

**PATIENT FACTORS INFLUENCING SATISFACTION WITH
QUALITY OF HEALTHCARE IN KENYA: A COMPARISON OF
ORDERED LOGIT AND ORDERED PROBIT REGRESSION
MODELS**

BY

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DECLARATION

I solemnly declare that this Research Project Report is my original undertaking and has not been presented in any institution whatsoever for scholastic award or otherwise.

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DEDICATION

I dedicate this study to my beloved parents - Mr. & Mrs. Samuel and Leah Kiget; my very dear and loving wife Ms Judy Chepkutto and my cheerful children Speziola Chemutai and Solace [Newwell] Kiprop.

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LIST OF ACRONYMS AND ABBREVIATIONS

CATI.....Computer Aided Telephone Interviews

CP.....Contact Points

CSI.....Customer/Patient Satisfaction Index

ESI.....Employee Satisfaction Index

ExM.....Experience Model

FBO.....Faith-Based Organization

MOMS.....Ministry for Medical Services

MOPHS.....Ministry for Public Health and Sanitation

PFI.....Priorities for Improvement

PSI.....Patient Satisfaction Index

SMART.....Specific, Measurable, Attainable, Relevant, Time-bound

VCT.....Voluntary Counseling and Testing

WHO.....World Health Organization

ABSTRACT

This study compares ordered logit and ordered probit regression models in identifying patient-level factors that influence his/her satisfaction with quality of health care. Patient satisfaction is a desirable outcome of a health system and is the most common metric used to assess the quality of healthcare provided. The data used was collected from public and private/faith-based health facilities in Kenya. The target population was the patients exiting the health facilities after receiving healthcare. The outcome variable was measured on a five-point ordinal scale: Very Satisfied, Somewhat Satisfied, Neutral, Somewhat Dissatisfied and Very Dissatisfied. The socio-demographic factors considered as influencing the outcome measure are the patient's age, gender, education level and employment status as well as facility type and ownership of health facility.

The study demonstrated that, provided that the proportional odds assumption is met, the ordered logit, and the ordered probit regression models produce relatively similar results. It also highlighted that patient's age, gender, education level and employment status are significant in predicting his/her satisfaction with quality of healthcare received. Since the two models considered produce similar results, either of them can be used to model patient satisfaction data.

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CHAPTER 1: INTRODUCTION

1.1 BACKGROUND INFORMATION

According to Juran (1988) and Crosby (1979) quality simply means “fitness for use” or “conformance to requirements or specifications” respectively. These definitions are consistent with that of Peach (2000) who said quality is “...the totality of characteristics of an entity that bears on its ability to satisfy stated or implied need”. It can also be said to be an excellence in goods and services, especially to the degree they conform to requirements and satisfy customers (American Society for Quality, 2001). In the healthcare context, WHO (1988), defines quality as “...the performance (according to standards) of interventions that are known to be safe, that are affordable to the society in question , and have the ability to produce an impact on mortality, morbidity, disability and malnutrition”. Donabedian (1983) affirms that quality in healthcare denotes “all the arrangements and activities that are meant to safeguard, maintain and promote the quality of care”. The most durable and widely cited definition of healthcare quality was formulated by the Institute of Medicine (IOM) in 1990. According to the IOM, quality consists of the “degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge”. Other authors have recognized Deming’s appreciation of the importance of the market. They refer to care that meets the expectations of patients and other customers of healthcare services. Therefore, for the purposes of this discussion; we have expanded the IOM definition. Quality consists of the degree to which health services for individuals and populations increase the likelihood of desired health outcomes (quality principles), are consistent with current professional knowledge (professional practitioner skill), and meet the expectations of healthcare users (the marketplace).

In the healthcare industry, quality of care is more than a concept; it is an important factor in the delivery of healthcare (Buttell, Hendler and Daley, 2007). It is a critical dimension of social justice and human rights principle and norms, and it forms one of the pillars of a viable and sustainable healthcare system (MOMS and MoPHS, 2011).

Increasingly, health care stakeholders such as governments, health authorities and consumers are attaching importance to health care quality (Lapsley, 2000; Smith et al. 2006). More and more, patients' satisfaction is recognized as essential component in the evaluation of health care quality (Derose et al. 2001; Donabedian, 1992). The quality of health care is not confined to clinical effectiveness or economic efficiency but also incorporate social acceptability as an important quality objective (Calnan, 1997; Donabedian, 1992; Maxwell, 1984).

Monitoring and evaluating consumer satisfaction with health care is a crucial input to improving the quality of health system and changes in the system as well as providing feedback for health care professionals and policy makers (Bara et al. 2002). Measures of consumer satisfaction with health care can provide important assessment of quality of healthcare not adequately captured by other health service statistics such as patient throughput, waiting times, consultation times and proximity (Sitzia and Wood, 1997; Williams and Calnan, 1991). In fact, it has been suggested that patient satisfaction is a major quality outcome in itself (Derose et al. 2001). The extent to which health care users are satisfied with their local providers may be a key factor underpinning their health behaviour and health care utilization (Rakin et al. 2002; Hadorn, 1991). It is envisaged that timely, accessible, appropriate health interventions, continuous and effective health services are important components of health care quality (Cambell et al. 2000).

Thus, one of the primary concerns of a health system revolves around the issue of patient/client satisfaction. In today's market, individuals are faced with many different options when deciding on a specific healthcare provider. Due to the varying options, quality and service stands out as two essential elements that influence the selection process. Thus, a healthcare provider's reputation for its commitment to quality and patient-centred customer service stands as one of the main criteria for individuals in choosing a healthcare service provider. Thus in improving health care service delivery, employee and patient satisfaction become crucial. One of the most effective tools that the government uses to measure how well services are provided to clients is through a client satisfaction survey. Client/Patient satisfaction is a relative concept, a reflection of the patients' evaluations of the quality of care, which relies on a subjective standard. The study described here evaluates patient satisfaction, as a measure of the quality of health care services provided by the public health system.

Patient satisfaction reflects a health consumer's attitude about service, service providers or patient's health status (Hall and Dornan, 1988-1), and being a component of healthcare quality and is increasingly being used to assess medical care in many countries (GoK, 2009). Patient satisfaction is deemed an important outcome measure for health services. As part of providing quality health care, addressing consumer satisfaction becomes paramount. Patient satisfaction is an important measure of healthcare quality because it offers information on the provider's success at meeting the expectations of the client. Patient satisfaction has been an important issue for health care managers. Many previous studies have developed and applied patient satisfaction as a quality improvement tool for health care providers (Young, Meterko and Desai, 2000). Following increased levels of competition and the emphasis on consumerism, patient satisfaction has become an important measurement for monitoring health care performance of health plans (Jatulis et al, 1997). This

measurement has developed along with a new feature: the patient's perspective of quality of care (Rubin, 1990).

Various dimensions of patient satisfaction have been identified, ranging from admission to discharge services, as well as from medical care to interpersonal communication. Well-recognized criteria include responsiveness, communication, attitude, clinical skill, comforting skill, amenities and food services. It has also been reported that the interpersonal and technical skills of health care provider are two unique dimensions involved in patient assessment of hospital care (GoK, 2009).

Determinants of patient satisfaction have been reported extensively. According to previous studies, patient characteristics such as age and education may influence a patient's assessment of hospital performance (Hargraves et al, 2001). A patient's health status and the severity of illness is also an important predictor of the patient's overall satisfaction level. Hospital features such as hospital size have been reported to be associated with consumer assessment of hospital quality. The relationship between health care providers and patients (i.e. interpersonal skill) has been reported to be the most influential factor for patient satisfaction (Cleary and McNeil, 1988).

1.2 STATEMENT OF THE PROBLEM

In 2001, the IOM (USA) asserted that as “as medicals science and technology has advanced at a rapid phase, the healthcare delivery system has floundered in its ability to provide consistently high quality care to all”. In Kenya, issues of quality of healthcare have lately come into sharp focus (MoMS, 2008).

As per WHO (2006), a wealth of knowledge and experience in enhancing the quality of health care has accumulated globally over many decades. In spite of this wealth of experience, the problem frequently faced by policy-makers at country level in both high- and low-middle-income countries is to know which quality strategies – complemented by and integrated with existent strategic initiatives – would have the greatest impact on the outcomes delivered by their health systems. One such desired outcome is the patient satisfaction. There are two main arguments for promoting a focus on quality in health systems at this time. Even where health systems are well developed and resourced, there is clear evidence that quality remains a serious concern, with expected outcomes not predictably achieved and with wide variations in standards of health-care delivery within and between health-care systems. Where health systems – particularly in developing countries – need to optimize resource use and expand population coverage, the process of improvement and scaling up needs to be based on sound local strategies for quality so that the best possible results are achieved from new investment. These sound strategies must be evidence-based - anchored on an in-depth understanding of determinants of that desired endpoint.

While many studies have been done on patient-related factors influencing his/her satisfaction with quality of healthcare received, very few if any at all has attempted to compare the results of the ordered logit, and the ordered probit regression models. Hahn E.D and Soyer R (2000) posit that the current opinion is that probit and logit models give essentially similar results in univariate binary response models. However, for multivariate binary response models, such advice is misleading. Predicting patient satisfaction requires the application of multivariate regression modeling techniques since multiple factors contribute to this outcome, and was thus the focus of this study.

1.3 RESEARCH QUESTIONS

What patient factors significantly influences his/her satisfaction with quality of healthcare received in Kenya?

How does the ordered logit and the ordered probit regression models compare when used to model patient factors influencing his/her satisfaction with quality of healthcare received in Kenya?

1.4 RESEARCH OBJECTIVES

Broad objective

The overall aim of the study was to compare the outcome of ordered logit and ordered probit regression models in investigating the patient factors influencing his/her satisfaction with quality of healthcare received in Kenya.

