outcomes.

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*This report is attached in the appendix for reference.

Appendix 1

Case Study: Waiting Room Issues

Chapter 1: INTRODUCTION

1.1 Background

Despite extensive research on defining and measuring health care quality, little attention has been given to patient's perspectives of high-quality health care. Feedback collection is one of the prominent techniques that is used to measure the patient's perspectives (Sugandhi, 2002). Feedback collection from the patient is essential for the provider to ascertain patient satisfaction and scope for improvisation. The benefits of customer loyalty to a provider of either services or products are numerous, and thus organizations are eager to secure as significant a loyal customer base as possible.

Patient satisfaction is a concept that has been receiving increasing attention reflecting an evolving focus in the service-oriented health care market (Umar, 2011). Understanding satisfaction and health care quality have been recognized as critical to developing many improvement strategies (ACHE, 2006). The inaugural quality work of Donabedian identified the importance of patient satisfaction as well as provided much of the basis for research in the area of quality in healthcare (Donabedian, 1980). In the healthcare sector, the importance of measuring patient satisfaction is well articulated and has been studied and measured extensively as a stand-alone construct and as a component of outcome quality. The concept of satisfaction is complicated, irrespective of the area in which it is studied. It is a multidimensional concept; not yet tightly defined; and part of an apparently yet to be determined complex model.

Historically, the health care sectors which are interested in obtaining high levels of patient satisfaction have focused on using knowledgeable, pleasant physicians and staff to deliver high quality care to the patients. In today's environment, this approach is insufficient. Changes in American lifestyles have profoundly altered patient's values. Timely delivery of the service with minimal waiting time has become one of the important predictor's of quality for the patients. The patients consider waiting as inactive, wasted or lost opportunity time (Katz 1991, Dansky 1997). To attain higher levels of patient satisfaction, the health care organizations need to focus on making the customers feel that they are wasting as little time as possible.

1.2 Overview of the Chapters

The case study is presented in the following chapters. Chapter 2 proposes the methodology for this study. Chapter 3 presents the results obtained from the case study. Chapter 4 is a discussion of the results.

Chapter 2: METHODOLOGY

2.1 Purpose

This paper examines the waiting times (actual, perceived) and several other factors that affect the patient satisfaction in an outpatient facility offering both analysis of the current situation and recommendations for improvement in the future.

The purpose of the study is to measure changes in patient's perceptions of waiting, gap between perceived and actual waiting time and overall patient satisfaction under specific conditions. This study is designed to test the following hypothesis:

1. As the perceptions of waiting time increase, patient satisfaction decreases.
2. Increased distractions reduce the perceptions of waiting time, increase patient interest level and may improve the patient satisfaction.

2.2 Rationale

The method will need a hospital / clinic environment for the study where patients wait and where there are some techniques to keep the patients busy because:

- The method has to determine existing relation among overall Satisfaction, gap between the perceived and actual waiting times and the activities the patients would be doing while they wait,
- The method has to determine improvement ways based on the data that would be collected from the above analysis, and
- Improvements need to be made based on the results from the preliminary data.

2.3 Actual Method

The study would take place in three phases, with the first phase serving as control. A survey questionnaire would be designed for phase 1 to measure the actual and perceived waiting times and patient satisfaction levels. The data would be then collected by observing and surveying the patients. Regression analysis and Analysis of Variance (ANOVA) would be performed to determine the effect of independent variables on the overall satisfaction and the gap (between perceived and actual waiting times).

In Phase 2, the variables (which could be manipulated) that could have an effect on the patient satisfaction levels and the gap in Phase 1 would be explored in detail. Based on the results from the phase 2, the variables that were believed to alter the gap and satisfaction levels would be manipulated.

In phase 3, the data would be then collected using the same survey questionnaire which was designed for phase 1. Then analysis would be performed in a similar way as phase 1. The intent of this phase would be to improve the patient satisfaction levels and decrease the gap by manipulating the variables that were found to be significant in phase 1.

2.4 Measurement

The actual waiting time of the patients was measured using a time stamp. The start time was considered as the point when the patient would leave the front desk after the initial check-in. The end point was considered to be the point when the patient would be picked up for the exam. The difference between the end time and the start time was recorded to be the actual waiting time. The activities performed by the patients during their wait were also observed and recorded.

Demographics (Age, Gender, Race), stress – levels, perceptions of waiting, patient satisfaction levels were measured by personal interviews. The questions related to demographics and the stress-levels were asked before the patient waited. Perceived waiting time and patient satisfaction levels were measured at the end of the wait. After a patient answered all the questions, the physical description of the patient and the time of the day were jotted on the back of the questionnaire.

The questionnaire was designed to measure the patient perceptions and satisfaction levels. Perceived waiting times were obtained by asking the patients to specify how long they thought they waited before they were called for the exam. Patient stress-level was measured in a five point scale, with end points ranging from relaxing to very stressful. Patient satisfaction was measured by asking the patients to rate the overall level of service they received at the department on the survey date. Ratings were on a five point scale, with end points ranging from completely dissatisfied to completely satisfied. This questionnaire format was identical for phase 1 & 3.

The data collection for this project took place between September 2010 and June 2011. Due to the nature of a real world setting, there were times when some patients did not wish to participate. No patient participated more than once during the same phase. However, since the outpatient department had some recurring patients, some patients participated in more than one phase of the study.

Chapter 3: RESULTS

This chapter has four sections – pre-intervention analysis, development of an intervention strategy, post-intervention analysis and overall analysis.

During the course of this study, 172 personal interviews were conducted with the patients at a regional medical center. Of these interviews, 66 were conducted during the phase – 1 (pre-intervention), 52 during the phase – 2 (development of an intervention strategy), and 54 during the phase -3 (post-intervention). The overview of the data collection is given below in the table:

Table 3 - 1 Overview of Data Collection

	Phase - 1 Pre - Intervention	Phase - 2 Development of an Intervention Strategy	Phase - 3 Post - Intervention
No. of patients	66	52	54

3.1 Pre - Intervention Analysis (Phase -1)

In this phase, Analysis of Variance (ANOVA) was used initially to test whether the differences existed in the overall satisfaction, gap and stress – level between age, gender and race. Correlation analysis was then performed to measure the association between the variables. A regression analysis was then performed on the collected data. The regression analysis performed

on the independent variables helped to determine which of the independent variables were significant for the overall satisfaction. The details of the analysis are presented below:

Descriptive Statistics

A total of 66 patients participated in this study. Thirty-eight patients (57.58%) were female and twenty-eight (42.42%) were male. According to the survey, fifty-six patients (84.85%) were White; nine patients (13.64%) were Hispanic and one patient (1.52%) was Asian. It was also found that 7.58% of the patients' age group was less than 20 years, 6.06% between 21 and 30, 12.12% between 31 and 40, 10.61% between 41 and 50, 19.70% of them between 51 and 60 and the remaining 43.93% were greater than 60 years old. Table 3 -2 shows the distribution of characteristic of the patients.

