

# A study to determine the most important variables of patient satisfaction in the case hospital

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## Abstract

As the number of hospitals in China grows and the demand for high-quality medical treatment increases, hospitals are being encouraged to maintain their standards by adhering to national criteria and to continually enhance their patient service. Most clinical cases in many underdeveloped nations are not effectively identified, treated, or monitored subsequently, according to some estimates.

Healthcare facilities sometimes struggle to meet the demands of patients who have diverse requirements or desires. Prioritize the whole experience of patients as well as the hospital itself, such as better presentation, more visits, and a better reputation to enhance patient satisfaction. When patients are satisfied, they are expressing themselves in a variety of ways about their subjective dimensions of experiences. It is possible to discover which areas of a hospital's operations could be improved based on patient feedback.

**Keywords:** SERVQUAL framework, regression analysis and decision trees

## Introduction

There are more and more hospitals in China, which means hospitals must keep their standards up to date with national regulations and enhance their service to patients. Most clinical cases are not effectively identified, treated, or monitored subsequently, according to several studies done in poor nations (Peabody et al, 2006). A lack of resources in underdeveloped nations may be a contributing issue, but a research shows that despite massive investments and adequate on-site amenities, there remains a low level of satisfaction (Bahrapour & Zoala, 2005).

A hospital's ability to fulfil every single patient is severely limited because the bulk of patients have particular demands or requests for medical services. Due to the importance of assessing patient satisfaction, not only is it important for the patient's experience in general, but it's also beneficial for the hospital in terms of better presentation, better management, better reputation and so on. There are a variety of ways to describe how patients feel about themselves (Pascoe, 1983). There are other benefits as well, such as the fact that patients have a substantial part in the quality improvement process. They can determine which areas require improvement and make thorough judgments based on patient wishes (Alhashem et al, 2011).

According on data from a small town hospital in China, the thesis' main objective is to identify important drivers of patients' satisfaction levels and to estimate the likelihood that patients would return to the hospital. As a result of China's unique health care system, as well as factors such as high levels of corruption and bureaucracy, researchers are less likely to come up with comprehensive and accurate findings. There will be no shortcuts used in this thesis.

Case hospital for further investigation is Shahu Central Hospital, an average-sized Chinese town hospital. Established in 1954 by the administration of XianTao, the Shahu Central Hospital became the city's first-tier public hospital. There are around 50 employees at this company, and it is located in the countryside near Xiantao city. This facility provides both inpatient and outpatient treatments, along with 24-hour emergency

care and transportation. Other departments include internal medicine, surgery, gynaecology and paediatrics. It is estimated that about 200 patients per day are seen on average in the beginning of 2019.

There will be two key chapters in the final section of the thesis. To begin, a brief introduction to the existing Chinese health care system will be provided together with evaluations of prior studies on probable drivers of patients' satisfaction levels.

On top of that, a conceptual model will be created based on prior findings and the current condition of the case hospital, as well.

### **Literature Review**

There have been notable improvements in the Chinese health care system, but it still has a long way to go. To keep up with China's rapid economic expansion, rising demand for improved health care and decreasing number of impoverished individuals throughout its history, China's healthcare system has been changed numerous times (Xi et al, 2017). After the previous health care system collapsed in the 1990s, leaving millions of individuals without health care, substantial changes were implemented. As a result of massive efforts on the part of the government, there are now three primary ways for urban and rural health care. Most people have easy access to medical services with this approach, and prices have been drastically reduced. Dense urbanisation and poor living circumstances, however, have left a huge disparity in hospitals and insurance coverage between urban and rural areas (Edoardo, 2015).

This led to a significant reduction in federal authority, with local authorities largely responsible for financing and overseeing the health care sectors in different regions. Since the fiscal support for public hospitals has been reduced as a result of reform, more hospitals have begun using unethical methods to make more profits by increasing the price of drugs, collecting extra cash from patients(also known as "Red Pocket" in Chinese term) and etc., which has a significant negative impact on patients' clinical experience and reputation of those hospitals (Blumental & Hsiao, 2005).

