UNIVERSITY OF NAIROBI

Masters Project

ANALYZING FACTORS THAT CONTRIBUTE TO PATIENT ADHERENCE TO THE REQUIRED REPEAT HOSPITAL VISITS IN KENYA

By

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DECLARATION

This research paper is my original work and has not been presented in any other institution or university.

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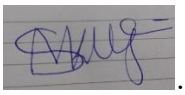
Signed……  … Date: ……12th ……October…2021……

This research paper has been submitted for examination with my approval as the university supervisor.

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DEDICATION

I dedicate this research project work to my beloved family in appreciation for their love and steady support during my studies.

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ABBREVIATIONS

ART	-	Antiretroviral Therapy
AIDS	-	Acquired Immunodeficiency Syndrome
AL	-	Artemether-Lumefantrine
CAPI	-	Computer Aided Personal Interview
CVD	-	Cardiovascular Diseases
GBD	-	Global Burden of Disease
GDP	-	Gross Domestic Product
GP	-	General Practitioner
HHA	-	Healthy Heart Africa
ICS	-	Inhaled Corticosteroids
KHHEUS	-	Kenya Household Health Expenditure and Utilization Survey
KNBS	-	Kenya National and Bureau of Statistics
NASSEP	-	National Sample Survey and Evaluation Program
QOL	-	Quality of Life
SPSS	-	Statistical Package for the Social Science
UK	-	United Kingdom
USA	-	United States of America
VIF	-	Variance Inflation Factors
WHO	-	World Health Organization

ABSTRACT

Adherence to repeat hospital visits is the degree to which individuals follow the given treatment regulations after visiting a health facility, which includes making all the required visits which is a key component in the general management of diseases. This research project was analyzing the factors that contribute to patient adherence to the required repeat hospital visits in Kenya. Adherence to required repeat hospital visit entails making all the subsequent appointments as directed by your physician. It also involves taking all medication as prescribed. This analysis will bring out the extent of adherence to all required visits and the degree of respecting the instructions as given from the health care facility. This form of adherence to health instructions is often a significant aspect of treatment, especially the treatment of chronic conditions (WHO, 2002) in order to derive the maximum medical benefits.

In Kenya, there has been disease incidences which reported by public health facilities and hospital visitations are expected to be significant in forming part of the patient healing. There are disease incidences and mortality cases that can be avoided. Adherence improves the health status of the individuals and healthcare maximum benefits are critical.

The main purpose of the analysis was to estimate the pattern of obedience to repeat hospital visits and medication in Kenya while evaluating the effects of demographic and socio-economic factors in relation to adherence to repeat hospital visits. This analysis used a descriptive study design to analyze the factors that induce patient towards adherence to repeat visits. The analysis used a probit model to estimation of the factors that influence adherence to and the extent of adherence to required repeat hospital visits in Kenya. The study used the Kenya Household Health Expenditure and Utilization Survey (KHHEUS) data from Kenya National and Bureau of Statistics (KNBS). The study variables that are found to be influencing patient adherence to required repeat hospital visits are distance (18.1%), employment (13.1%), quality of health care services (12.2%), being employed (13.1%), higher levels of education (9.6%) and gender (3.9%). The study recommends for shortening of the distance travelled by patients to hospitals, improvement of the quality of health care services. Additionally, from the study results, there is need to promote literacy to tertiary levels since this has been observed to be an important factor contributing positively to adherence to repeat visits. Provision and promotion of employment opportunities will spur adherence since this takes care of the ability to pay for health care costs. From the findings also, there is need to do sensitization to males who less likely to be more adherent that the female counterparts. In addition, health care services should be mad affordable thus eliminate the issue of cost that may deter adherence.

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

The provision of healthcare service can be described as a synchronized faultless coordination between health care providers and patients. This includes all the collection of assistances aimed at preventing diseases curing the sick and undertaking any rehabilitation necessary to restore back patients original health status (Besley & Gouvela, 2000). If sick people receive the necessary health care, it greatly impacts by reducing future hospitalizations. This demands for compliance to any medical advice, which is a big goal target to control cost and improve quality in the system of health care. The rate of compliance to medical instructions in Kenya has risen sharply in recent past and is a matter of concern to health experts, planners and the patients themselves if the opposite is to happen. However, the factors that affect this trend are scantily understood.