Table 3 – 2 Characteristic of the Phase -1 Patient Subjects

Phase - 1 (Pre - Intervention)			
	Variables	Frequency	Percentage (%)
Gender	Male	28	42.42%
	Female	38	57.58%
Race	American	56	84.85%
	Hispanic	9	13.64%
	Asian	1	1.52%
Age	<20	5	7.58%
	21 - 30	4	6.06%
	31 - 40	8	12.12%
	41 - 50	7	10.61%

	51 - 60	13	19.70%
	60 >	29	43.94%

Actual Waiting Times

Actual waiting times were collected using a time stamp. Nearly 40% of the patients that were interviewed waited less than five minutes and only 18% waited over sixteen minutes. On average, the patients who were surveyed waited for 9.92 minutes. Figure 3 -1 shows the distribution of actual waiting times.

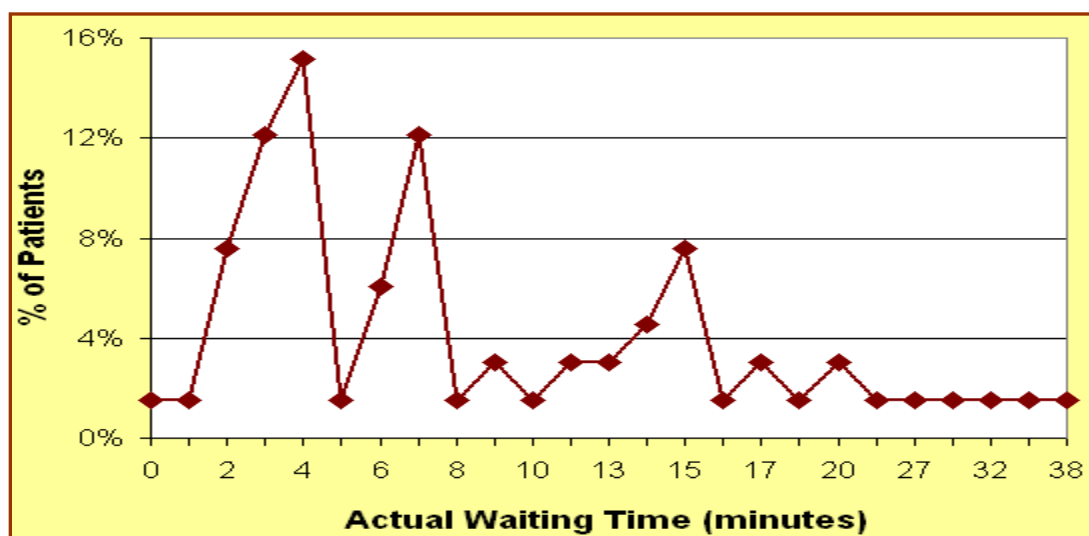


Figure 3 -1 Distribution of Actual Waiting Times

Perceived Waiting Times

To measure the perceived waiting times, the patients were asked “How long do you think you waited today (in minutes)?” On average, the patients thought they waited for 10.56 minutes. Figure 3 – 2 shows the distribution of perceived waiting times for the 66 patients that were interviewed.

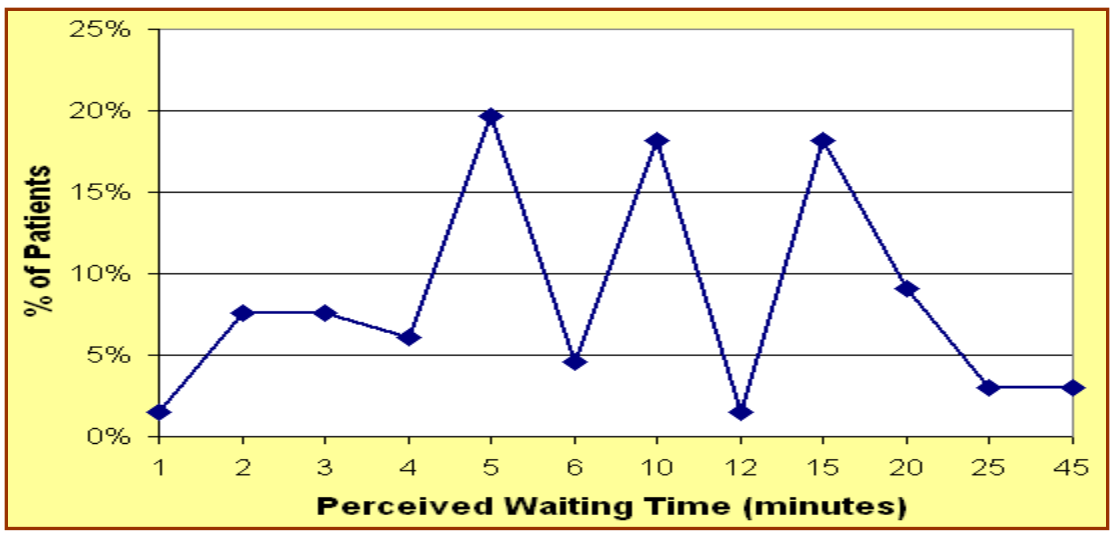


Figure 3 – 2 Distribution of Perceived Waiting Times

Gap: Difference between Actual and Perceived Waiting Times

As expected, the survey confirmed that patients tend to underestimate and overestimate the time they spend waiting. Differences between perceived and actual waiting times were normally distributed. On an average, the patients overestimated the waiting time by 6.45%. Figure 3 – 3 shows the distribution of the gap – differences between perceived and actual waiting times.