In 1998, the government launched the first basic medical insurance programme for urban employees. A specific proportion of an employee's gross salary must be paid by both the company and the employee as health insurance (Liang & Langenbrunner, 2013). However, when more and more people migrated to metropolitan areas, the government rapidly realised that it was a huge burden. Because of this, a reform was implemented to alleviate the burden on the government and businesses (Blumental & Hsiao, 2015).

Employers must pay 6 percent of their revenue to UEBMI and employees must pay 2 percent. Retired employees are exempt from paying the premium since they have previously paid for a specified number of years (Liu et al, 2016). Instead of flowing directly into employees' accounts as before, it is split into two primary channels: individual medical savings accounts and social pooling accounts, with social pooling accounts accounting for 70 percent of total premiums paid out by employers.

Medical savings accounts are used to cover outpatient, emergency service, pharmaceutical costs, whereas social pooling accounts are used to cover inpatient costs (Edoardo, 2015).

There are still certain urban inhabitants who are not covered by the UEBMI system, such as jobless citizens and children (under 18). Urban Residence Basic Medical was created in 2009 to guarantee that those minority are also covered by the plan (Liang & Langenbrunner, 2013). A primary goal of the project is to help jobless urban dwellers and children with chronic or severe illnesses.

In China, the rural population makes up a larger proportion of the total population than the urban population. As more and more people relocate to metropolitan areas with better opportunities, higher living standards, and better health care, the number of rural inhabitants continues to decline (Smith et al,

2005). Health care was difficult to obtain for rural inhabitants forty years ago, and even if they had the chance, they couldn't pay the exorbitant costs. Because education resources were scarce, most rural inhabitants were unaware of how important it was to keep themselves healthy by routinely washing their hands, avoiding contact with unclean surfaces, etc. Rural regions have a high fatal rate because to this, such as with the SARS pandemic (Edoardo, 2015). As

Therefore, the government resurrected the rural cooperative medical insurance programme to improve the health care system in the countryside (RCMS).

In addition to the three basic forms of insurance listed above, there are a few more. This includes Commercial Health Insurance (CHI), one of the most widespread forms of insurance in the world. Apparently, the present social insurance system isn't enough for wealthy families and individuals. The Commercial health insurance is generally purchased as a supplement in case of catastrophic events or serious sickness.

Comparing commercial health insurance to social health insurance, commercial health insurance has a greater reimbursement ratio and premiums, and the person must pay a comparatively higher price. But it doesn't stop individuals from buying Commercial health insurance.

Residents in metropolitan areas are more ready to pay for commercial health insurance because their financial condition is better.

Below, figure 1 illustrates the hierarchy and detailed structure of the present Chinese health care delivery system.

Both the government and professional medical groups monitor China's existing health care system. As a result, the government has complete authority over all professional health care units. There is therefore a combination of horizontal and vertical management across the organisation (Shi, 1993). Chinese health care may be divided into two major categories: urban and rural. Urban hospitals are divided into province and city hospitals. A three-layer model that includes county, township, and village health units can be used to show the rural sector. This type of health unit is found in counties, municipalities, and villages with minimal health resources, as the name suggests (Tao & Wang, 1992).

Ministry of Health clearly sits atop the hierarchy. Ministry of Health has direct and considerable influence over all its subordinate entities, as it is overseen by the state council. Other responsibilities include managing government financial resources, as well as providing funding to various medical institutes, schools, etc (Hillier & Shen, 1996).

That's followed by a provincial health bureau under the direct supervision of each province, which is responsible for about 700 provincial hospitals. Due to the fact that there are 34 provinces and autonomous areas in China, each province's administration style and health resources are entirely distinct (Shi, 1993). Main responsibilities of the Provincial Health Bureau are dedicated to maternity and newborn health. Defensively, the Provincial Health Bureau must ensure that the norms and standards established by higher authorities, such as the Ministry of Health, are properly maintained and monitored.