In healthcare, the word compliance implies the patient's behavior towards the medical advice given in respect to use of healthcare services, alteration of lifestyles and the after visits to the attending doctor. Adherence in health care comes in when a patient gets help from a doctor who then the checks the patient and makes a therapy recommendation from which the sick person is given medical instruction which he follows it to the last word as given by the doctor. In relation to taking drugs, adherence is the agreed undertaking of the treatment as approved by the doctor. For doctors in health care, the more cheering occurrence springs from the patients adopting to the perfectly trustworthy treatment instruction that's provided. Whether it is advice on drug usage, call for follow-up visits, or for making crucial lifestyle modifications, most patients will persistently adopt well to the intended prescriptions or recommendations. This explicit adherence outcome by patients normally leads to reduces bad health results for the patient which leads to declines in health care costs in the long run. Without compliance, there could be negative health outcomes which can lead to injury, increased disease infections and even cause fatalities. When a patient is required to revisit doctor's premises several occasion, the ultimate result is a rise in health care related costs which includes the travelling costs and the actual treatment costs together with purchase of medication.

The World Health Organization (WHO) has put health care compliance into five different components -; illness associated reasons, treatment-linked aspects, patient characteristics, socio and economic factors and the whole provider system features (WHO, 2000).

Across the world, between 25% and 50% of people who go to hospitals do not take their treatment as instructed. Like in the United States, suboptimal obedience to health care advice has been linked with 125,000 fatalities and 10% of further treatments (Cutler, Fernandes-Llimos, Fromer, Benrimoj, & Garcia-Cardenas, 2018). The socio-economic effect was also in PubMed and Scopus in September 2017, which had an increase in healthcare cost (>80%), medical costs (70%), health facility charges (50%), specialty medication costs (<30%), and hospitalization costs (<20%) (Kuo SZ, Haftek, & Lai, 2017). Around the globe, approximately 71% of related health care costs are connected to the non-compliance of patients to the previously given medical instructions, which leads to readmission (Jafar, TH; Gandhi, M; Jehan , I; de , Silva HA; Shahab , H, 2018). In the Southern Asia, the general prevalence to hypertension is estimated at 27%. In a study about a Rural Epidemiology, the results depicted that more than half of patient of hypertensive were not having any information about it and had poor adherence to required medication by up to 80% (Jafar, TH; Gandhi, M; Jehan , I; de , Silva HA; Shahab , H, 2018). Uncontrolled blood pressure was found greater than 50% in Bangladesh, more than 75% in Pakistan and around 62% in Sri Lanka. The European Association and the American Diabetes Association did a study of diabetes patients who were following all the given guidelines. This was conducted in 10 developing countries; 2 from Africa (Egypt, South Africa), 5 from Middle East (Israel, Saudi Arabia, United Arab Emirates, Iran and Lebanon) and 3 from South Asia (Bangladesh, India and Pakistan). The analysis revealed that than three quarters of the patients did not do any required follow-up visit to a Dialectologist. An additional 35% patients did not get any necessary information about the diabetes disease which could have been critical in aiding uptake of medicine and healing. In an analytical experiment for diabetes patients, only 30% were found to comply with the drug regimens directed with those of poor background taking the higher portion. (Shrivastava, Shrivastava , & Ramasamy , 2013). Misinterpretation was pinpointed as a cause for non-adherence in more than half of the conducted analyses, poor attitude related to the given medicines was second at 30% while negative perceptive was around 15% (Shah, et al., 2018). Patients with long-term illnesses such as hypertension (45% in Bangalore, 50% in Pakistan and 60% in Mumbai and hypercholesterolemia (60% in Kuwait) (Zelko , Klemenc-Ketis , & Tusek-Bunc, 2016) where the linkage to symptoms is not clear are more likely to be less compliant to given therapy instructions and follow-ups. Those in such conditions comprehensibly fail to

adhere to treatment of long-term conditions where the cure does not produce healing in the immediate. Additionally, it was found that the level of no-adherence by the elderly would range from 6% to 55% in the selected 10 countries on average.

From a study on compliance in Africa on hypertension medication, there was findings that two out of three patients had correspondingly poor levels of adherence to antihypertensive therapy. A systematic assessment of research which was estimating the degree of adherence to antihypertensive therapy in growing economies was issued in 2017 (Nielsen , Shrestha , & Neupane , 2017). The research which was done in African countries; Nigeria, Ethiopia, Ghana and Zimbabwe. The results showed modest adherence antihypertensive treatment, which was around 35.4% in Ethiopia, 93.3% in Ghana had a great level of non-adherence 92.5%, reported in Nigeria and 93.3% in Ghana. This gives a broad picture of the level of compliance within our continent Africa.