Specific objectives

The specific objectives of the study were:

- (i) To determine the level of patient satisfaction with the healthcare received in Kenya
- (ii) To determine the patient factors which significantly influence his/her satisfaction with quality of healthcare received
- (iii) To compare the results of ordered logit and the ordered probit regression models when used to model patient factors influencing his/her satisfaction with quality of healthcare received

1.5 JUSTIFICATION

The main aim of conducting the survey was to find out the level of patient satisfaction with the health care delivery at public health facilities. Patient feedback is important for gaining an understanding of the level of client satisfaction. An understanding of the determinants of client satisfaction helps policy and decision makers to implement programs tailored to meet patients' needs as perceived by patients and service providers. This is in line with the vision, outlined in the current National Health Sector Strategic Plan II (NHSSP II), as “*an efficient and high quality care system that is accessible, equitable and affordable for every Kenyan*”. The data gathered through measuring patient satisfaction accounts for the level of care delivered by health staff and as a result holds health staff accountable for their service. The information generated from the survey will not only be used as a tool in decision-making but will also be used as a barometer for assessing any improvements that has occurred since the earlier survey conducted in 2007 and make further recommendations on improving the experience of clients being seen at public health facilities in Kenya.

This Study focused on the overall satisfaction that patients gain from consuming health services from a given provider, public or private as it relates to the person-level factors. Patient satisfaction is affected by both personal (level 1) and organizational (level 2) characteristics, but much of the overall variability is explained at each level is a subject of inquiries. Investigating the variation of satisfaction within and between individuals, and also within and between hospitals and its origins provides valuable information for planning effective policies of quality improvement. In fact, depending on whether patient experience is more influenced by patient or hospital characteristics, different actions have to be defined and implemented.

1.6 HYPOTHESES

The research hypotheses to be established are that the age, gender, education level, marital status and employment status of a patient significantly influences his/her satisfaction with the quality of healthcare received; and the null hypotheses to be tested are that the age, gender, education level, marital status and employment status of a patient do not significantly influence his/her satisfaction with the quality of healthcare received in Kenya

1.7 SCOPE OF THE STUDY

The Client/Patient Satisfaction Survey covered both public and private/faith-based health facilities across all NHSSP II levels in Kenya involving all the then 8 provinces.

1.8 LIMITATIONS OF THE STUDY

The study had one main limitation: the patient factors (i.e. the predictor variables) studied are limited to age, gender, education level and employment status. Other patient factors that could possibly influence satisfaction with healthcare like patient's health and marital status among others were not captured in the primary study and therefore their possible confounding role could not be assessed and controlled.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

This literature review covers issues of quality; quality of healthcare; Kenya Quality Model for Health (KQMH); measuring quality of healthcare and patient satisfaction as a healthcare quality measure.

2.2 QUALITY OF HEALTHCARE

Quality of healthcare is the foremost goal of any health system (KQMH, 2000).IoM (2001) has provided a set of suggestions that a health system should seek to make improvements in six areas (or dimensions) of quality, which are named and described below. These dimensions require that health care be:

- *effective*, delivering health care that is adherent to an evidence base and results in improved health outcomes for individuals and communities, based on need;
- *efficient*, delivering health care in a manner which maximizes resource use and avoids waste;
- *accessible*, delivering health care that is timely, geographically reasonable, and provided in a setting where skills and resources are appropriate to medical need;
- *acceptable/patient-centred*, delivering health care which takes into account the references and aspirations of individual service users and the cultures of their communities;
- *equitable*, delivering health care which does not vary in quality because of personal characteristics such as gender, race, ethnicity, geographical location, or socioeconomic status;

- *safe*, delivering health care which minimizes risks and harm to service users.

2.3 THE KENYA QUALITY MODEL FOR HEALTH (KQMH)

The GoK through the MoH in collaboration with the stakeholders is providing leadership and stewardship in the development of Health Systems for improved quality health services. In 2001, the MoH through the Department of Standards and Regulatory Services (DSRS) spearheaded the development of the Kenya Quality Model (KQM) to provide a conceptual framework for quality improvements of the health services in the country. The document integrated evidence-based medicine through wide dissemination of public health and clinical standards and guidelines with total quality management and patient partnership (PP). It also defined quality improvement in healthcare as a process: to improve adherence to standards and guidelines; to improve Structure – Process - Outcome of health services by applying quality management principles; and to satisfy patients/clients needs in a culturally appropriate way.

In the year 2008/09, KQM was renamed the Kenya Quality for Health (KQMH) and expanded in scope to cater for clinical, management and leadership so as to address the inadequacies of the KQM (KQMH, 2011) which is presently being implemented by the GoK through the Ministry of Health (MoH) in an effort to improve the quality of healthcare.

2.4 MEASURING QUALITY OF HEALTHCARE

One of the first comprehensive works that focused on quality of healthcare was published in a series of three books by Avedis Donabedian (1980, 1982 and 1985) and was summarized in a subsequent article by himself (Donabedian, 1985). He propose that one could assess whether high quality care

is provided by examining the structure of the setting in which care is provided, by measuring the actual process of care and /or by assessing what the outcomes of the care are.

The Donabedian's article (1985) defines the structure as the characteristics of the setting in which care takes place. Measures of the setting used might include characteristics of: Physicians and hospitals (e.g., a physician's specialty or the ownership of a hospital); Personnel; and/or Policies related to care delivery. Increasingly, we view structure as not just the way clinics and hospitals are organized and operated, but by the policies they have in place that affect care quality. For example, processes for monitoring and promoting quality, incentives for high quality care, etc. can have an influence on how well care is delivered. A motivation for focusing on structure is the premise that the setting can be a strong determinant of care quality and given the proper system, good care will follow. For example, one would expect care to be of higher quality when all staff are clear about their roles and responsibilities, when there are strategies for monitoring adherence to recommended procedures, and there are systematic approaches to continuously improving care quality.

Donabedian (1985) further elaborates the process measures as assessing whether a patient received what is known to be good care. They can refer to anything that is done as part of the encounter between a physician or another health care professional and a patient, including interpersonal processes, such as providing information and emotional support, as well as involving patients in decisions in a way that is consistent with their preferences, etc.

Lastly, Donabedian (1985) gave the definition of outcomes as referring to a patient's health status or change in health status (e.g., an improvement in symptoms or mobility) resulting from the medical care received. This includes intended outcomes, such as the relief of pain and unintended outcomes,

such as complications. Although the term “outcomes” is sometimes used loosely to refer to results such as mammography rates, such measures are actually process measures in the Donabedian sense. There is also a category of measurement called intermediate outcomes. This includes measures like Hemoglobin A1c levels for people with diabetes and blood pressure measurements. These intermediate outcomes are often closely related to other health outcomes.

For outcomes to be used as quality of care measures, they must reflect, or be responsive to, variations in the care being assessed (Deyo, Diehr, & Patrick, 1991; Terwee, Dekker, Wiersinga, Prummel, & Bossuyt, 2003). For example, it is known that taking blood pressures is necessary for monitoring how well blood pressure is controlled and that controlling blood pressure reduces the probability of heart attacks, strokes and other bad outcomes. It is also known that certain outcomes, such as death after being treated in a hospital for a heart attack is related to the quality of care provided.

2.5 PATIENT SATISFACTION AS A HEALTHCARE QUALITY MEASURE

2.5.1 Complex nature of Patient satisfaction: Dimensions that can explain patient satisfaction’s concept

The complex nature of patient satisfaction’s concept implies that dimensions to be investigated are well identified considering the patient perspective (Calnan, 1988). In fact, a critical aspect in the patient satisfaction’s measurement is that models and instruments sometimes reflect the providers’ perspective rather than the patients’ one (Calnan, 1988). Thus, in order to monitor patient satisfaction with a health service by using questionnaires it is not enough to identify the main aspects of care and to define questions related to them. On the opposite side, it is important to use

appropriate and scientifically rigorous means to measure patient experience so that accurate and meaningful information is produced.

In 1990s researchers, health policy-makers and managers gave more attention to the patient perception of the quality of health services (Behm et al., 2000). In these years, the patient satisfaction studies have increased as shown by a PubMed search for “patient satisfaction” or “customer satisfaction”. Results of a PubMed search for “Patient satisfaction” or “Customer satisfaction” concepts (1950 – 2010). Despite its large use, the patient satisfaction was initially considered as a difficult concept to be measured and interpreted (Fitzpatrick & Hopkins, 1983; Williams, 1994). A unanimous consensus on the definition of satisfaction with healthcare is not already fully achieved (Avis et al, 1996; Baker, 1997) due to the multi-dimensional and subjective nature of this concept, which is affected by individuals’ expectations, needs or desires. For example, when users have limited knowledge of opportunities and low expectations of service quality, high satisfaction scores may be recorded even though poor standards of care have been ensured. Factors influencing dissatisfaction could be somewhat different from factors generating satisfaction. While on one side an adequate or acceptable standard of quality might be considered as necessary, on the other, a feeling of satisfaction might result from a high quality service. Moreover, when something negative happens consumers might be satisfied or not; for instance, this depends on whether the negative event is caused by the health professionals or it is not due to their behavior (Williams et al, 1998). Thus, it is possible that what makes one person satisfied might make another one dissatisfied (Avis et al, 1996; Greeneich, 1993). These ambiguities related to the “patient satisfaction” concept enhance the debate among researchers, health professionals and managers. In recent years, new approaches have also been evaluated and adopted in order to introduce more objective measures of the service’s quality. For instance, researchers ask people to report in detail their experience with

health service using reporting and rating scales. The obtained results could be considered more helpful in order to identify weaknesses in the delivery and organization of the health services (Jenkinson et al, 2002). Sometimes, also patients' willingness to use again and/or recommend services (e.g., hospital, general practitioner, etc.) is investigated as a reliable proxy of overall evaluation both in not for profit and in market-based health systems.

A common objection to patient satisfaction research is related to technical and methodological issues (Rubin, 1990; McDaniel and Nash, 1990). In 1990s, when patient satisfaction measures were increasingly used to monitor the performance of health services, Sitzia (1999) pointed out the poor attention to the validity and reliability properties of questionnaires adopted in previous studies. These properties explain the extent to which a questionnaire is really able to capture the construct it is supposed to measure (Streiner et al, 2008). When the questionnaire properties are not evaluated and methodological weaknesses exist, misleading results may be generated and erroneous signals may be sent out. Thus, a rigorous methodology has to be ensured.