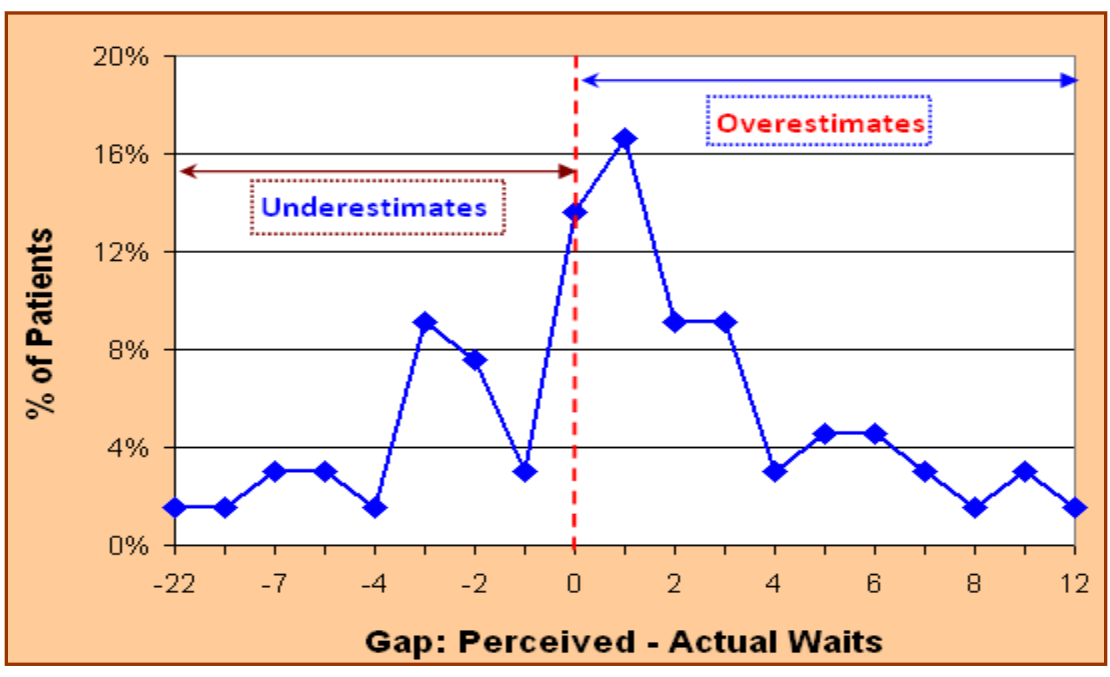


Figure 3 - 3 Distribution of Gap: Perceived – Actual Waiting Times

Stress – Level

When asked to rate the stress – level in a five point scale ranging from 1 = relaxing to 5 = very stressful, 27 patients (40.91%) rated the stress – level as 1 (relaxing), 13 patients (19.70%) as 2, 7 patients (10.61%) as 3, 12 patients (18.18%) as 4 and the remaining 5 patients (10.61%) as 5 (very stressful). Figure 3 – 4 shows the distribution of stress – levels of the patients.

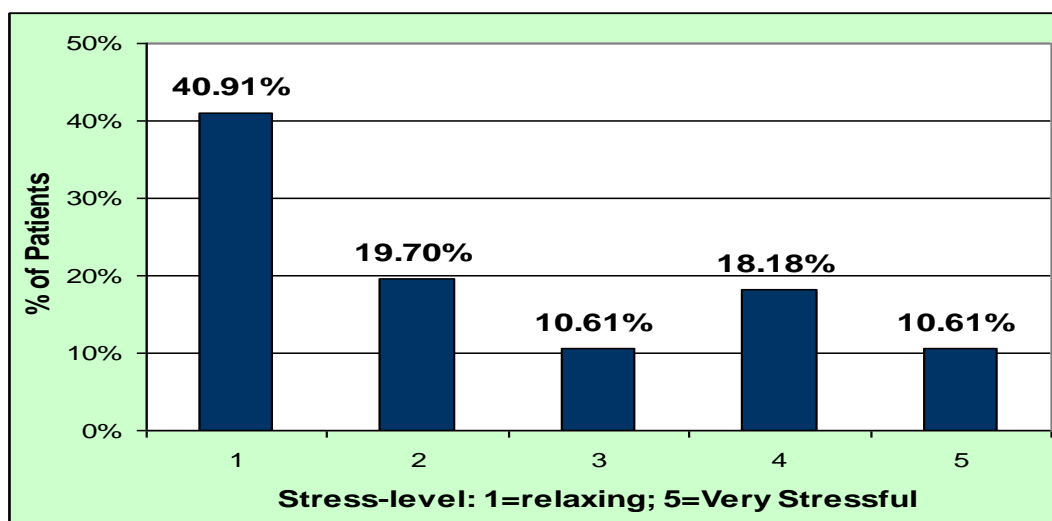


Figure 3 - 4 Distribution of Stress – Levels of Patients

Overall Patient Satisfaction

All the patients were asked “How satisfied are you with the overall service level?” In general, it was found that the patients were satisfied with the level of service the hospital was providing. The outpatient setting received an overall patient satisfaction of 4.37; with 37 patients (56.06%) indicating their satisfaction was a 5. Figure 3 – 5 provides the distribution of responses to this question.

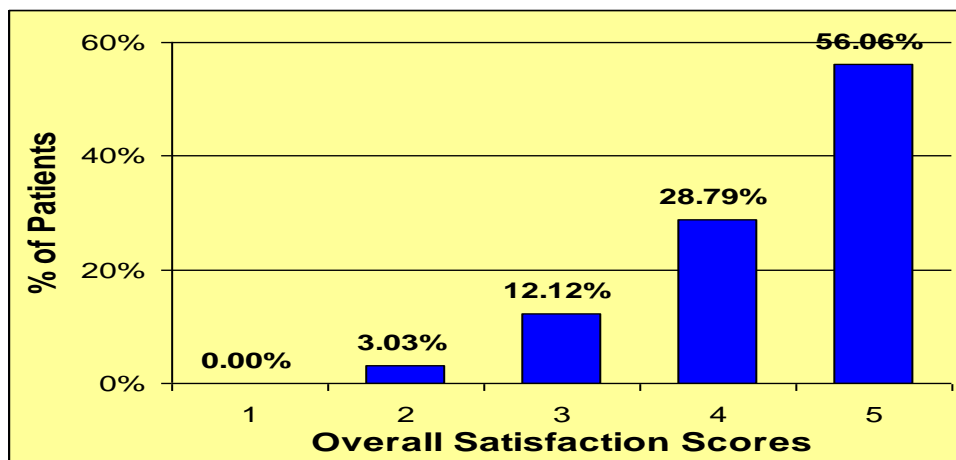


Figure 3 - 5 Overall Satisfaction Scores on Survey Date

Activity

The activities performed by the patient while waiting were observed and documented. From the analysis, it was found that majority of the patients (60.60%) were involved in some kind of an activity (like reading magazine, talking with other person etc.) and the remaining 26 patients (39.39%) were sitting idle. Table 3 – 3 shows the different activities that the patients were doing while they were waiting.

Table 3 - 3 Distribution of Patients' by Activity Type

Activity	Frequency	Percentage (%)
Watching T.V	0	0.00%
Sitting Idle	26	39.39%
Reading Magazine	8	12.12%
Talking with Other Person	16	24.24%
Talking on Cell Phone	1	1.52%
Other	5	7.58%
Reading Paper	10	15.15%

Analysis of Variance (ANOVA) on Demographics

The Analysis of Variance (ANOVA) was used to test whether the differences existed in the overall patient satisfaction, stress – Level and gap between age, gender and race. Table 3 – 4 shows the ANOVA summary. The results show that there is no statistical difference (NS) between the different groups in age, gender and race to the overall patient satisfaction, stress – level and the gap.

Table 3 - 4 ANOVA Summary for Demographics

Variables	Age	Gender	Race
Overall Patient Satisfaction	NS	NS	NS
Stress - Level	NS	NS	NS
Gap	NS	NS	NS

Table 3 – 5 shows the means of actual waiting time, perceived waiting time, stress-levels and overall satisfaction scores.