There is robust indication that medical compliance degrees are worse in the midst of African patients compared to others zones. An evaluation of compliance to antihypertensive treatment printed in 2017 (Abegaz & Shehab, 2017) exhibited great regional variations with a greater proportion of poor adherence degrees amongst patients in Africa (62.4%) equaled by (43.5%) in Asian, American at 36.6% while Europe was at 36.6%. There are a multiple reasons why there are low medical adherence a tricky problem to take care of (Kini & Ho, 2018). In this study the factors shall be analyzed and identified for those that influence adherence to repeat hospital visits.

Moreover, in sub-Saharan Africa, adherence to medical therapy has been on the rise. Data reporting for different diseases in different countries has mixed reactions. Studies show a high proportion of 69.0% of pregnant women reporting perfect adherence. For instance, the general uptake of HIV antiretroviral therapy (ART) has improved and full-grown in sub-Saharan Africa. The concern has moved to the access to treatment and sustaining of patients. Since ART is a long-life commitment, it then involves persistent adherence to all days' treatment doses schedules and making repeated visits to healthcare centers for care. This is in agreement with other practices in managing other related chronic diseases across the globe. A methodological review of people who has stared ART in sub-Saharan Africa found out that around a quarter of them were no longer in care after first year. This could double in the second year. Some of these patients ended up dying while others are labelled as a lost group in the treatment process (Rosen, 2007). This indicates how patients who stop on treatment are at great risk of getting ill and even die as a result of the HIV-AIDS associated disorders such as tuberculosis. Non-

adherence will finish out the immunological advantage of ART and increases AIDS-related diseases, deaths and further hospitalizations (Hogg, 2002).

The STEPwise survey conducted in the Kenya with the help of WHO in 2015, the results show that the overall hypertension medical adherence for all was 23.8%, with men being infected more (25.1%) than women (23.8%) (KNBS, 2015). Approximately. More than 91% of hypertension patients did not take any medicines. The analysis show that only 22% of patients were following the hypertension treatment as instructed by the doctor.

The Healthy Heart Africa (HHA) which is a strategy in Africa coiled towards tackling the growing problem of hypertension and other related diseases, conducts study related to the disease management. Using Kenya for instance, the HHA undertook a study which was exhibited that changing the employment of more styles in the handling of people with hypertensive patients heads to acceptable adherence to the arranges revisits to the facilities and could portray personal follow-ups by those who could go back to the doctor clinic (AstraZeneca, 2014). Adhering to the hospital visits model was greatly higher than the walk-in and end-week clinical revisits. Available research findings in relation to adherence to revisits in Kenya is on chronic communicable diseases is very minimal. Very small research has been conducted done on the level of adherence to non-communicable diseases in Kenya.

Another study to in Nairobi, Kenya, which was investigating factors associated with non-compliance to Highly Active Antiretroviral Therapy (HAART), those found to be fully adherent were 82% (Wakibi , Ng'ang'a, & Mbugua, 2011).

Research studies on the prevalence of malaria disease in Kenya were undertaken from 2010 to 2016 and analyzed using series of outpatient malaria case-management surveys. From the research findings, there has been found that adherence has significantly improved in areas which have a high malaria risk for instance the lake endemic region of Nyanza region. However, in areas with less likelihood of infection, only the negative tests results were found to be significant while the patients who showed tested febrile had decreased trends. Prescribing of the first dose of artemether-lumefantrine (AL) in the hospital was considerably great in the lake regions of the Nyanza areas due to expected high transmission. In the places where there is low risk, the transmission and AL dosing, prescribing and instruction tasks have over time changed significantly. Across several studies, the level of compliance in the country varies significant and from disease to disease.

1.2 Statement of Research Problem

In the last 40 years, health practitioners and scientists have been gathering knowledge related to status of medical adherence by patients, what influences it, and any other required treatment instruction. Adherence to treatment instruction is often a significant attribute of health treatment, especially the dealing with the chronic diseases (WHO, 2002) in order to derive the optimum health benefits. For patients, they usually need to be supported and not be blamed in order to make them more compliant.