2.5.2 Personal and organizational factors that better explain the variability of patient satisfaction

A large number of studies analyzed how the patients' perception of health services' quality is influenced by their expectations; socio-demographic characteristics and clinical needs (Westaway, 2003; Bruster et al., 1994; Sitzia and Wood, 1997). Moreover, in recent years, the characteristics of the external environment have been also considered as additional factors influencing individual evaluation. Researchers mainly observed whether variations exist across different organizations (e.g.hospitals) (Stubble et al, 2007) (Kollen et al, 2010) and which their origins are (Veenstra et al, 2003; Brown et al, 2008; Hekkert et al, 2009; Salisbury et al, 2010;Van Empel et al, 2010). A combined analysis of both individual and contextual characteristics allows taking into account the main aspects influencing overall satisfaction. Furthermore, adjusting for these aspects, patients'

ratings can also be compared across organizations. The paper (Murante A.M., Seghieri C., Nuti S., Brown A.D., *The effects of institutional characteristics on inpatient satisfaction. A multilevel analysis*, proceeding) focuses on the multidimensionality of the health quality concept. As pointed out by Donabedian (Donabedian, 1988) structural and organizational aspects, healthcare process and patient satisfaction have to be considered together according to a comprehensive approach.

2.5.3 The patient role

Usually, words as *patient*, *user* and *consumer* are indistinctly used as synonyms, even though they differ for the nature of relationships between health professionals and citizens. While the *patient* is a person who has an illness and comes to doctors and nurses asking for advice and treatment, the *user* may identify people who used, use or could use health care services. Instead, the *consumer* reminds us of a person who purchases goods and services for his needs or a person who consumes something (Herxheimer and Goodare, 1999). According to McIver (1992) in 1980s a general shift towards consumerism, evident in UK National Health System, increased the promotion of a “customer service-oriented culture”. Thus, even though the use of “consumer” concept in health care mainly received a wide opposition from the medical establishment (Wassersug, 1986) because of its strong commercial connotation (Blaxter, 1995; Leavy et al 1989, Normand, 1991), the consumerism movement introduced in health systems the issue of the protection of the consumers’ interests. Patient becomes a consumer when he looks for health services after having collected all information helpful to make the best choice (Shackley and Ryan, 1994). In this regard, researchers questioned: *Can patient fulfill the role of consumer? And more, Does patient wish to fulfill it?* (Owens and Batchelor, 1996). In 2002 a study conducted in eight European countries (Germany, Italy, Poland, Slovenia, Spain, Sweden, Switzerland and UK) highlighted that patients ask for a more autonomous role in the health care decision-making process and, then, for more information, equitable access, freedom of choice, prompt attention, respect and quality of amenities (Coulter and Jenkinson,

2005). Nonetheless, consumers of health care still are often not well and sufficiently informed. This information asymmetry causes an imbalance in the relationship between who asks for health services and who provides them. Even though much effort has been put into these issues, the Health Care Systems still have to work in order to move away from the idea of patient as a passive and dependent stakeholder.

2.5.4 Elements to be considered in order to create patient -oriented services

In the last years health systems changed the way of thinking and delivering care: patient became the centre of the overall care process and new organizational models were applied in order to provide patient-centered services. The publication *Seeing the person in the patient* (Goodrich and Cornwell, 2008) provides several definitions of the “patient-centered care” concept, of which the most complete and clear one identifies the following dimensions: “(i) compassion, empathy and responsiveness to needs, values and expressed preferences; (ii) co-ordination and integration; (iii) information, communication and education; (iv) physical comfort; (v) emotional support, relieving fear and anxiety; (vi) involvement of family and friends” (Institute of Medicine, 2001). This definition is consistent with the responsiveness’s goal assigned to the international health systems by the World Health Organization. In fact, health services have to meet the clinical needs of population as well as to ensure respect for persons, prompt attention, quality of amenities, access to social support networks and choice of the provider. Based on these premises, the third paper (Murante A.M., Nuti S., *A marketing approach for creating patient oriented pathways in hospital services*, accepted at the 10th International Marketing Trends Conference, Paris, January 2011) aims at promoting marketing’s approaches and methods in order to orient health policies towards the actual needs of citizens. The study focuses on the elements that most affect the patient’s overall experience and the factors to be improved in order to create patient-centered hospital service. The

analysis highlights also the differences existing among patients hospitalized in three different wards (medical, surgical and obstetrical, gynecological and pediatric).

2.5.5 Patient satisfaction measurement

A critical aspect in the patient satisfaction's measurement is that models and instruments sometimes reflect the providers' perspective rather than the patients' one (Calnan, 1988). For example, the patient capability to evaluate health services and professionals' skills is frequently questioned (Ben-Sira, 1976; Rao et al, 2006), even when these items receive high satisfaction rates. According to Hopkins et al.(1994) patients are less capable of judging technical competence because of a real informative asymmetry and in any case they are more reserved in expressing critical comments with regard to the abilities of doctors. As a consequence, the high satisfaction scores observed may depend on the confidence in doctors' capabilities. Instead, Coulter (2006) argued that well designed questionnaires allow to assess both the technical competence and interpersonal skills of health professionals.

The patient satisfaction measurements have been generally used in order to provide researchers, health managers and professionals with valuable information for understanding patients' experience, promoting patient's compliance with treatment, identifying the weaknesses in services and evaluating health service performance (Fitzpatrick, 1984; Sitzia and Wood, 1997). Although the debate on the use of patient satisfaction as an outcome measure is still open (Reker et al, 2002; Norquist, 2009), it has been observed that satisfied patients are more compliant and more likely to participate in their treatment (Stewart, 1989; Guldvog, 1999). In fact, a satisfied patient is more aware of his care pathway and more willing to follow the physician prescriptions.

As said before, the level of satisfaction depends on several and different elements. For instance, healthy people tend to be more satisfied when they receive general information on health services and on their quality; on the contrary, people with a chronic condition may be more satisfied if involved in the decision-making process (Cleary, 1997). Thus, the improvement of patient compliance requires adopting different actions depending on the patient's profile. The assessment of patient satisfaction with the process of care is an important measure of the care quality and it allows identifying the phases of the process to be improved. Questionnaires using report style questions allow observing how the care is delivered (Wensing et al, 2003; Leeper et al, 2003). Some studies have highlighted that satisfaction strongly increases when care is provided in accordance with the clinical standard procedures (Lantz et al, 2005; Marchisio et al, 2006). Furthermore, the patients' point of view may help managers to evaluate activities such as the purchase of new technologies or the test of new medical treatments (Hopkins et al, 1994; Goulrey and Duncan, 1998; Dunlop et al, 2003; Ahmad et al, 2008; Van Koulil et al, 2009).

2.5.6 Patient experience: a new perspective for performance evaluation systems in health sector

A famous statement on the performance – quality – management relationship argues: “The ultimate goal is to manage quality. But you cannot manage it until you have away to measure it, and you cannot measure it until you can monitor it” (Eagle et al., 1993). Thus, a question is: *how to measure the quality in health care?* In most cases, managers and policy-makers who have approached performance measurement agreed with Donabedian's (1988) definition of health quality as a comprehensive concept including both service characteristics (structure, organization, care process) and patient satisfaction. In the last years, several health care services have adopted multidimensional evaluation systems in order to monitor the outcome of health programs (Katesa et al., 2001) as well as the performance of organizations (Arah et al., 2003).

CHAPTER 3: METHODOLOGY

3.1 RESEARCH AREA

Kenya - a nationwide survey undertaken in the then 8 provinces.

3.2 RESEARCH POPULATION

In the primary study, the facility based exit (satisfaction) survey targeted the clients/patients who had visited the facility, Government-owned or faith-based, and had received service on the day of the survey. This included patients and parents/caregivers/guardians who had accompanied a person who sought a service at the facility. In this study, only adult patients (those of 18 years and above) were included because the predictor variables involved apply more to this category of respondents.

3.3 RESEARCH DESIGN

The study is based on a cross-sectional survey undertaken by Ipsos Synovate (formerly Steadman Group) on behalf of the MoMS in 2009. Therefore, the data used in this analysis is secondary data.

3.4 SAMPLE SIZE AND SAMPLING DESIGN

3.4.1 Primary study

A simple random sample was drawn from the exiting patients/clients at each level of facility so as to attain the targeted number for that facility. The sample distribution for each facility at each KEPH level is shown in the table below:

Table 1: Sample sizes for various health facilities

	Total	Faith-Based organization	Government Owned
Total	2018	308	1710
Referral hospitals (level 6)	90	10	80
Provincial hospitals (level 5)	177	0	177
District hospitals (level 4)	861	31	830
Sub district Hospital (level 4)	52	26	26
Health centers (level 3)	490	144	346
Dispensaries (level2)	348	97	251

3.4.2 Present study

The sample size for the regression modeling is based on the guidelines provided by Hosmer and Lemeshow (1991) which explains that to validly fit the logit or the probit model, ordered or otherwise, a minimum sample of 10 is required for each continuous or discrete, and 10 for each level of the categorical predictor variable. In this study, there are 4 categorical predictor variables with various levels. Accordingly, to fit the proposed models, a minimum of 230 subjects would be required for each model. This sample size requirement was far surpassed in the primary study.

No sampling was done in this study – all data pertaining to the variable in question obtained, entered and cleaned in the primary study was analyzed.

Power and sample size calculations

There are no generally agreed methods for relating the number of observations versus the number of independent variables in the model. One rule of thumb suggested by Good and Hardin is $N = m^n$, where N is the sample size, n is the number of independent variables and m is the number of observations needed to reach the desired precision if the model had only one independent variable. For example, a researcher is building a linear regression model using a dataset that contains 1000 patients (N). If he decides that five observations are needed to precisely define a straight line (m), then the maximum number of independent variables his model can support is 4, because

$$\frac{\log 1000}{\log 5} = 4.29$$

3.5 DATA COLLECTION METHODS AND TOOLS

The secondary data was sourced from the Ministry of Health’s (MoH) Division of Policy and Planning in July 2013 via a formal application. The data was from a study titled “Kenya’s Health Sector: Customer and Employee Satisfaction Survey” undertaken in October/November 2009 by Ipsos Synovate (formerly Steadman) Ltd on behalf of the then Ministries of Medical Services (MoMS) and Public Health and Sanitation (MoPHS) with funding from WHO and Essential Health Services (EHS) Programme - a DFID funded programme. It targeted the general public, clients visiting health facilities and employees of both government-owned and faith-based health facilities across the then eight provinces in the country. It was aimed at providing the sector stakeholders with feedback on the satisfaction with service delivery within the health facilities in Kenya. The primary objective of the customer satisfaction survey was to develop an integrated Customer

Experience Index that gives the levels of customer satisfaction and a measure that will help MOMS/MOPHS in streamlining service delivery. The Employee survey on the other hand was designed to establish the employee satisfaction levels across staff in both public and faith-based health facilities. In this study, only the results of the Customer Satisfaction Survey were used. Patient-specific data was extracted and used for the planned analyses.