Table 3 – 5 Summary Statistics for Phase - 1

	Phase - 1 (Pre - Intervention)
# of Responses	66
Actual Wait	
% 0 - 5 minutes	39.39%
% 6 - 10 minutes	24.24%

% 11 - 15 minutes	18.18%
% > 16 minutes	18.18%
Average Actual Wait Time (minutes)	9.92
Perceived Wait	
% 0 - 5 minutes	42.42%
% 6 - 10 minutes	22.73%
% 11 - 15 minutes	19.70%
% > 16 minutes	15.15%
Average Perceived Wait Time (minutes)	10.56
Stress - Level (average on 1 - 5 scale)	2.38
Overall Satisfaction (average on 1 - 5 scale)	4.37

Pearson correlation coefficients between the different variables are presented in Table 3 – 6. As expected, there was a strong positive association between actual and perceived waiting times ($r = 0.82$). The overall satisfaction was found to be negatively correlated with actual and perceived waiting time and the stress – level. This confirms that the overall satisfaction is inversely related to the perceived waiting time.

Table 3 – 6 Pearson correlation coefficients between measures

	Actual Waiting Time	Perceived Waiting Time	Gap	Stress - Level	Overall Satisfaction
Actual Waiting Time	1	0.8242 ³	-0.2617 ²	0.1010	-0.2118 ¹
Perceived Waiting Time		1	0.3309 ³	0.0036	-0.2780 ²

Gap			1	-0.1622	-0.1209
Stress - Level				1	-0.2274 ¹
Overall Satisfaction					1

¹Correlation is significant at the 0.10 level.

²Correlation is significant at the 0.05 level.

³Correlation is significant at the 0.01 level.

Regression Analysis

Overall Satisfaction

The relationship between the overall satisfaction (dependant variable) and perceived and actual waiting time, stress – levels, demographics, time of arrival and activity (independent variables) were examined further using regression analysis (Table 3 – 7). Linear regression showed that the Perceived waiting time, stress – levels and the time of arrival were significant predictors of the overall patient satisfaction. Overall, 28.8% of the variance in overall satisfaction was explained by the predictors ($p < .05$).

The model for the output of regression analysis with regression coefficients for the overall satisfaction can be written as:

$$\text{Overall Satisfaction} = 4.21 - 0.141 \text{ Stress - Levels} + 0.0092 \text{ Actual Waiting time} - 0.0283 \text{ Perceived Waiting time} + 0.0165 \text{ Activity} + 0.310 \text{ Time of Arrival} - 0.0360 \text{ Age} + 0.060 \text{ Gender} + 0.017 \text{ Race} - 0.0239 \text{ Gap}$$

Table 3 – 7 Regression Analysis of overall satisfaction

Variables	Overall Satisfaction	P - Value
Actual Waiting Time	NS	0.109
Perceived Waiting Time	S	0.024
Stress - Levels	S	0.034
Age	NS	0.558
Gender	NS	0.77
Race	NS	0.942
Time of Arrival	S	0.005
Activity	NS	0.779
Gap	NS	0.814

NS – Not Significant; **S** – Significant

From the analysis, it is clear that the gap was not a significant predictor of overall satisfaction. But, prior studies (Anita, 2009) have found that reducing the gap between perceived and actual waiting times would increase the customer satisfaction.

So, a deliberate decision has been made to consider gap as a second dependent variable.

Gap

The relationship between the gap (dependent variable) and stress – levels, age, time of arrival and activity (independent variables) were examined using regression analysis (Table 3 – 8). Linear regression showed that the activity was a significant predictor of the gap between perceived and actual waiting time. Overall, 22.4% of the variance in the gap was explained by the predictors ($p < .05$).

The model for the output of regression analysis with regression coefficients for the gap can be written as:

$$\text{Gap} = 4.22 - 0.465 \text{ Stress - Level} - 1.21 \text{ Activity} + 0.319 \text{ Time of arrival} + 0.285 \text{ Age}$$

Table 3 – 8 Regression Analysis of Gap on the independent variables

Variables	Gap	P - Value
Stress - Levels	NS	0.251
Age	NS	0.434
Time of Arrival	NS	0.614
Activity	S	0.000

NS – Not Significant; **S** - Significant

The results show that the activity performed by the patients' during their wait is the most significant factor that affects the gap. This means gap between the perceived and actual waiting time could be influenced by manipulating the activities that the patients' were doing while they were waiting.

3.2 Development of an Intervention Strategy (Phase – 2)

A focus group was formed and they brainstormed the list of activities that could be done while a patient would wait (attached in Appendix 2). A survey questionnaire was then designed to know the activities the patients' would like to do while they wait. The survey was handed out to the patients and was then collected by the outpatient secretary. The back – side of the survey had the list of all the activities that were brainstormed by the focus group. The questionnaire was completed anonymous, without the inclusion of any identifying information. A total of 52 patients participated in the survey.

Figure 3 – 6 shows the responses to the survey question. Interestingly, majority of the respondents wanted to read (52%) and solve puzzles while they wait (17%).

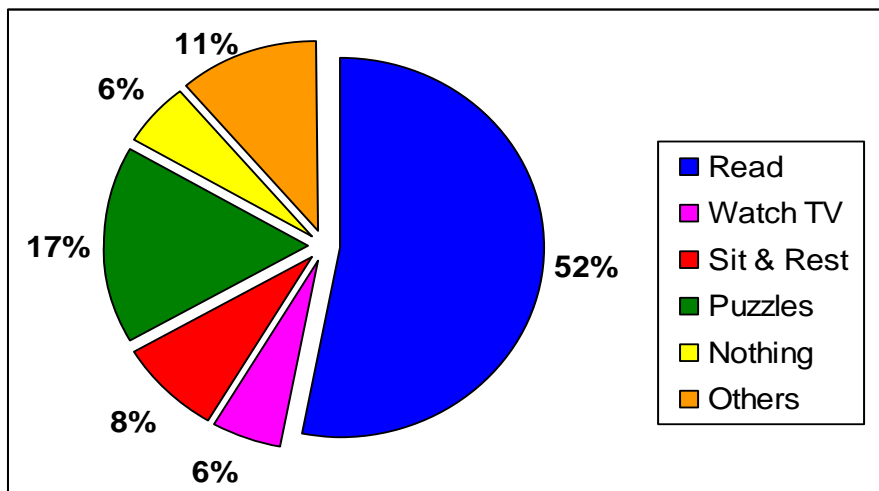


Figure 3 – 6 Activities Patients' would like to do while waiting

A list of all the activities that could be done with the current conditions in the waiting room (Table 3 – 9) were observed and documented. There were no puzzle books in the waiting room and also the magazines present were restricted just to health and fitness.

Table 3 – 9 Activities in the waiting area – before the experiment

Activities - before the experiment
Health Magazines
Read Newspapers (English)
Watch TV
Toys for Children

With the permission of the Director and based on the survey results, majority of the activities that the patients have asked for were added in the waiting area. Some of the activities like music and a bigger T.V were not added due to the operational issues in the waiting area. Table 3 – 10 provides the list of all the additional activities that were added.

Table 3 – 10 Activities in the waiting area – newly added

Activities that were added
Puzzles - Crossword
New Posters to enhance the waiting room
Sports Magazines
Spanish Newspaper - Printed every other week
Educational Materials
Books

3.3 Post - Intervention Analysis

In order to make comparisons between the pre and post phases, it was important that the only factor on which respondents differed be whether or not they were exposed to the item that was being manipulated (i.e., the activities). So, with the implementation of the new activities in the waiting room, the impact of the intervention was needed to be assessed on the satisfaction scores and the gap. Therefore data was collected using the same survey questionnaire which was designed for phase 1. The analysis was performed in a similar way as pre-intervention analysis.