There is no question that there is a big disparity between urban and rural people in terms of health resources. According to Figure 2, medical institution beds per 1,000 people in urban regions are about twice as high as the total number of beds per 1,000 people in rural areas, which include township health clinics. Aside from that, the number of licenced physicians in urban hospitals is double that of rural ones. According to the data given, people of distant towns and villages have limited access to high-quality

hospitals with extensive infrastructure. In addition, it explains why an increasing number of rural inhabitants are moving to metropolitan regions, where living standards are much better.

Aside from the unequal distribution of health resources, inefficiency is seen as a major cause of patient dissatisfaction and irritation. Sometimes, hospital personnel may be unprofessional, meaning they aren't entirely committed to their jobs, and resources may be inefficiently used in some cases as well. The average length of time a patient stays in a hospital bed at an urban hospital is eight days. Due to inadequate scheduling, several hospitals tacitly recommend that patients stay in the hospital for many days prior to the formal procedure.

China's state hospitals are generally subsidised through providing wages to hospital staff. Aside from that, hospitals will be able to use the income generated by the services they give to patients. They are usually used to buy new equipment, renovate the hospital and to pay out bonuses at the end of the year. Notably, hospitals' prices are set by the government, which keeps them below cost, allowing the poor to have easy access to health care in general (Winnie and William, 2008).

The fragmentation of services in the present health care system is a major flaw in the current health care system. In reality, not all health care facilities are run by the local government.

It is possible that some of them are owned by military institutions, businesses, people and so forth. Hospitals and private clinics are known to engage in fierce competition with one another on a daily basis. When it comes to speed and customization, the private clinic may beat hospitals, albeit at a greater expense. They are better at delivering dependable and economical treatments than private hospitals.

### **Research Gap**

Studies on patient satisfaction have been conducted on a wide range of topics including management systems, locations, services, hospital employees, patient profiles and so on.

According to research, these factors may be divided into two categories: hospital features and patient characteristics, as both of them have a significant impact on patients' satisfaction levels (Kotler, 2003).

Hatice and Zineldin (2010) define professional healthcare as the capacity of hospital employees to deliver promised and qualified treatment in accordance with the hospital's standard operating procedures and regulations. This is the dependability component of the SERVQUAL model (Hatice and Zineldin 2010). Numerous studies have shown that professional treatment has a significant impact on patient satisfaction.

Patients' satisfaction tends to be better when they receive adequate therapy, according to Andaleeb (2001). The happiness of patients is also influenced by professional management, skill in diagnosing and treating illnesses, and frequent patient monitoring. Patient satisfaction is greatly reduced by incompetent hospital staff, bad administration, and a lack of skill in managing disease (Carlin et al, 2012).

When it comes to the attitudes of hospital staff, they are significantly associated with patient satisfaction. Most patients have no idea what sort of ailment they have, and they suffer from aches and anxieties as a result of the disease. Visitors to hospitals expect hospital staff to be professional, pleasant, and courteous when they visit the hospital's facilities. Apart from that, they are anxious to dispel their doubts by bombarding you with numerous inquiries. The odds of patients being dissatisfied and irritated are quite high if hospital workers behave with impatience, contempt, and other unpleasant actions (Chen et al., 2013).

There are a number of tangible factors that have an impact on patient satisfaction. As soon as a patient enters the hospital, their first impression of the institution and the surrounding environment is critical. Because of the first impression, they're far less likely to be happy with the service. As an alternative, if

people make a positive first impression, their odds of being satisfied are higher. Sovd et al. (2006) confirm that the physical environment has a beneficial impact on patient happiness.

There are a number of factors that contribute to the hospital's accessibility (Sitza, 1997). Accessibility and patient happiness have been examined extensively by many researchers and a substantial positive link has been established (Crow et al., 2002). Patients are more likely to give positive feedback if the hospital is more easily accessible.