In the Satisfaction Survey, a well structured questionnaire was used to collect the data. The interviews were conducted by trained enumerators with vast experience in field surveys.

The questionnaire design was based on various touch points that will be track over time. A full day debriefing session was conducted by the project team with topics addressed to the various services offered but not limited to: Casualty; Enquiries; Collection of card; Laboratory; X-ray; Pharmacy and Accounts/cashier

Table 2: Research methodology

Approach	Why and How, with whom	Content/Evaluation areas
Health Facility Exit Survey	To help capture the immediate customer experience after leaving hospital/dispensary/health facility.	Some of the areas evaluated among others include: -Were the patients satisfied with the services? -Which areas in their opinion needed improvement among other things?

In 2009 survey, quantitative research was carried out on customer satisfaction survey using three methods for data collection i.e. mystery observation visits, health facility based survey and a

household based survey. These three approaches help in quantifying feedback from the population under study.

3.6 DATA ANALYSIS AND INTERPRETATION

3.6.1 Patient Satisfaction Index (PSI)

The ExM Customer model was used to compute the Overall Satisfaction Levels (OSL) of patients who have received healthcare from either government owned or faith based health facilities. The PSI is a composite weighted score that ranges from 1 to 100 points where 100 is Excellent (or Very Satisfied), and 1 is Least Satisfaction (or Very Unsatisfied). The Drivers of satisfaction are the factors that have high influence on the OSL of patients.

3.6.2 Indices' computation

The Customer and Employee Satisfaction Index measures the level of satisfaction using rating points ranging from 10 (lowest) to 100 (highest possible). The measure is a composite index that is derived from customer/employee service attributes that are measured in a 10-point scale. The index is also weighted. The weighting is done because all the different attributes have got different levels of contribution to the overall satisfaction. The individual contribution weight of each attribute is generated from a multiple regression analysis between the overall satisfaction (dependent variable) and the individual attributes (independent variables). The regression coefficients are used as the weights. The individual attribute scores are then weighted by the regression coefficient scores. The scores are then averaged to obtain a final index score. This is calculated at the respondent level.

3.6.3 Ordered logit regression model

Model description and interpretation

According to Kirkwood (2000), ordered logit model is also known as the cumulative logit model as it is used to model cumulative probabilities, and it is the extension of logistic regression which is appropriate when the outcome variable is ordered categorical. She further indicates that the most commonly applied model is the proportional odds model while the less commonly used models are the continuation ratio model and the stereotype model. Some authors refer to this model as the ordered logit model, because it is a generalization of the logit model to ordered response categories. McCullagh (1980) calls it the *proportional odds* model, for reasons that will be apparent presently. Agresti (1996) prescribes the ordered logit model follows:

Assuming

$$P(y \leq c_i) = \sum_{k=1}^i P_k$$

Then the model is of the form:

$$\ln \left(\frac{P(y \leq c_j)}{P(y > c_j)} \right) = \beta_{0j} + \beta_{1j}X_1 + \beta_{2j}X_2 + \dots + \beta_{pj}X_p$$

And if the predictors do not depend on the category level but the intercept does then the model is known as the proportional odds model. In this model, the parameters represent the exposure odds ratios for being in the highest j categories. For example, if there were four outcome categories and a single exposure variable, then the exposure odds ratio would represent the combined comparison of outcome: category 4 with categories 3, 2 and 1; categories 4 and 3 with categories 2 and 1 and categories 4,3 and 2 with category 1. It is assumed that the effect of exposure is the same for all

such splits of the categories of the outcome variable. The name proportional odds arises since the odds ratio of having a score of c (see the equation above) or less for two different sets of values of the explanatory variables does not depend on c .

$$\ln \left(\frac{P(y \leq c_j)}{P(y > c_j)} \right) = \beta_{0j} + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_p X_p$$

Thus, the overall odds of any event can differ, but the effect of the predictors on the odds of an event occurring in every subsequent category is the same for every category. If there are m categories then we have $m-1$ models which have parallel lines as only the intercept is different.

$$p_1 = \frac{\exp(\beta_{01} + \beta_1 X_1 + \dots + \beta_k X_k)}{1 + \exp(\beta_{01} + \beta_1 X_1 + \dots + \beta_k X_k)}$$

for p_2, \dots, p_{m-1}

$$p_j = \frac{\exp(\beta_{0j} + \beta_1 X_1 + \dots + \beta_k X_k)}{1 + \exp(\beta_{0j} + \beta_1 X_1 + \dots + \beta_k X_k)} - \frac{\exp(\beta_{0j-1} + \beta_1 X_1 + \dots + \beta_k X_k)}{1 + \exp(\beta_{0j-1} + \beta_1 X_1 + \dots + \beta_k X_k)}$$

$$p_m = 1 - \sum_{j=1}^{m-1} p_j$$

Application in modeling patient satisfaction

Ordered logit can be used in modeling patient satisfaction since it appropriately identifies relationships which are statistically significant between the explanatory variables and the ordered categorical dependent variable. This holds true for ordinary least squares regression. However, one important dissimilarity with ordinary least squares regression is that the ordered logit effectively determines unequal differences between ordinal classifications in the dependent variable [Greene,

1997]. Because of this, ordered logit is able to capture qualitative differences between different levels of satisfaction with quality of healthcare.

3.6.4 Ordered probit regression model

Model description and interpretation

The ordered probit model is a generalization of the probit model applied to ordinal categorical response data (McCullagh, 1980). It was first considered by Aitchison and Silvey (1957), results from modeling the *probit* of the cumulative probabilities as a linear function of the covariates, so that

$$\Phi^{-1}(\gamma_{ij}) = \theta_j + \mathbf{x}_i\boldsymbol{\beta}$$

Where $\Phi()$ is the standard normal cdf. The model can also be obtained from the latent-variable formulation assuming that the error term has a standard normal distribution, and this is usually the way one would interpret the parameters. Further, Aitchison and Silvey (1957) explains that estimates from the ordered probit model are usually very similar to estimates from the ordered logit model-as one would expect from the similarity of the normal and the logistic distributions-provided one remembers to standardize the coefficients to correct for the fact that the standard normal distribution has variance one, whereas the standard logistic has variance $\pi^2/3$. Like many models for qualitative dependent variables, this model has its origins in bio-statistics (Aitchison and Silvey 1957)

According to McCullagh (1980), the ordered probit model is given by the following form:

$$\mathbf{y}^* = \boldsymbol{\beta}'\mathbf{x} + \boldsymbol{\epsilon},$$

where \mathbf{y}^* is an ordered categorical response variable. The vector of estimated parameters is given by $\boldsymbol{\beta}'$ and the vector of explanatory variables is given by \mathbf{x} . The error term, $\boldsymbol{\epsilon}$, (also called disturbance

term) is assumed to have a normal distribution of mean equal to zero and variance equal to one, with cumulative distribution denoted by $\Phi(\cdot)$ and density function denoted by $\phi(\cdot)$. Jackman S. (2000) asserts that ordered probit model is a widely used approach to estimating models of this type and almost always employs the probit link function. He goes ahead to elaborate that the central idea is that there is a latent continuous metric underlying the ordinal responses observed by the analyst. Thresholds partition the real line into a series of regions corresponding to the various ordinal categories. The latent continuous variable, y^* is a linear combination of some predictors, x , plus a disturbance term that has a standard Normal distribution.

For each of the possible patient factors (predictors), a patient falls in a level of satisfaction, n , where $n = 1, 2, 3$, if $\mu_{n-1} < y^* < \mu_n$. The data on the patient's response on satisfaction, y , are related to the underlying latent variable, y^* , through the thresholds μ_n . From this, the probabilities take the following form:

$$\text{Prob}(y = n) = \Phi(\mu_n - \beta'x) - \Phi(\mu_{n-1} - \beta'x), \quad n = 1, 2, 3,$$

where $\mu_0 = 0$ and $\mu_3 = +\infty$ and $\mu_1 < \mu_2$. These are the thresholds from which the categorical responses of level of patient satisfaction are estimated.

From the ordered probit regression, the following are reported: (i) the estimation of thresholds, μ , and (ii) the estimated parameters, β . The thresholds show the range of the normal distribution which is associated with the actual values of the categorical dependent variable, level of satisfaction. The effect of the changes in explanatory variables on the underlying scale is represented by parameters β . The marginal effects of x on the underlying level of patient satisfaction is evaluated as follows:

$$\frac{\delta \text{Prob}(y = n)}{\delta \mathbf{x}} = -[\Phi(\boldsymbol{\mu}_n - \boldsymbol{\beta}'\mathbf{x}) - \Phi(\boldsymbol{\mu}_{n-1} - \boldsymbol{\beta}'\mathbf{x})]\boldsymbol{\beta}, \quad n = 1, 2, 3, 4.$$

The direction of the estimated parameters, $\boldsymbol{\beta}$, as well as the magnitudes of the same parameters indicate how a predictor variable affects the level of patient satisfaction. The parameter estimation is by maximum likelihood approach and the estimates have all the usual properties that MLEs have. The likelihood ratio tests are also a convenient way of testing combinations of parameters and alternative specifications etc.

Application in modeling patient satisfaction

Ordered probit can be used in modeling patient satisfaction since it appropriately identifies relationships which are statistically significant between the explanatory variables and the ordered categorical dependent variable. This holds true for ordinary least squares regression. However, one important dissimilarity with ordinary least squares regression is that the ordered probit effectively determines unequal differences between ordinal classifications in the dependent variable [Greene, 1997]. Because of this, ordered probit is able to capture qualitative differences between different levels of satisfaction with quality of healthcare.