The total disease incidences registered by public health facilities were a noteworthy high in two years 2018 and 2019 In Kenya. With this, it is an indication of the expected hospital visits in the same year and the trend thereof in the coming years. The reported mortality in the same period was significantly high number of persons where respiratory diseases was the highest leading cause of morbidity at 25.0 per cent of all reported disease cases (KNBS, 2020). Most of these deaths could be avoided if patients could adhere to medical advice as instructed. The adherence could be in form of attending all the repeat medical visits required. The repeat medical visits can be in form of receiving routine follow-up treatment and taking of medicine for more than one day which is necessary to enable a patient to return to normal life and undertake daily economic activities. There are numerous and divergent economic and psychosocial justifications on why sick people usually more than often do not follow medical instruction. They comprise of; unfriendly side influences of the given medicines financial difficulties, illiteracy and low counseling, family turmoil, inadequate exchange of information between patient and doctor, mistrust to doctors, mental illnesses and disabilities (Stephenson, Rowe, Haynes, & Macharia, 1993).

The 2018 Kenya Household Health Expenditure and Utilization Survey (KHHEUS) reports that nearly 39.2 per cent of respondents reported to be ill in the last four weeks of the survey with a huge number reporting to have visited or consulted with a health provider (hospital/ health center/ clinic). However, from the survey findings, it was reported that a significant number (77.66%) of the surveyed respondents, made all the visits that were essential. From the survey, evidence is available that a considerable proportion of Kenyans do adhere to the required hospital visits or full medication as recommended by the physicians. This may also take form of following completely all the medication as instructed. To comprehend the factors that influence compliance to the curative orders of physician from the view point of the sick, and the health care practitioners brings a lot of knowledge to the government and other stakeholders. This study aims at analyzing the factors for adherence to repeat hospital visits in

Kenya. Patients' adherence to recommended treatment advice is always affected by the quality of healthcare. Patient commitment to making all the required repeat visits is good way of health promotion and reduction of hospitalization costs. It is also a key influencer to development in humans. Any persisted low adherence to medical and hospital visits will attribute to disease worsening, increased deaths and additional costs of health care. Consumption of healthcare thus becomes a very important public health and policy subject matter which is of high concern to governments, stakeholders, replicating the efforts to both expound health results and meet global commitment to attain universal health care. Consumption of health care services thus matters in general to the population health levels. Consumption of healthcare at the hospitals and clinics is affected by culture, distance to health facilities, education level, cost of services, and out stock of drugs. This study was to analyze the factors that contribute to patient adherence to the required repeat hospital visits and medication in the Kenyan context.

1.3 Research Questions

The research study was based on the following questions.

i. What is the pattern of adherence to repeat hospital visits and medication in Kenya?
ii. How do demographic and socio-economic factors influence adherence to repeat hospital visits/medication?
iii. What are the policy recommendations based on the findings in (i) and (ii) above?

1.4 Research Objectives

The general objective of the study was to analyze the factors that contribute to patient adherence to the required repeat hospital visits in Kenya

Specifically, the objectives of the survey were-:

i. To assess the pattern of adherence to repeat hospital visits and medication in Kenya
ii. To evaluate the effects of demographic and socio-economic factors in relation to adherence to repeat hospital visits/medication.
iii. To recommend possible policy proposals from the research findings.

1.5 Justification of the Study

Adherence to required repeat medication/hospital visits is a primary factor to the realization of full treatment and healing. Increased medical compliance boosts towards reaping of maximum healthcare gains which leads to the improvement in efficiency of health care

systems (WHO, 2000). Medications do not work if not well taken as per the given prescription. Treatments again will not be effective if those given do not go by the prescribed treatment instruction, however in growing economies only half of patients who have suffered a chronic medical condition comply to therapy instructions. In developing countries like Kenya, limited access to medicines, when jointly mixed with poor access to health care, lack of appropriate diagnosis and poor levels of adherence are a threat to treatment of chronic illnesses. Healthcare providers have the power to intervene and empower patients to more medical adherence. This can help in identifying the patients who would have missed their schedules. Factors that improve the positive uptake of the intermediations can be the training on compliance principles, obtaining the tools to monitor appointment keeping, and supervisory support. Early discovery of medical-treatment defaulters will aid the health care providers to construct the targeted patient assistance to improve medical adherence and compliance. Study of literature prevails that non-adherence for life time diseases is likely to triple in the next twenty years. This makes it a worry reason for developing countries like Kenya due to the pressure which is exerted to its government which has large debts and meager allocations of health care finances in relation to the total GDP.