The average waiting time is regarded as the most important factor for patients (Sitza, 1997). The relevance of other components is not overlooked, though. Waiting too long might cause patients to get irritated and upset, which has a negative impact on the hospital's reputation. Patients are less likely to return for a subsequent visit if they have to wait longer without being told, especially for emergency services (Rahmqvist & Bara, 2010). Aside from that, for patients who are

Far from the hospital it might be seen as an indication of importance. According to a research, 50% of patients believe that the present admission and discharge process is too long and difficult, resulting in wasted time (Lin et al., 2001). These conditions make patients less likely to be happy with their clinical experience, according to the American Medical Association.

However, there is one issue that cannot be overlooked: the price. Customers have always been preoccupied with price, and this is equally true for patients. Researchers at the University of Michigan found that pricing and patient satisfaction are adversely related, according to Victor et al. (2012). Patient discontent is common when hospital expenditures are more than expected.

Those with insurance, on the other hand, don't worry about the expense of the service. Their primary worry is whether or not they received adequate and good care (Xiao & Barber, 2008). As a result, this rationale does not apply to patients with health insurance who, when expenses are high, tend to be more satisfied since they see greater costs as an indication of superior care. As a result, people without health insurance are unlikely to be happy with the treatment, which comes at a hefty cost.

### **Research Objective & Methodology**

If you want the best outcomes from your study, you need the right approach. A research technique, on the other hand, is not always easy to choose. To paraphrase Sogunro, most researchers face the issue of selecting the best appropriate approach. Quantitative and qualitative techniques are the two most often utilised strategies by researchers (Yilmaz, 2013). In any case, this does not mean that these two approaches are universally applicable because various research aims might result in different research methodologies. In some cases, a combination of the two methods may be used in a single study.

As Creswell (1994) explains, quantitative research is focused on clarifying problems based on the implications numerical data, which will be extensively evaluated using various statistics approaches. In quantitative research, questionnaires are typically used, which are sent to target groups based on the study objective. On the other hand, Strauss and Corbin (1998) define qualitative research as a form of study that does not rely on statistical methodologies or other quantitative methods to obtain its conclusions. This allegation appears to be fabricated.

instead of taking into account other aspects of study design. Adding to the concept, Yilmaz (2013) says qualitative research stresses understanding an issue by utilising descriptive language from different informants in a natural environment. Interviews are regarded to be the most common qualitative research tool.

The selected research approach is quantitative, as mentioned in the preceding section. It is therefore necessary to create and build a questionnaire that will assist in identifying those key factors that influence the case hospital's satisfaction. It's no surprise, therefore, that the target audience for this case is Chinese. This means that a Chinese version of the survey must be created so that the respondents can easily access and comprehend it.

My thesis will, however, include an English version for the benefit of my readers and supervisors.

Patients are asked to rate their overall satisfaction with the case hospital in the first portion of the questionnaire, which is divided into four sections. There are three primary parts to this study. The second section looks at how case hospital factors influence patient outcomes. Part three looks at how patients factor into case hospital factors, and part four evaluates patient willingness to return to case hospital. Questions 1 and 2 make up the first section of the questionnaire

There are a total of seven Likert scale questions, with zero being the least score and seven being the maximum score.

As soon as the final version of the questionnaire is completed, steps are made to find ways to get it out to the intended audience. As the number of Chinese who own mobile phones continues to rise, filling out the questionnaire online is quite handy. With Wenjuanxing, China's largest online survey platform, the questionnaires are distributed among the patients at the case hospital. To make it easier for older people to fill out the questions, I decided to print them out in paper format.

One of the care characteristics is given a score of 0, which makes no sense. As a result, these types of answers are thrown out. Total answers have an useable rate estimated at 97 percent, which is quite high. Patients may have a strong desire to improve the case hospital, which might be the cause.

### **Data Analysis & Findings**

Two or more variables must be compared in a correlation study. Researchers will be interested in investigating how strong the associations are and whether they are positively linked or not if these factors have been shown to be associated (Chok, 2010). The importance of understanding the many forms of correlation analysis and selecting the most relevant ones for your research is therefore paramount.