3.6.5 Fitting Ordered Logit and Ordered Probit Regression Models to the data

In both models, the outcome variable will be an ordinal/ordered 5-category OSL derived from the computed Patient Satisfaction Indices. These categories and their codes will be: Very Satisfied (5); Somewhat Satisfied (4); Neutral/Neither/Uncertain (3); Somewhat Dissatisfied (2) and Very Dissatisfied (1). The following four patient factors captured by the primary study were employed as predictor variables: age, gender, education level and employment status.

The Ordered Logit and Ordered Probit Regression Models will be fitted to the data and the results compared and interpreted accordingly.

3.6.6 Control of confounders

In this study, possible confounders included patient's health status, whether out- or in- patient, type of illness/disease suffered, type of service received, cadre of health personnel who served the patient, level of healthcare, ethnicity, region of residence among others. Only three of these were built into the statistical model for the purpose of control; these were the health facility (KEPH) level, health facility ownership and the type of service the patient had just received at the time of interview (whether in- or out-patient) as data on them was available. The rest could not be controlled owing to the fact that data on them had not been collected in the primary study as regression modeling had not been anticipated then.

3.7 ETHICAL ASPECTS

All facets of the relevant ethics were adequately addressed by the primary study; hence was not replicated here except for a formal application and subsequent acquisition of the original datasets from the Ministry of Health (MoH).

CHAPTER 4: RESULTS

4.1 INTRODUCTION

This Chapter presents the results in two parts: first, the descriptive summary of patient characteristics as captured in the primary study – the original Patient Satisfaction Survey, and second, the results of the secondary study – the regression modeling study. The presentation of the results of the primary study was necessary to permit the reader of the current study have a good understanding of what the original study entailed.

4.2 DESCRIPTIVE SUMMARY OF PATIENT CHARACTERISTICS

4.2.1 Results based on predictor variables

The study achieved 2018 exit patient interviews spread across the country in various health facilities as follows.

4.2.1.1 Health facilities by levels and ownership

Table 3: No. of health facilities studied by level

	Total	Faith organization	Based Government Owned
Total	2018	308	1710
Referral hospitals (level 6)	90	10	80
Provincial hospitals (level 5)	177	0	177
District hospitals (level 4)	861	31	830
Sub district Hospital (level 4)	52	26	26
Health centers (level 3)	490	144	346
Dispensaries (level 2)	348	97	251

4.2.1.2 Type of service received – whether outpatient or inpatient

4.2.1.3 Health facility level and age

Table 4: Health facility level and age

		18 - 25 years	26 - 30 years	31 - 35 years	36 - 40 years	41 - 45 years	46 - 50 years	51 - 55 years	56 - 60 years	61+ years
Ownership of health facility	Faith-Based Organization	17%	30%	11%	26%	10%	4%	2%	1%	0%
	Government Owned	23%	28%	13%	19%	9%	3%	2%	2%	1%
Health facility level	Referral hospitals (level 6)	16%	32%	16%	24%	9%	0%	2%	0%	0%
	Provincial hospitals (level 5)	23%	19%	16%	16%	14%	7%	2%	1%	2%
	District hospitals (level 4)	18%	30%	16%	20%	8%	3%	2%	2%	1%
	Sub district Hospital (level 4)	15%	35%	10%	31%	8%	2%	0%	0%	0%
	Health centres (level 3)	32%	28%	8%	18%	7%	2%	2%	2%	1%
	Dispensaries (level2)	22%	26%	9%	22%	11%	4%	1%	2%	2%

The sample had fair spread across respondents if different age groups.

4.2.1.4 Health facility level and gender

Table 5: Health facility level and gender

	Total	Total	Male	Female
		2018	41%	59%
Ownership of health facility	Faith-Based Organization	308	46%	54%
	Government Owned	1710	40%	60%
Health facility level	Referral hospitals (level 6)	90	43%	57%
	Provincial hospitals (level 5)	177	40%	60%
	District hospitals (level 4)	861	45%	55%
	Sub district Hospital (level 4)	52	46%	54%
	Health centres (level 3)	490	37%	63%
	Dispensaries (level2)	348	37%	63%

A quota sample of 308 interviews was achieved with people seeking services from Faith-Based facilities while the overall sample of 1710 respondents was achieved with people who had sought service from the government owned facilities.

4.2.1.5 Health facility level and education

Table 6: Health facility level and education

		No formal schooling	College education	Primary education	University education	Secondary school education	Post secondary
Ownership of health facility	Faith-Based organization	9%	26%	25%	3%	31%	2%
	Government Owned	5%	21%	28%	3%	39%	2%
Health Facility category	Referral hospitals (level 6)	2%	41%	16%	7%	30%	3%
	Provincial hospitals (level 5)	2%	18%	25%	3%	45%	3%
	District hospitals (level 4)	4%	28%	20%	4%	39%	2%
	Sub district Hospital (level 4)	4%	37%	12%	2%	44%	0%
	Health centres (level 3)	4%	12%	36%	2%	42%	2%
	Dispensaries (level2)	13%	13%	39%	1%	30%	3%

The sample achieved respondents from different education backgrounds with some interviewed in Swahili to ensure they do comprehend the questionnaire content.

4.2.1.6 Patient's employment status

4.2.2 Results based on Customer/Patient satisfaction index

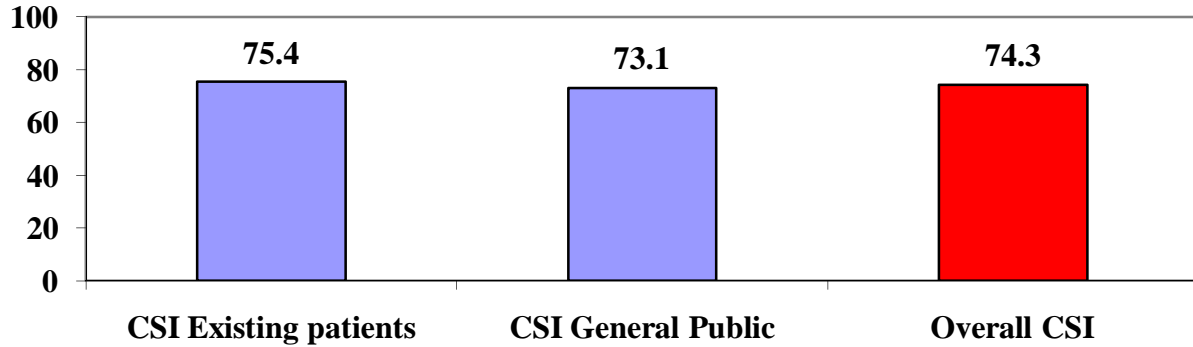


Figure 1: Customer/Patient Satisfaction Index

Patients who used faith based facilities had a higher level of satisfaction at 80, seven index points higher than those who used Government owned facilities (74).

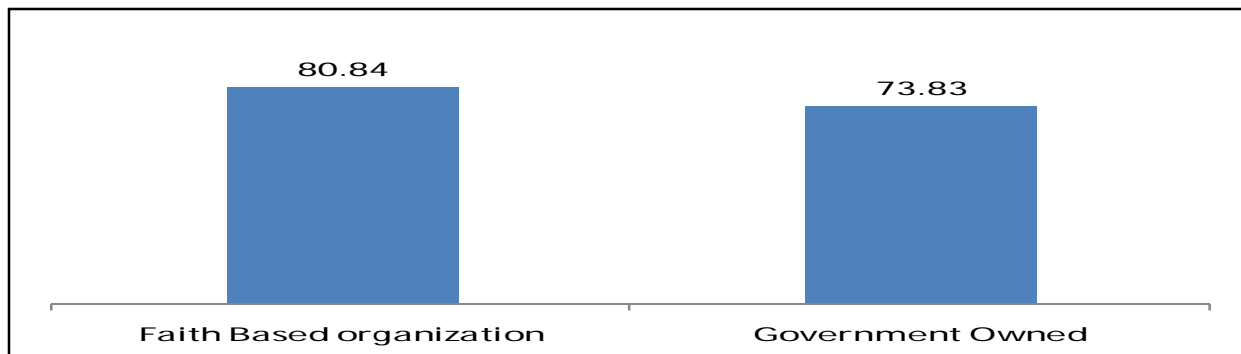


Figure 2: PSI by health facility ownership

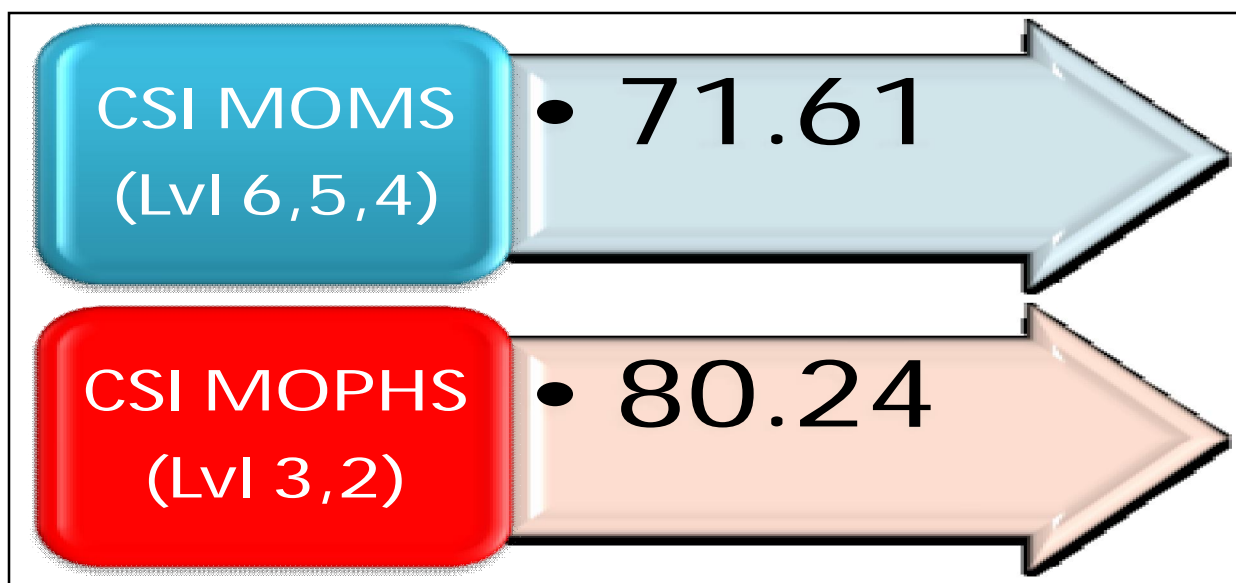


Figure 3: PSI by Ministries

	CSI
Referral hospitals (level 6)	74.60
Provincial hospitals (level 5)	69.68
District hospitals (level 4)	71.09
Sub district Hospital (level 4)	71.07
Health centers (level 3)	80.00
Dispensaries (level2)	80.47

Figure 4: PSI by health facility level

The PSI is low at provincial hospitals as compared to the other level hospitals.