Improved adherence decreases health-care costs, impairs disease effects and reduces death rates. In Kenya there has been no policy framework for follow-up activities that ensures medical compliance. As stated above such low levels of adherence can have adverse effect on the population and the economy at large. This study looked into the measures that can improve compliance and bring down any negative health outcomes like; injury; increased morbidity and death. This study analyzed the factors for adherence and possible intervention factors and policies. It is therefore significant to examine the factors that contribute to patient adherence to the required repeat hospital visits in Kenya.

1.6 Study Scope

The focus of this analysis aimed at dissecting the factors influencing patient adherence to required repeat hospital visits. The study analyzed data used from the Kenya Household Health Expenditure and Utilization (KHHEUS) Survey which was done out in 2018. It was a countrywide survey which included 37,500 households sample taken from 1,500 (923 in rural and 577 in urban areas) clusters. Data analysis was conducted through use of Stata. The study used the theory of reasoned planned behavior, the functionalist approach and the conflict approach theories in explaining the expected health behavior.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In the process of giving out health care services, getting the correct diagnosis and effective medical treatment for most health conditions, will impact a patient's life and quality of life. Barriers do exist in the process of consuming healthcare services. Patients' failure to follow the recommendations given by healthcare provider has been largely identified as one of the significant barriers. The forms of failure on adherence by patient are explained in many ways. Those under treatment can easily forget or misinterpret the instruction passed to them by their healthcare professionals to treat or prevent diseases. Adherence carries a significant measure of economic weight. In this chapter I explore other studies that have explained barriers that have hindered adherence to hospital visits and continuous treatment which is a key in determining the success of treatment. Barriers to making all the required repeat visits can be tackled as the sick, the healthcare providers and whole health care system factors and the way of interacting with them. To improve medication adherence, we need to identify the specific obstacles for each sick person and implementing the appropriate methods to subdue. Those in supervision of health care management have a great role to manage adherence in a daily way.

2.2 Theoretical Review

There are varied theories that tend to explain the factors that influence compliance to repeat hospital visits and the general patient treatment behavior.

2.2.1 Theory of Reasoned Action/Planned Behavior

These two closely related theories which explains how a patient's health behavior is influenced by their plan to undertake a certain action. Someone's objective to undertake a behavior (behavioral intention) is estimated through his/her attitude about the behavior, and secondly, the prejudiced customs related to the behavior (Martin , 2012). Subjective customs can be influenced by the social environment where a person can profess power over the actions he can undertake. Presumably there are positive attitudes towards subjective norms will lead to higher distinguished charge and improve probability plans that govern the change in the behavior. These theories of reasoned action/planned behavior offer very meaningful information for foreseeing behaviors towards health planning. It also caters for good disease control methods being put in place. Subjective norms are used to explain the behaviors of hospitals, patients and

others stakeholders in the whole health care management. These philosophies have been used to give direction on future compliance and adherence to medical and repeat hospital visits.

2.2.2 The Functionalist Approach

This theory was envisaged by Talcott Parsons using the functionalist viewpoint which emphasized for suitable and effective health care which is critical for people's capacity to work (Parsons, 1951). When infested with a disease, we become weak to do our roles in the economic development. This can be attributed to early deaths, since it will deter individuals from carrying out their day to day roles which help in nation building and the thus the society receive a bad return. The poor people who fall sick are at high risk of contracting the same to those with good health and all eventually become sick. Weakly managed health care service provision is d ineffective in a society's functioning since people who are already sick re prone to being more sick while those in good health can easily be sick. This is directly linked to non-adherence to medication or repeat hospital visits. Generally, for a people to be considered ill, said Parsons, several conditions should be certified (Parsons, 1951). This is what Parson referred to as the sick role. To start out, it should not be expected that sick people started their own sicknesses. To add to that, if you an individual gets sick, they are better in willing to get well soonest.