There are several ways of measuring how closely two variables are connected, and correlation analysis is one of the most often used methods. If the value of one variable is reliant on the other, Sheskin (2007) notes that the two variables are said to be linked. Assuming A and B have a positive correlation, this means that the value of A will grow as well. It's the opposite when A's value grows and B's does not.

Forecasting relies heavily on a statistical technique called linear regression. Measure the link between the target variable and independent variables, as well as forecast the result of a given event, is at the heart of the method's basic principle.

Beyond linear regression, the decision tree technique offers information on how to get optimal outcomes in addition to those of linear regression analysis. As a general rule, the decision tree technique involves supervised learning. There are leaf nodes and nonleaf nodes (Leonard, 2017).

The decision tree technique is one of the most widely used supervised learning systems, and it produces results that are very accurate and stable. Unlike linear regression analysis, non-linear connections may be addressed and evaluated fully utilising a decision-tree framework. Since there are so many variables in different datasets, the system is regarded as being very adaptable. Decision tree models may be further divided into two categories. regression tree decision-making

It is more common to use decision tree classification since it is easy to identify which label a variable belongs to by looking at the tree it generates.

In all, there were 271 valid answers from patients at Case Hospital. A 43-year-old sample, as can be shown in Table 6, may seem excessively elderly. The minimum and maximum ages, respectively, are 18 and 80 years old. The frequency plot shows that the bulk of our respondents are between the ages of 40 and 70, indicating that the majority of our respondents are elders, as shown by their age. Regarding gender, there are 141 men and 130 women, which is a very evenly split number.

## **Conclusion**

In order for the case hospital to enhance its management system, it must be aware of its flaws. As a consequence of this research, numerous suggestions are made with the goal of improving patient happiness and the clinical experience in general as a whole.

First and foremost, hospital employees should be well-trained and nurtured in terms of professional knowledge and experience. The example hospital will be able to enhance patient satisfaction and return rates by delivering high-quality service. In addition, physicians and nurses need to have a professional attitude in order to be effective. Diagnoses and treatments must be based on a thorough grasp of the patient's health history. In addition, a detailed treatment plan and instructions on how to take the medication are essential. As far as future hospital recruiting is concerned, the case hospital will need to thoroughly examine the candidate's professional background before making a final hiring decision.

As a second consideration, the accessibility of services must be prioritised. Patients don't appear to be happy with the present service time, based on the findings. For patients, a lengthier service session is helpful since it allows for a more thorough treatment or clarification of sickness, according to a recent survey. Some physicians, on the other hand, may prefer a shorter service session, which gives them more time to take care of personal matters and document patients' records. If doctors want to improve patient happiness, they may have little choice except to extend the present service time. If a longer service duration is not allowed, patients can be given a comprehensive explanation of why a short session is better.

As a consequence of a few restrictions, this study's findings are less accurate. There are too few data points for machine learning models. When supplied with more data, machine learning models tend to provide more accurate outputs. In this example, there are only 283 replies, and after filtering out the incorrect ones, there are only 271 records that may be used for machine learning models. As a result of the 7:3 split between the training and testing sets, there is not enough data to evaluate the accuracy of two models simultaneously. Because of this, the lack of data leads to the standard machine learning overfitting issue. It's possible that the random forest model's high accuracy (86.6 percent) isn't typical since the training data is insufficient. Therefore, the model has not learnt enough from the dataset, resulting in an exceedingly basic training model. In other words, there is not enough learning going on. It is possible to collect additional data in the future so that the model may be properly trained, therefore eliminating the problem of underfitting. As a second restriction, the huge number of variables that are included in the models might provide an issue. Using all factors, it is certainly useful to identify every key driver and predictor of patient satisfaction and readiness to return. It is true, however, that there are both required and superfluous variables in the equations. Models with redundant variables have a reduced accuracy level, which might be detrimental to the models. Because of this, it is important to eliminate duplicate variables and maintain just those that are necessary. In the future, feature selection might be used to pick relevant variables in machine learning models.

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