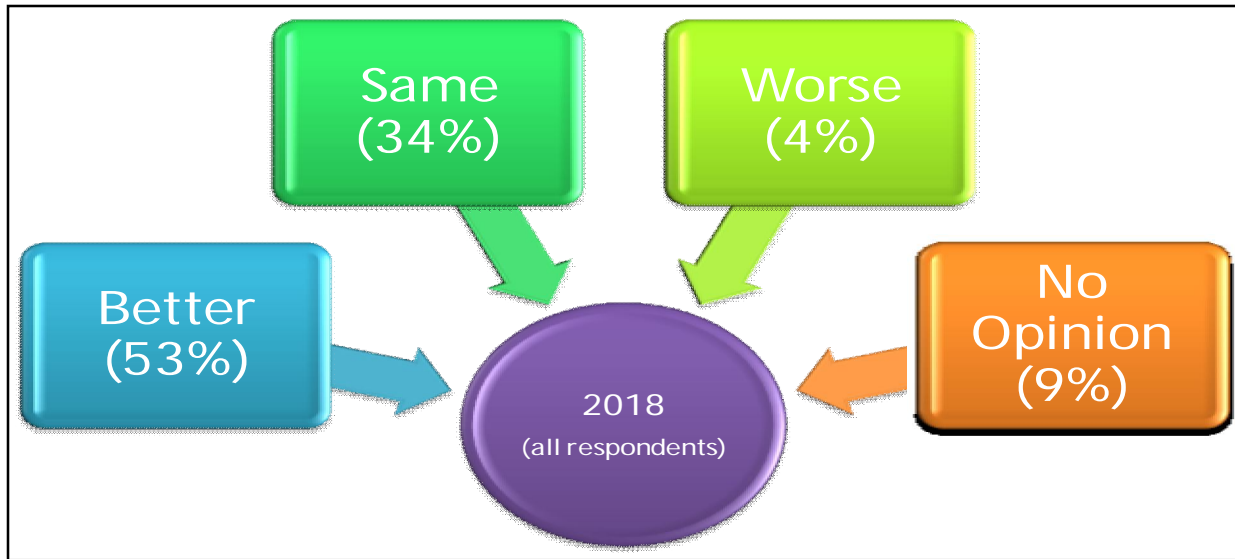


Figure 5: Overall perception of services rendered

4.3 RESULTS FOR THE REGRESSION MODELLING

4.3.1 Fitting the Ordered logit regression model to the Patient Satisfaction data: PLUM - Ordinal Regression procedure

Table 7: Case Processing Summary

		N	Marginal Percentage
Overall level of satisfaction with quality of healthcare received	Very Dissatisfied	97	8.2%
	Somewhat Dissatisfied	157	13.2%
	Neutral/Neither	332	28.0%
	Somewhat Satisfied	402	33.9%
	Very Satisfied	199	16.8%
Gender of the respondent	Male	508	42.8%
	Female	679	57.2%
Age of the respondent	18-25yrs	411	34.6%
	26-35yrs	417	35.1%
	36-50yrs	197	16.6%
	51-60yrs	94	7.9%
	60+yrs	68	5.7%
highest education level	No formal education	66	5.6%
	Primary education	353	29.7%
	Secondary education	463	39.0%
	Post secondary education	305	25.7%
Employment status of the respondent	Working full-time	332	28.0%
	Unemployed pensioner	66	5.6%
	Working part-time	195	16.4%
	Housewife taking care of home full-time	239	20.1%
	Casual/piece jobs	248	20.9%
	Other employed	53	4.5%
	Unemployed	54	4.5%
Health facility level (level 2 to level 6)	Dispensaries (Level 2)	313	26.4%
	Health Centres (Level 3)	304	25.6%
	Sub-District & District Hospitals (Level 4)	263	22.2%
	Provincial Hospitals (Level 5)	206	17.4%
	National Referral Hospitals (Level 6)	101	8.5%
Health facility ownership	Government-owned	830	69.9%
	Faith-based Organisation (FBO)-owned	357	30.1%
Valid		1187	100.0%
Missing		39	
Total		1226	

Table 8: Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	2570.143	2613	.721
Deviance	2226.735	2613	1.000

Link function: Logit.
 The significance value greater than 0.05 (as above) indicates that the logit model with predictors is significantly better than the one with intercept only odds assumption holds using both Pearson and Deviance statistic.

Table 9: Parameter Estimates

	Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Threshold [overallsatisfaction = 1]	-2.027	.416	23.681	1	.000	-2.843	-1.210
[overallsatisfaction = 2]	-.900	.410	4.832	1	.028	-1.703	-.098
[overallsatisfaction = 3]	.389	.409	.906	1	.341	-.412	1.190
[overallsatisfaction = 4]	2.033	.413	24.225	1	.000	1.224	2.843
Location [gender=1]	.034	.116	.088	1	.007	-.193	.262
[gender=2]	0 ^a	.	.	0	.	.	.
[agegroup=1]	.221	.248	.793	1	.003	-.266	.708
[agegroup=2]	.374	.248	2.278	1	.031	-.112	.859
[agegroup=3]	.425	.260	2.673	1	.002	-.085	.934
[agegroup=4]	-.054	.289	.035	1	.052	-.621	.513
[agegroup=5]	0 ^a	.	.	0	.	.	.
[educlevel=1]	.022	.271	.007	1	.034	-.508	.553
[educlevel=2]	-.380	.151	6.324	1	.012	-.676	-.084
[educlevel=3]	-.326	.138	5.562	1	.018	-.598	-.055

[educlevel=4]	0 ^a	.	.	0	.	.	.
[employmentstatus=1]	.126	.274	.211	1	.046	-.411	.663
[employmentstatus=2]	.178	.335	.282	1	.005	-.479	.835
[employmentstatus=3]	.259	.283	.834	1	.061	-.297	.814
[employmentstatus=4]	.237	.285	.695	1	.004	-.321	.796
[employmentstatus=5]	.329	.276	1.422	1	.033	-.212	.871
[employmentstatus=6]	.264	.355	.552	1	.008	-.432	.960
[employmentstatus=7]	0 ^a	.	.	0	.	.	.
[facilitylevel=1]	.022	.208	.011	1	.016	-.385	.429
[facilitylevel=2]	.049	.208	.056	1	.012	-.358	.457
[facilitylevel=3]	.136	.212	.412	1	.021	-.279	.551
[facilitylevel=4]	.037	.219	.028	1	.066	-.393	.467
[facilitylevel=5]	0 ^a	.	.	0	.	.	.
[facilityownership=1]	.135	.115	1.373	1	.041	-.090	.359
[facilityownership=2]	0 ^a	.	.	0	.	.	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

The significance values (less than 0.05) column indicates that the predictors are significant.

Table 10: Test of Parallel Lines^c

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	2752.376			
General	2695.693 ^a	56.683 ^b	57	.487

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

The significance value greater than 0.05 (as above) indicates that the proportional odds assumption holds.

4.3.2 Fitting the Ordered probit regression model to the Patient Satisfaction data: PLUM - Ordinal Regression

Table 11: Case Processing Summary

		N	Marginal Percentage
Overall level of satisfaction with quality of healthcare received	Very Dissatisfied	97	8.2%
	Somewhat Dissatisfied	157	13.2%
	Neutral/Neither	332	28.0%
	Somewhat Satisfied	402	33.9%
	Very Satisfied	199	16.8%
Gender of the respondent	Male	508	42.8%
	Female	679	57.2%
Age of the respondent	18-25yrs	411	34.6%
	26-35yrs	417	35.1%
	36-50yrs	197	16.6%
	51-60yrs	94	7.9%
	60+yrs	68	5.7%
highest education level	no formal education	66	5.6%
	primary education	353	29.7%
	secondary education	463	39.0%
	post secondary education	305	25.7%
Employment status of the respondent	Working full-time	332	28.0%
	Unemployed pensioner	66	5.6%
	Working part-time	195	16.4%
	Housewife taking care of home full-time	239	20.1%
	Casual/piece jobs	248	20.9%
	Other employed	53	4.5%
	Unemployed	54	4.5%
Health facility level (level 2 to level 6)	Dispensaries (Level 2)	313	26.4%
	Health Centres (Level 3)	304	25.6%
	Sub-District & District Hospitals (Level 4)	263	22.2%
	Provincial Hospitals (Level 5)	206	17.4%
	National Referral Hospitals (Level 6)	101	8.5%
Health facility ownership	Government-owned	830	69.9%
	Faith-based Organisation (FBO)-owned	357	30.1%
Valid		1187	100.0%
Missing		39	
Total		1226	

Table 12: Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	2568.761	2613	.728
Deviance	2225.438	2613	1.000

Link function: Probit.

The significance value greater than 0.05 (as above) indicates that the logit model with predictors is significantly better than the one with intercept only odds assumption holds using both Pearson and Deviance statistic.