Descriptive Statistics

A total of 54 patients participated in this study. Twenty nine patients (53.70%) were female and twenty five (46.30%) were male. According to the survey, forty four patients (81.48%) were White; ten patients (18.52%) were Hispanic. It was also found that 7.41% of the patients' age group was less than 20 years, 12.96% between 21 and 30, 14.81% between 31 and 40, 7.41% between 41 and 50, 22.22% of them between 51 and 60 and the remaining 35.18% were greater than 60 years old. Table 3 - 11 shows the distribution of characteristic of the patients.

Table 3 – 11 Characteristic of the Phase – 3 Patient Subjects

Phase - 3 (Post - Intervention)			
	Variables	Frequency	Percentage (%)
Gender	Male	25	46.30%
	Female	29	53.70%
Race	American	44	81.48%
	Hispanic	10	18.52%
	Asian	0	0.00%
Age	<20	4	7.41%
	21 - 30	7	12.96%
	31 - 40	8	14.81%
	41 - 50	4	7.41%
	51 - 60	12	22.22%
	60 >	19	35.19%

Actual Waiting Times

On average, the patients waited for 9.11 minutes. Figure 3 - 7 shows the distribution of actual waiting times. Nearly twenty percent of the patients waited for less than or equal to five minutes, and only thirteen percent waited more than sixteen minutes.

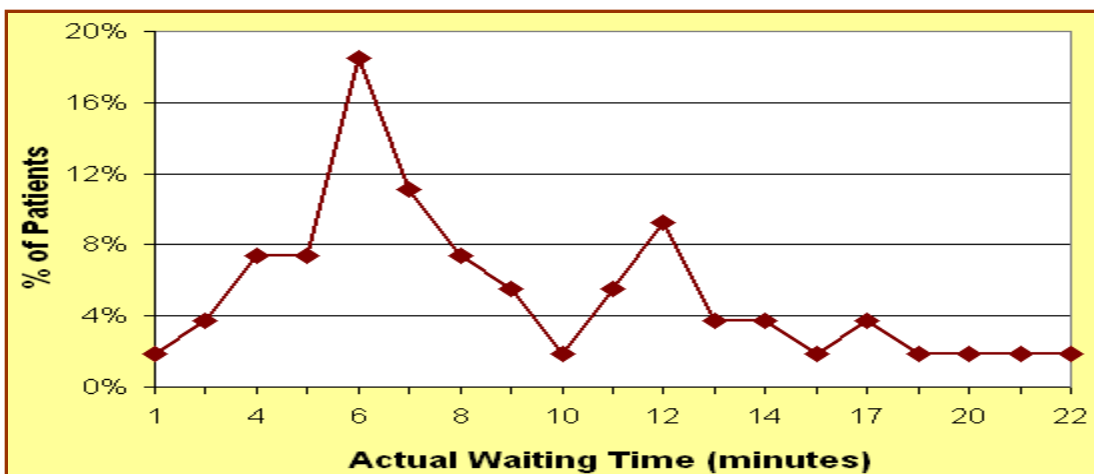


Figure 3 - 7 Distribution of Actual Waiting Times (Phase - 3)

Perceived Waiting Times

On average, the patients thought they waited for 9.68 minutes. Figure 3 - 8 shows the distribution of perceived waiting times for the 54 patients that were interviewed. Nearly thirty five percent of the patients' believed that they had waited less than five minutes.

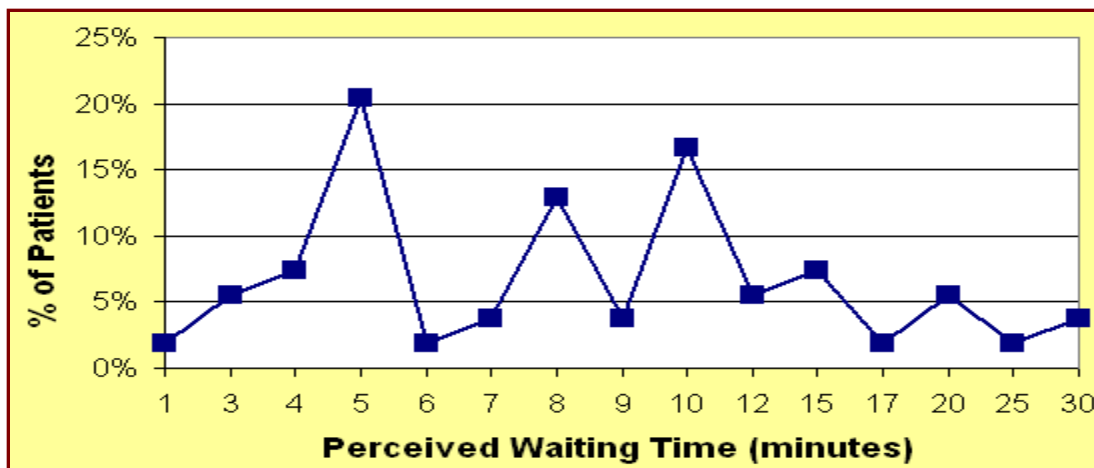


Figure 3 - 8 Distribution of Perceived Waiting Times (Phase - 3)

Gap: Difference between Actual and Perceived Waiting Times

The patients' tend to underestimate and overestimate the time they spend waiting. On an average, the patients overestimated the waiting time by 6.25%. Figure 3 – 9 shows the distribution of the gap – differences between perceived and actual waiting times.

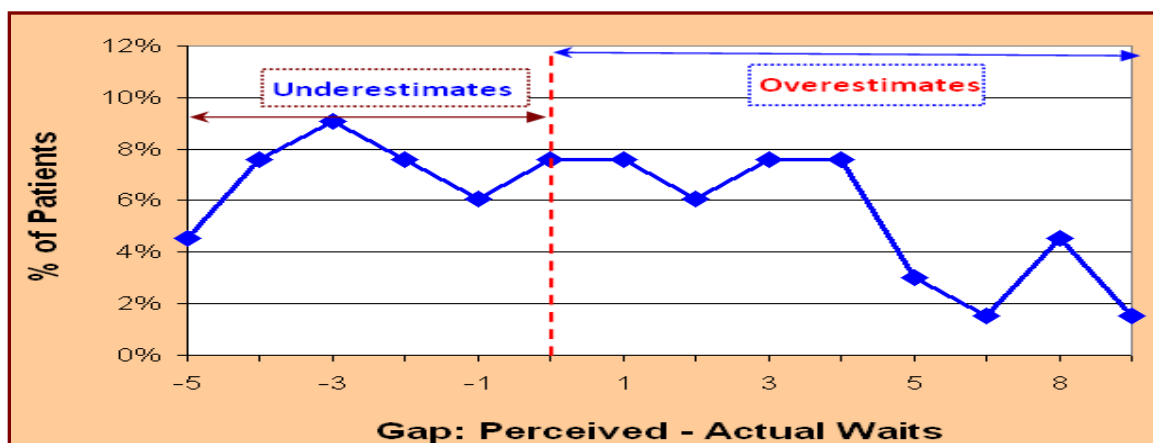


Figure 3 - 9 Distribution of Gap: Perceived – Actual Waiting Times (Phase – 3)

Stress – Level

Out of the 54 patients, 23 patients (34.85%) rated the stress – level as 1, 15 patients (22.73%) as 2, 8 patients (12.12%) as 3, 5 patients (7.58%) as 4 and the remaining 3 patients (5.56%) as 5. Figure 3 – 10 shows the distribution of stress – levels of the patients.

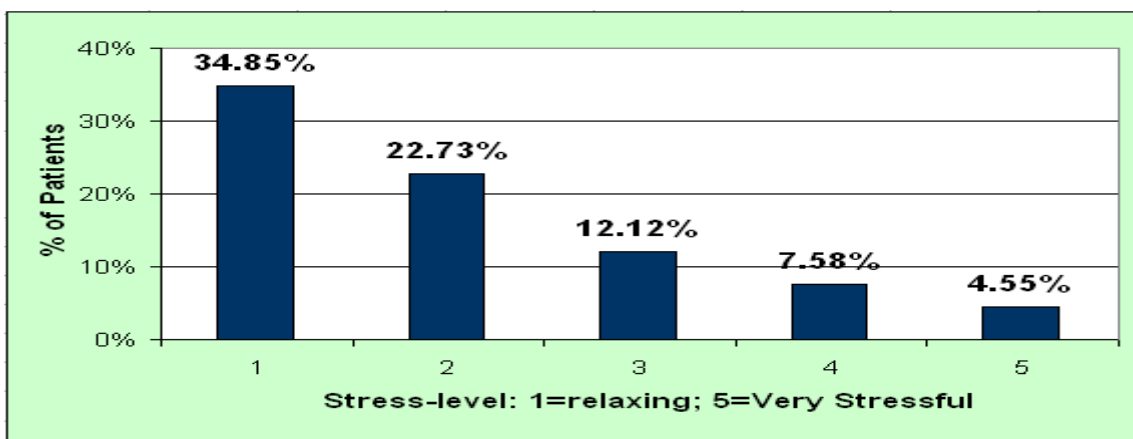


Figure 3 - 10 Distribution of Stress – Levels of Patients (Phase – 3)

Overall Patient Satisfaction

The mean of the overall patient satisfaction for the post intervention analysis was 4.68 in a five point scale. 41 patients (62.12%) indicated their overall satisfaction as 5. Figure 3 – 11 provides the distribution of responses to this question.

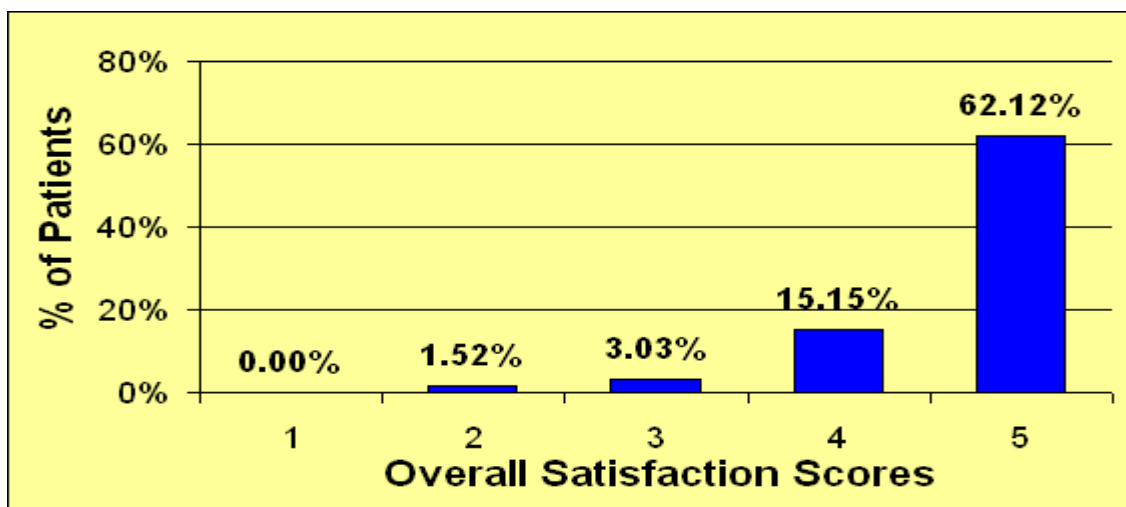


Figure 3 - 11 Overall Satisfaction Scores on Survey Date (Phase – 3)

Activity

It was found that majority of the patients (74.07%) were involved in some kind of an activity and the remaining 14 patients (25.92%) were sitting idle. Table 3 – 12 shows the different activities that the patients were doing while they were waiting.

Table 3 - 12 Distribution of Patients' by Activity Type (Phase – 3)

Activity	No. of Patients	% of Patients
Watching T.V	4	7.41%
Sitting Idle	14	25.93%
Reading Magazine	4	7.41%

Talking with Other Person	9	16.67%
Talking on Cell Phone	2	3.70%
Other	2	3.70%
Reading Paper	7	12.96%
Reading Book	8	14.81%
Puzzle - Crossword	4	7.41%

Analysis of Variance (ANOVA) on Demographics

The Analysis of Variance (ANOVA) was used to test whether the differences existed in the overall patient satisfaction, stress – Level and gap between age, gender and race. Table 3 – 13 shows the ANOVA summary. The results show that there is no statistical difference (NS) between the different groups in age, gender and race to the overall patient satisfaction, stress – level and the gap.

Table 3 - 13 ANOVA Summary for Demographics (Phase – 3)

Variables	Age	Gender	Race
Overall Patient Satisfaction	NS	NS	NS
Stress - Level	NS	NS	NS
Gap	NS	NS	NS

Table 3 – 14 shows the means of actual waiting time, perceived waiting time, stress-levels and overall satisfaction scores.

Table 3 – 14 Summary Statistics for Phase - 3

	Phase - 3 (Post - Intervention)
# of Responses	54
Actual Wait	
% 0 - 5 minutes	20.37%
% 6 - 10 minutes	44.44%
% 11 - 15 minutes	22.22%
% > 16 minutes	12.96%
Average Actual Wait Time (minutes)	9.11
Perceived Wait	
% 0 - 5 minutes	35.19%
% 6 - 10 minutes	38.89%
% 11 - 15 minutes	12.96%
% > 16 minutes	12.96%
Average Perceived Wait Time (minutes)	9.68
Stress - Level (average on 1 - 5 scale)	2.07
Overall Satisfaction (average on 1 - 5 scale)	4.61

Pearson correlation coefficients between the different variables are presented in Table 3 – 15. As expected, there was a strong positive association between actual and perceived waiting times ($r = 0.81$). The overall satisfaction was found to be negatively correlated with actual and perceived

waiting time and the stress – level. This confirms that the overall satisfaction is inversely related to the perceived waiting time.