Table 13: Parameter Estimates

	Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Threshold [overallsatisfaction = 1]	-1.156	.242	22.913	1	.000	-1.629	-.683
[overallsatisfaction = 2]	-.548	.240	5.243	1	.022	-1.018	-.079
[overallsatisfaction = 3]	.235	.239	.969	1	.325	-.233	.704
[overallsatisfaction = 4]	1.224	.241	25.825	1	.000	.752	1.696
Location [gender=1]	.013	.068	.037	1	.047	-.120	.146
[gender=2]	0 ^a	.	.	0	.	.	.
[agegroup=1]	.152	.145	1.093	1	.006	-.133	.436
[agegroup=2]	.247	.145	2.922	1	.087	-.036	.531
[agegroup=3]	.274	.152	3.243	1	.072	-.024	.571
[agegroup=4]	-.016	.169	.009	1	.024	-.347	.315
[agegroup=5]	0 ^a	.	.	0	.	.	.
[educlevel=1]	.044	.158	.077	1	.082	-.266	.354
[educlevel=2]	-.223	.088	6.388	1	.011	-.396	-.050
[educlevel=3]	-.182	.081	5.097	1	.024	-.341	-.024
[educlevel=4]	0 ^a	.	.	0	.	.	.
[employmentstatus=1]	.087	.160	.295	1	.087	-.227	.401
[employmentstatus=2]	.115	.196	.347	1	.056	-.268	.499
[employmentstatus=3]	.167	.166	1.014	1	.014	-.158	.491

[employmentstatus=4]	.167	.166	1.003	1	.017	-.160	.493
[employmentstatus=5]	.183	.161	1.282	1	.057	-.134	.499
[employmentstatus=6]	.182	.208	.770	1	.080	-.225	.589
[employmentstatus=7]	0 ^a	.	.	0	.	.	.
[facilitylevel=1]	-.027	.122	.048	1	.027	-.265	.212
[facilitylevel=2]	-.002	.122	.000	1	.089	-.240	.237
[facilitylevel=3]	.042	.124	.116	1	.033	-.200	.285
[facilitylevel=4]	.004	.128	.001	1	.075	-.247	.255
[facilitylevel=5]	0 ^a	.	.	0	.	.	.
[facilityownership=1]	.081	.067	1.462	1	.027	-.050	.213
[facilityownership=2]	0 ^a	.	.	0	.	.	.

Link function: Probit.

a. This parameter is set to zero because it is redundant.

The significance values (less than 0.05) column indicates that the predictors are significant.

Table 14: Test of Parallel Lines^c

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	2751.079			
General	2696.043 ^a	55.036 ^b	57	.549

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

The significance value greater than 0.05 (as above) indicates that the proportional odds assumption holds.

CHAPTER 5: DISCUSSION

The main aim of this study was to compare the outcome of Ordered Logit and Ordered Probit Regression Models in investigating the patient factors influencing his/her satisfaction with quality of healthcare received in Kenya. To achieve this, Patient Satisfaction Survey Data (MoMS, 2009) was used. Patient satisfaction was the outcome variable, which was measured on ordinal scale as follows: Very Dissatisfied, Somewhat Satisfied, Neutral/Neither, Somewhat Satisfied and Very Satisfied. The predictor variables were the age, gender, education and employment status, and were all categorical.

The study demonstrated that the ordered logit and the ordered probit regression models yield approximately the same results (Tables 11 and 17) provided that the proportional odds assumption is satisfied, which was the case in both models (Tables 12 and 18). The similarity was premised on the finding that in models, all the considered independent variables i.e. gender, age, education level and employment status were found to be significant, in magnitude and direction, in predicting the patient's overall satisfaction with quality of healthcare. This finding was consistent with some of the previous studies. In particular, Soyer R. and Hahn E. (2000) acknowledge the conventional wisdom that in most cases, the choice between logit link and the probit link is largely a matter of taste. Greene (1997) concludes his discussion of the issue with the summary "in most applications, it seems not to make much difference which link function is used". Another author (Gill, 2001) puts it just plainly, that the two link functions "provide identical substantive conclusions". Somewhere else, comparable advice appears recurrently whenever the subject is discussed (e.g., Maddala, 1983; Davidson and MacKinnon, 1993; Long, 1997; Powers and Xie, 2000; Fahrmeir and Tutz, 2001; Hardin and Hilbe, 2001). Empirical support for the recommendations regarding both the similarities and differences between the probit and logit models can be traced back to results obtained by

Chambers and Cox (1967). They found that it was only possible to discriminate between the two models when sample sizes were large and certain extreme patterns were observed in the data. However, some authorities differ with this commonly held position. While acknowledging this popular view, Soyer R. and Hahn E. (2000) as it relates to univariate binary response models, they expressly state that for multivariate response models such advice is misleading.

Quality of healthcare is the most important dimension of healthcare since it has bearing on the health outcomes (Donabedian, 1988). Patient satisfaction is regarded as one of the desired outcomes of care, an element in health status, a measure of the quality of care, and “as indispensable to assessment of quality as to the design and management of health care systems’ (Donabedian, 1988). According to Donabedian, (1988), patient satisfaction may be affected by several factors which may be categorized as structure, process and outcome (other than patient satisfaction itself).

Possible patient factors affecting his/her satisfaction with healthcare are principally demographic characteristics (Sitzia, 1983) such as age, gender, race, place or region of residence, education level, employment status, health status among others. Ware et al (1983) found out that age is an important determinant of satisfaction with healthcare received. In this study, satisfaction with healthcare was found to rise with increasing age. This was largely consistent with the findings in most other studies (Carr-Hill, 1992; Sitzia et al, 1997; Cohen, 1996; Williams, 1991 and Rahqvist, 2001) on satisfaction with healthcare who found that older patients generally report higher levels of satisfaction than younger patients. However, this relationship be confounded by patient’s health status or health-related quality of life (Cohen, 1996).

Regarding gender, this study demonstrated that gender has a statistically significant effect on healthcare satisfaction levels with females tending to report higher satisfaction levels. This is in stark contrast to a study by Sitzia and Wood (1997) which led to the conclusion that gender has no effect on satisfaction levels. However, Rahmqvist (2001) in one aspect found absence of correlation between gender and patient satisfaction index (PSI) and on the other hand discovered the exact opposite of Sitzia and Wood's finding – males showing somewhat better satisfaction than males. This underscores the need for further research on gender's role on patient satisfaction.

On the effect of education level on satisfaction with quality of healthcare, this study found that patient satisfaction was influenced negatively by the increasing educational attainment i.e. higher satisfaction is associated with lower educational level and vice versa. Sitzia and Woods (1997) claim that the evidence on the relationship between educational attainment and satisfaction is ambiguous and could be confounded by other factors such as income.

While this study has found that more formal employment is associated with higher satisfaction ratings, review of literature reveals virtual absence of studies with this variable in focus.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

This study managed to demonstrate, like most other studies, that there are no statistically significant differences between the outcomes of the ordered logit and the ordered probit regression models when used in modeling patient factors influencing satisfaction with quality of healthcare in Kenya. Therefore, either can be used to model patient satisfaction data. The study also revealed that in Kenya, patient factors such as age, gender, education level and employment status are significant predictors of the patient's likelihood of getting satisfied with the quality of healthcare they receive in both Government-owned and Faith-based-owned health facilities.

6.2 RECOMMENDATIONS FOR FURTHER RESEARCH

With regard to ordered logit and ordered probit models, further research is required to explore the differences between the logit and the probit link function in not only multivariate realm but also in situations of large sample size and in the presence of extreme data patterns.

In respect of Patient Satisfaction with quality of healthcare, the role of gender, educational level and employment status need to be investigated further, preferably by systematic review and meta analysis.

Besides, further research should explore possible role or effect of the hierarchical/ multilevel organization of the Kenya's health system so as to investigate simultaneously and more comprehensively the person-level, the organization-level and the NHSSP-2 health facility level - level factors. Lastly, spatial and temporal healthcare quality factors need to be explored.

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APPENDIX I: QUESTIONNAIRE

PATIENT EXIT INTERVIEW QUESTIONNAIRE

INTRODUCTION:

Good morning\ afternoon. My name is from **Ipsos Synovate Kenya (Formerly Steadman Group)** which is an independent market research company. We are doing a survey amongst users of healthcare facilities in Kenya in order to evaluate the services they offer. You have been randomly selected to take part in this survey. All information that you give me will remain strictly confidential and will only be used for research purposes? It will not take more than 25 minutes of your time.

Name of Respondent: _____

Pre Record the following detail

Health facility name	
----------------------	--

Province	
District	

Health Facility category: Information to be obtained from Health facility administrator

Referral hospitals (level 6)		Sub district Hospital (level 4)	
Provincial hospitals (level 5)		Health centers (level 3)	
District hospitals (level 4)		Dispensaries (level 2)	

Ownership of health facility

Faith Based organization		Government Owned	
--------------------------	--	------------------	--

Screener:

Which language would you like us to conduct the interview in?

English		Kiswahili	
---------	--	-----------	--

S1.Have you received any services today at this health facility? *(Note: This can also be applicable for a person who had accompanied a child or an incapacitated person to receive services at the health facility)*

Yes for Self		>> Continue	No		>> Terminate
Yes for other					

Demographics

D1. Gender

Male		Female	
------	--	--------	--

D2a. Age of respondent

15- 17 yrs		36 - 40 yrs		56 - 60 yrs			
18 - 25 yrs		41 - 45 yrs		61+ yrs			
26 - 30 yrs		46 - 50 yrs		DK			
31 - 35 yrs		51 - 55 yrs		RTA		Record Exact age.....	

D2b. Age of person who received services at health facility today

Below 5 years		15- 17 years	
5 to 10 years			
11 to 14 years		Adult: Above 18 years	

D3. Highest Education Level

No formal schooling		College education	
Primary education		University education	
Secondary school education		Refused	
Post secondary		Don't know	

D4. Employment status

Working full-time		Unemployed Pensioner	
Working part-time		Housewife taking care of home full-time	
Casual/piece jobs			
Other employed (specify)_____			
Other (specify)_____			

Preliminary Section

P1. Did you receive Inpatient or outpatient services today?