Table 3 – 15 Pearson correlation coefficients between measures (Phase – 3)

	Actual Waiting Time	Perceived Waiting Time	Gap	Stress - Level	Overall Satisfaction
Actual Waiting Time	1	0.816 ³	0.106	-0.021	-0.244 ¹
Perceived Waiting Time		1	0.661 ³	0.131	-0.461 ³
Gap			1	0.253	-0.476 ³
Stress - Level				1	-0.213
Overall Satisfaction					1

¹Correlation is significant at the 0.10 level.

²Correlation is significant at the 0.05 level.

³Correlation is significant at the 0.01 level.

Regression Analysis

Overall Satisfaction

The relationship between the overall satisfaction (dependent variable) and perceived and actual waiting time, stress – levels, demographics, time of arrival and activity (independent variables) were examined further using regression analysis (Table 3 – 16). Linear regression showed that the Perceived waiting time, stress – levels and the time of arrival were significant predictors of

the overall patient satisfaction. Overall, 35.5% of the variance in patient satisfaction was explained by the predictors ($p < .05$).

The model for the output of regression analysis with regression coefficients for the overall satisfaction can be written as:

Overall Satisfaction = 4.93 - 0.0313 Stress - Levels + 0.0354 Actual Waiting time - 0.0684 Perceived waiting time + 0.0557 Activity + 0.079 Time of Arrival + 0.0328 Age - 0.080 Gender - 0.313 Race

Table 3 – 16 Regression Analysis of overall satisfaction on the variables

Variables	Overall Satisfaction	P - Value
Actual Waiting Time	NS	0.241
Perceived Waiting Time	S	0.004
Stress - Levels	NS	0.646
Age	NS	0.502
Gender	NS	0.643
Race	NS	0.288
Time of Arrival	NS	0.459
Activity	NS	0.083

NS – Not Significant; **S** - Significant

Gap

The relationship between the gap (dependent variable) and stress – levels, age, time of arrival and activity (independent variables) were examined using regression analysis (Table 3 – 17).

Linear regression showed that the activity was a significant predictor of the gap between

perceived and actual waiting time. Overall, 24.8% of the variance in the gap was explained by the predictors ($p < .05$).

The model for the output of regression analysis with regression coefficients for the gap can be written as:

$$\text{Gap} = -0.38 + 0.536 \text{ Stress - Levels} - 0.363 \text{ Activity} + 0.777 \text{ Time of Arrival} + 0.027 \text{ Age}$$

Table 3 – 17 Regression Analysis of Gap on the independent variables

Variables	Gap	P - Value
Stress - Levels	NS	0.251
Age	NS	0.434
Time of Arrival	NS	0.614
Activity	S	0.008

NS – Not Significant; **S** - Significant

3.4 Overall Analysis

3.4.1 Overall Satisfaction

Phase - 1 vs Phase - 3

Table 3 -18 describes the means and standard deviations of each phase: phase – 1 and phase – 3. The means represent the average overall satisfaction for the groups on a five-point scale. It is clear from the table that the average satisfaction score for phase – 1 patient's is 4.379, whereas for phase – 3 patient's it is 4.685.

Table 3 – 18 Two-Sample t test: Phase – 1 vs Phase - 3

		N	Mean	Std. Deviation	Std. Error Mean
Overall Satisfaction	Phase - 1	66	4.379	0.818	0.1
	Phase - 3	54	4.685	0.639	0.087

To test whether there is any statistical difference in the satisfaction scores between phase – 1 (before the intervention) and phase – 3(after the intervention), a 2-sample t test was performed. The test revealed a statistically significant difference between the two phases ($t = -2.30$, $df = 117$, $p < 0.05$). The phase – 3 patients (Mean = 4.685, standard deviation = 0.639) reported significantly higher levels of satisfaction levels than the phase – 1 patients (Mean = 4.379, standard deviation = 0.639).

Table 3 -19 describes the independent samples t-test information to ascertain whether there is a significant difference between the two phases in relation to satisfaction scores.

Table 3 – 19 Independent Samples Test: Phase – 1 vs Phase - 3

		Levene's Test for Equality of Variances		t-test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval	
								Lower	Upper
Overall Satisfact	Equal variances assumed	5.05	0.027	-2.25	118	0.027	-0.306	-0.576	-0.036

ion	Equal variances not assumed			-2.30	117	0.023	-0.306	-0.57	-0.043
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Occupied vs Unoccupied

The overall satisfaction was compared between the patients' who were involved in some kind of an activity (Occupied) to that of the patients' who were sitting idle (Unoccupied). Forty patients (33.33%) were sitting idle and the remaining eighty patients (66.66%) were involved in an activity during their wait. Table 3 – 20 describes the means and the standard deviation for both occupied and unoccupied patients.

Table 3 – 20 Independent Samples Test: Occupied vs Unoccupied

		N	Mean	Std. Deviation
Overall Satisfaction	Occupied	80	4.65	0.676
	Unoccupied	40	4.25	0.839

A 2-sample t test was performed to test whether the mean of overall satisfaction for unoccupied patients is significantly different from that of occupied patients. The test revealed a statistically significant difference between the two groups ($t = -2.62$, $df = 65$, $p < 0.05$). The occupied patients (Mean = 4.65, standard deviation = 0.676) reported significantly higher levels of satisfaction levels than the unoccupied patients (Mean = 4.25, standard deviation = 0.839).

5.4.2 Gap

Phase - 1 vs Phase - 3

Table 3 -21 describes the means and standard deviations of each phase: phase – 1 and phase – 3. The means represent the average gap for the groups. The average gap between perceived and actual waiting time for phase – 1 and phase -3 are 0.64 and 0.57 respectively.

Table 3 – 21 Two-Sample t test: Group Statistics

		N	Mean	Std. Deviation	Std. Error Mean
Gap	Phase - 1	66	0.64	5.12	0.63
	Phase - 3	54	0.57	3.73	0.51

To test whether there is any statistical difference in the satisfaction scores between phase – 1 (before the intervention) and phase – 3 (after the intervention), a 2-sample t test was performed. The test revealed that there is no significant difference between the two phases ($t = 0.08$, $df = 116$, $p > 0.05$). Table 3 - 22 describes the independent samples t-test information to show that there is no significant difference between the two phases in relation to the gap.

Table 3 – 22 Independent Samples Test - Gap

		Levene's Test for Equality of Variances		t-test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval	
								Lower	Upper
Gap	Equal variances assumed	0.27	0.602	0.07	118	0.941	0.062	-1.591	1.715
	Equal variances not assumed			0.08	116	0.939	0.062	-1.541	1.666

Occupied vs Unoccupied

The gap between the perceived and actual waiting times was then compared between the patients' who were involved in some kind of an activity (Occupied) to that of the patients' who were sitting idle (Unoccupied). Forty patients (33.33%) were sitting idle and the remaining eighty patients (66.66%) were involved in an activity during their wait. Table 3 – 23 describes the means and the standard deviation for both occupied and unoccupied patients.