Inpatient	
Outpatient	

MAIN QUESTIONNAIRE

SECTION ONE: IMPORTANCE OF SERVICE ATTRIBUTES

ASK ALL:

1. Is this the health facility that you visit most often when you need healthcare?

Yes		>>>> 2
No		

2. What makes you chose to visit this healthcare facility as opposed to others?

Proximity to my home		Shorter waiting time (Faster Services)	
Good Services		Medicine is available	
The only one available		Less costly	
Other (please specify)			

3. I would now like you to think of health services in general. If 10 is extremely important and 1 is least important, how **important** would you say the following attributes are to you, regardless of whether you are satisfied with them or not?

	Extremely Important					Least Important					
	10	9	8	7	6	5	4	3	2	1	D

												K/ N R
The friendliness of their staff (attitude of health worker)												
The knowledge of staff												
Dealing with problems compassionately												
Treating you with respect												
Understanding your health needs												
The guidance and information they provide on your health needs												
The cleanliness and tidiness of the health facility												
The overall appearance of the staff												
Time it takes to be served												
Considering emergency case and giving them priority												
Respect												
Cost of service rendered												

Social approval (i.e. the people who matter to me would approve of me)											
The values the institution holds being in line with what I personally uphold											
Dignity											
Privacy											
Courtesy of health worker											
IF INPATIENT ALSO ASK											
Quality of beds											
Emergency response of Ward Workers											
Space within the wards											
Quality of food											
Quantity of food											
Wash rooms											
Length of stay											
IF FROM MORTUARY ALSO ASK											
Embalming of bodies											

Speed of release of bodies											
Transport provision for bodies											
Identification process for bodies											

SECTION TWO: IMMEDIATE OVERALL EXPERIENCE

4. Please tell me, which places did you visit at this health facility today? **TICK ALL APPLICABLE**

Enquiries	
Card Collection Point	
Accounts/ Cashier	
Casualty	
Consultation Room	
Lab	
Pharmacy	
X-ray	
Antenatal Clinic	
VCT	
Well baby Clinic	

Mortuary	
For Inpatient	
Surgical Ward	
Maternity Ward	
Children's Ward	

5. Thinking now about the service you have just received from this healthcare facility, If 10 is Extremely Satisfied and 1 is Not At All Satisfied, how many points out of 10 would you give to this health facility for their **OVERALL SERVICE**?

Extremely Satisfied	Satisfied							Least Satisfied	Not at all satisfied	
10	9	8	7	6	5	4	3	2	1	DK/NR

6. I would now like you to think of the service which you have received from this health facility, If 10 is excellent and 1 is not at all good, how many points out of 10 would you give to this health facility for

Excellent	Not at All good
-----------	-----------------

	10	9	8	7	6	5	4	3	2	1	D K / N R
The friendliness of their staff (attitude of health worker)											
The knowledge of staff											
Dealing with problems compassionately											
Treating you with respect											
Understanding your health needs											
The guidance and information they provide on your health needs											
The cleanliness and tidiness of the health facility											
The overall appearance of the staff											
Time it takes to be served											
Considering emergency case and giving them priority											

Respect										
Cost of service										
Social approval (i.e. the people who matter to me would approve of me)										
The values the institution holds being in line with what I personally uphold										
Dignity										
Privacy										
Courtesy of health worker										
IF INPATIENT ALSO ASK										
Quality of beds										
Emergency response of Ward Workers										
Space within the wards										
Quality of food										
Quantity of food										
Wash rooms										
Length of stay										
IF FROM MORTUARY ALSO ASK										

Embalming of bodies																				
Speed of release of bodies																				
Transport provision for bodies																				
Identification process for bodies																				

Section Three: IMMEDIATE EXPERIENCE SPECIFIC TO PLACES VISITED TODAY

We shall now talk about the services you received from each of the places you visited today.

7. Thinking now about the service you have just received from this healthcare facility, If 10 is Extremely Satisfied and 1 is Not Satisfied at all, how many points out of 10 would you give to (MENTION EACH PLACE VISITED SEPARATELY) facility for their **OVERALL SERVICE?**

	Extremely Satisfied										Not At All Satisfied	
	10	9	8	7	6	5	4	3	2	1	DK/NR	
Enquiries												
Card Collection Point												
Accounts/ Cashier												
Casualty Examination Room												
Lab												
Pharmacy												
X-ray												

Maternity										
VCT										
Well baby Clinic										
Mortuary										

8. a) How much time in minutes did you spend before being attended to at (**MENTION EACH PLACE VISITED SEPARATELY**)? **RECORD TIME IN MINUTES FOR EACH PLACE VISITED.**

b) How much time in minutes did you spend while being attended to at (**MENTION EACH PLACE VISITED SEPARATELY**)? **RECORD TIME IN MINUTES FOR EACH PLACE VISITED.**

	Record Waiting Time in Minutes	Record Service Time in Minutes
	Mins	Mins
Enquiries		
Card Collection Point		
Accounts/ Cashier		
Casualty		
Examination Room		

Lab		
Pharmacy		
X-ray		
Maternity		
VCT		
Well baby Clinic		
Mortuary		

INPATIENT

c) How long have you stayed/been admitted at this health facility?

	Tick appropriately	
Less than 1 day		
1- 2 days		
2 – 4 days		
4- 7 days		
More than one week		

9. How many points out of 10 would you give to (MENTION EACH PLACE VISITED SEPARATELY) facility for their (read each attribute)? **RECORD ACTUAL POINTS GIVEN.**

Extremely Satisfied										Least Satisfied	DK/NR
10	9	8	7	6	5	4	3	2	1	99	

	Enquiries	Card Collection Point	Accounts/Cashier	Casualty	Examination Room	Lab	Pharmacy	X-ray	Maternity	VCT	Well baby Clinic	Mortuary
The friendliness of their staff (attitude of health worker)												
The knowledge of staff												

Dealing with problems compassionately												
Treating you with respect												
Understanding your health needs												
The guidance and information they provide on your health needs												
The cleanliness and tidiness of the health facility												
The overall appearance of the staff												
Time it takes to be served												
Considering emergency case and giving them priority												
Respect												

Cost of service												
Social approval (i.e. the people who matter to me would approve of me)												
The values the institution holds being in line with what I personally uphold												
Dignity												
Privacy												
Courtesy of health worker												
Cost/price paid for services												

I am now going to ask you about your experience with regards to medicine prescribed if at all.

10. Were you prescribed any medicine during your visit today?

Yes		>>> 14
No		

11. Did you receive ALL the medicine that was prescribed today from the Pharmacy?

Yes		
No		>>> 12

12. Did you receive some MEDICINE AT ALL?

Yes Some		>>> 13
None at all		>>> 13

13. For what reasons have you not received the medicines?

Drugs not available		Drugs expensive, will buy elsewhere	
Other (please specify)		Did not have enough money	

I am now going to ask you about your experience with regards to any payments you have made at this health facility if at all.

14. Were you asked to pay for any of the services today?

Yes		>>15
No		>>> 18

15. At what points of your visit today did you have to pay for a service? RECORD ALL

16. Please tell me, how much did you pay at (**MENTION EACH PLACE MENTIONED AT Q15**)?

17. What do you think about the amount paid at (**MENTION EACH PLACE MENTIONED AT Q15**)? Would you say Expensive or Affordable?

	Q15	Q16	Q17	
	TICK APPROPRIATELY	In Shillings	Expensive	Affordable
Enquiries				
Card Collection Point				
Accounts/ Cashier				
Casualty				
Examination Room				
Lab				

Pharmacy				
X-ray				
Maternity				
VCT				
Well baby Clinic				
Mortuary				

18. Considering the whole of your experience today at this health facility and compared to 6 months ago, would you say the services are....**READ OUT.**

Better	
Same	
Worse	
NR	

Section Five: Image

19. Thinking about the **facilities and infrastructure** in this health facility, which words in each of the following pairs is appropriate to describe this health facility?

Old fashioned		Modern	
Boring		Exciting	
Intimidating		Approachable	
Clean		Dirty	

20. Thinking about the **health workers** in this health facility, which words in each of the following pairs is appropriate to describe them?

Caring		Arrogant	
Knowledgeable		Not Knowledgeable	
Boring		Exciting	
Professional		Unprofessional	
Intimidating		Approachable	
Time conscious		Careless with Time	

21. What are some of the things you would say you liked about this health facility?

22. What could this health facility do to improve the service they provide to you and other patients?

Section Six : Loyalty

23. Considering your experiences and opinions about this health facility, would you **recommend** the services it offers? Would you say you

24. Considering your experiences and opinions about this health facility, would you **continue to use their services** whenever need arises? Would you say you.....

25. Considering your experiences and opinions about this health facility and assuming your medical costs were taken care of, would you consider using any other health facility over a private health facility for profit? Would you say you

	Q19: Recommend	Q20: Continue to use their services	Q21:
Definitely Would			
Probably Would			
Might or Might Not			
Probably would not			
Definitely Would Not			

Thank Respondent and Close Interview.

APPENDIX II: SPSS SYNTAX FOR ORDERED LOGIT, AND ORDERED PROBIT REGRESSION MODELS

Ordered logit regression model

This was done in Statistical package for Social Sciences (SPSS) using PLUM - Ordinal Regression procedure and the outputs were as follows:

```
GET
  FILE='D:\AfyaHseData 2010.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
PLUM overall satisfaction BY gender agegroup educlevel employmentstatus facilitylevel
facilityownership
  /CRITERIA=CIN(95) DELTA(0) LCONVERGE(0) MXITER(100) MXSTEP(5)
PCONVERGE(1.0E-6) SINGULAR(1.0E-8)
  /LINK=LOGIT
  /PRINT=FIT PARAMETER SUMMARY TPARALLEL
```

Ordered probit regression model

This was done in Statistical package for Social Sciences (SPSS) using PLUM - Ordinal Regression procedure and the outputs were as follows:

```
GET
  FILE='D:\AfyaHseData 2010.sav'.
PLUM overall satisfaction BY gender agegroup educlevel employmentstatus facilitylevel
facilityownership
  /CRITERIA=CIN(95) DELTA(0) LCONVERGE(0) MXITER(100) MXSTEP(5)
PCONVERGE(1.0E-6) SINGULAR(1.0E-8)
  /LINK=PROBIT
  /PRINT=FIT PARAMETER SUMMARY TPARALLEL
```