Table 3 – 23 Independent Samples Test: Occupied vs Unoccupied

		N	Mean	Std. Deviation
Gap	Occupied	80	-0.787	4.42
	Unoccupied	40	3.4	3.33

A 2-sample t test was performed to test whether the mean of the gap for unoccupied patients is significantly different from that of the occupied patients. The test revealed a statistically significant difference between the two groups ($t = 5.80$, $df = 99$, $p < 0.01$). The occupied patients (Mean = -0.787, standard deviation = 4.42) perceived the waiting time to be significantly lesser than the unoccupied patients (Mean = 3.40, standard deviation = - 0.787).

Chapter 4: DISCUSSIONS AND CONCLUSIONS

This chapter further discusses the results from the previous chapter. Based on these discussions, this chapter summarizes the study.

4.1 Summary of Results

- On average, patient perceived waiting time were more than the actual waiting time in the pre – intervention phase (by 6.45%) and post – intervention phase (by 6.25%).
- As expected, it was found that there was a strong positive association between the actual and perceived waiting times in the pre – intervention phase ($r = 0.82$) as well as in the post – intervention phase ($r=0.81$).
- The overall satisfaction was negatively correlated with actual, perceived waiting time, gap and the stress – level in both the pre & post - intervention phase.
- The ANOVA results for the descriptive statistics showed that there was no statistically significant difference between the different groups in age, gender and race to the overall patient satisfaction, stress – level and the gap for both pre & post – intervention phase.
- The regression analysis results for the pre – intervention phase showed that perceived waiting time ($p = 0.024$), stress – level ($p = 0.034$), and time of arrival ($p = 0.005$) were the significant predictors of the overall satisfaction. Overall, the model explained 28.8% of the variance in the overall satisfaction.
- The regression analysis for the pre – intervention phase showed that the activity ($p = 0.000$) was the only significant predictor of the gap. Overall, the model explained 22.4% of the variance in the gap.

- The regression analysis results for the post – intervention phase showed that perceived waiting time ($p = 0.004$) was the only significant predictor of the overall satisfaction. Overall, the model explained 35.5% of the variance in the overall satisfaction.
- The regression analysis for the post – intervention phase showed that the activity ($p = 0.008$) was the only significant predictor of the gap. Overall, the model explained 24.8% of the variance in the gap.

The difference between the pre & post intervention analysis for the dependent measures (overall satisfaction & gap) were evaluated using a 2 – sample t test.

- The results showed that there were significant differences in the mean of the overall satisfaction between the pre & post intervention groups ($t = -2.30$, $p = 0.023$). The post – intervention patients (Mean = 4.685) reported higher levels of satisfaction than the pre – intervention patients (Mean = 4.379).
- The mean of the gap between perceived and actual waiting time was reduced from 0.64 (pre – intervention) to 0.57 (post – intervention). However, no statistically significant differences were found between them ($t = 0.07$, $p = 0.941$).

A 2 – sample t test was conducted to evaluate the differences between occupied and unoccupied patients on the dependent measures (overall satisfaction & gap).

- The results showed that there were statistically significant differences in the mean of the overall satisfaction between the occupied & unoccupied patients ($t = -2.62$, $p = 0.011$). The post – intervention patients (Mean = 4.65) reported higher levels of satisfaction than the pre – intervention patients (Mean = 4.25).

- There were statistically significant differences in the mean of the gap between the occupied & unoccupied patients ($t = 5.80$, $p = 0.003$). The occupied patients (Mean = -0.787) had lower gap than the unoccupied patients (Mean = 3.4).

4.2 Major Findings

In general, the findings supported majority of our preliminary hypotheses. However, there were a couple of surprises. The major findings of the study are:

- Overall, patients tended to overestimate the time they spent in the waiting room.
- Perceived waiting time is more important than the actual waiting time in predicting the overall satisfaction of the patients.
- As the perceived waiting time increases, patient satisfaction tends to decrease.
- Occupying the patient's mind with some kind of an activity tends to decrease the gap between perceived and actual waiting times.
- Occupied patients perceived higher satisfaction levels compared to that of unoccupied patients.

4.3 Overall Discussion

- Prior studies have suggested that perceived waiting time is generally correlated to the actual waiting time. The results in this study are consistent with those findings as it was found that there was a correlation between the perceived and actual waiting times in both the phases.
- In this study, the perceived waiting time was more than the actual waiting time in both the phases. These results are consistent with those findings of previous studies where customers tended to overestimate how much time they had waited for the service.

- Significant relationship was found between perceived waiting time and the overall satisfaction in both the phases. Whereas, there was no significant relationship found between the actual waiting time and overall satisfaction. The lack of relationship between actual waiting time and overall satisfaction and the presence of relationship between perceived waiting time and overall satisfaction suggests that patient perceived waiting time may play a more integral role in the formation of overall satisfaction impressions than the actual time spent.
- This study did not show any significant change in the gap between the pre & post intervention phases. Given that the new activities that were added in between the pre & post intervention phase, one would expect the patients in the post intervention phase would perceive lesser waiting times. Surprisingly, this is not supported in this study. One possible explanation is that the activities which were not added (music & bigger T.V) due to the operational issues might be affecting this.
- This study confirmed one of Maister's (1985) propositions on the psychology of waiting lines which state that "Occupied time feels shorter than unoccupied time". The gap between the perceived and actual waiting time was significantly shorter for the occupied patients than the unoccupied patients.
- It was also found that the overall satisfaction of the occupied patients were significantly higher than the unoccupied patients. This result might be due to the fact that the occupied patients perceive lesser waiting time than the unoccupied patients. As the overall satisfaction is negatively correlated to the perceived waiting time, the overall satisfaction certainly increases with the decrease in the gap.

- This study also confirmed that the post - intervention phase improved the overall satisfaction compared to the pre - intervention phase. This result is not surprising because the additional activities that were provided in the post intervention phase led to occupy more patients with some kind of an activity which further led to higher satisfaction levels.

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Appendix – ii

Activities that could be done while waiting

1. Make phone calls
2. Read newspaper
3. Read a magazine
4. Play electronic games with the cell phone
5. Text messages
6. Play games on the cell phone
7. Watch T.V
8. Bring along pencil and a game book of crossword puzzles, word jumbles
9. Talking with friends / relatives who accompanied
10. Talking with other patients who were waiting in line.
11. Reading a book
12. Listen to music
13. Play with the kids.
14. Drinking pop/coffee
15. Eating some kind of snacks
16. Browsing internet – checking email etc.
17. Take rest
18. Think about work – refocus
19. Take powernap.
20. Make a to-do list
21. Writing down the goals in life
22. Solve a problem
23. Thinking of something to do for the spouse.
24. Organize the wallet/purse
25. Consider how you'd go about asking for a raise.
26. Add up all the debt – plan about financial condition
27. Draw pictures
28. Try to remember something