Any other action would bring the thinking that they are faking their own sickness or pretending to be not sick and would not be seen as sick by those know them or the whole society at large. In the process of completing model, what happens to sick people is that they usually confirm their sicknesses with physicians are expected to be obedient all the given guidelines on treatment so that they become well. When a patient who goes to hospital and does not follow given instruction, he will not be in a position to heal. This well explains the non-compliance behavior that most patients partake and results in increased mortality, significant extension of the disease and more costs for treatment. By doing all the necessary required, those who are ill should thus receive treatment. At the same point, economic activities that they do should be taken over and where possible they take rest even when they want to remain active. For physicians, should be able to detect whether the patient is sick, decide how to manage it to possibly making him have good health again. For this to be accomplished, the physicians require collaboration with the patients, who in this case have to obey what instructions are given. Thus, as viewed by Parsons, the physician-patient affiliation as tiered such that while the doctor passes on instructions to the patient who should follow it up.

2.2.3 The Conflict Approach

This approach on health behavior brings out the inequalities in health care quality and the services provided thereof (Weitz, 2013). It worth noting that, health care quality of varies a lot globally. Societies thrive on inequities based on ethnicity, gender, social class, and race lines which are replicated in our health-related matters. Those who are from poor social families have a high chance of contracting diseases. When they become sick, the insufficient health care systems create a difficult situation for then to heal. As evidenced the differences that are there in health care are far much great and vast. These deep-rooted variations usually lead to differential societal health care functioning's which lead adherence a hard task to manage. The explained behaviors thus affect the non-adherence to medical therapy by patients

2.3 Empirical Literature Review

Research during the past several decades have indicated the several factors could affect or disrupt the adherence to repeat hospital visits and the compliance to medical advice. The variables that have been highlighted from literature can be classified into categories like; therapy-associated factors, patient-centered factors, economic and social factors, and healthcare system aspects.

2.3.1 Patient-Centered Factors

Age

From a review of the studies, there are a large proportion of that suggest elderly people might have higher compliance (Marteau & Weinman , 2004) (Hertz, Unger , & Lustik , 2005). In a cross-sectional which was done in the United Kingdom for patients aged 60 years and above, they were found to be greatly adherent to the given tablets for antiepileptic disease than those aged 59 years and below (86% vs 66%, respectively) (Buck , Jacoby, & Baker , 1997). A comparable research which was on the barriers to healing of patients also that drug-use adherence was supportively connected to the 61 years and above (Sirey, Bruce, & Alexopoulos, 2001). This study employed a multi-stage sampling strategy to classify grownups who had an earlier analysis of main depressive condition, as established by the Structured Clinical Cross-examination of findings where they sought after mental health medications at outpatient health centers. These results are in agreement with the results by a report from a review done by Krousel-wood et al in 2014 on the relationship amongst antihypertensive therapy adherence and revisited changes in blood pressure (Krousel-Wood, Thomas, & Muntner, 2004;19). The

study was cross-sectional in design done in a rural setting with about 1,391 respondents (Krousel-Wood, Thomas, & Muntner, 2004;19). In addition, another study which was done in Canada in 2005, focused on slightly youthful respondents (mean age 45–51 years) exhibited similar direction that non-adherence was greater in lower ages (Lacasse & Archibald, 2005). They studied patients who were infected with asthma were complying the inhaling steroids. The study had an experimental research design. The bearing of non-adherence on the lower ages is prominently shown in these studies. The averagely aged patients were greatly ascertained to not complying with the given prescription. Likewise, a study in Japan found out that people who are their crucial of their life (41–60 years) were found not adhering to the given medical prescription (Iihara, Tsukamoto, & Morita, 2004). A study carried out for Japanese patients with chronic diseases was carried out and found that patients of the younger age were intentionally non-adherence to medication.

A cross-sectional community based study in the US done in 1999, which had a sample size of 723 women exploring about patients' adherence to hemodialysis, those who had the ages range 21 to 40 years indicated chances of non-compliance (Leggat, 1998). It was found out that these patients between 21 and 29 years were engaged on other priorities of life.

Marital Status

Marriage usually has influence on the level of compliance to therapy as found out by a qualitative review by Swett and Noones in the United States (Swett & Noones, 1989). The review was to investigate the frequent reasons which caused therapeutic non-adherence. The study results found out that the getting assisted by a spouse can be an aid towards being compliant to given medical instructions than those patients who have no partner. In another qualitative study by Jia-Rong Wu et al. on determining medication adherence as meditated the relationship by marital status, single patients were highly expected to be non-adherent and were more than double to under-go an occurrence than patients with partners ($p = .017$) (Jia-Rong , et al., 2011). Being married has been a significant factor in explaining adherence behavior by the married more than single patients.

Gender

This is explained in a longitudinal in-person quarterly survey in the United States carried out in 2014, that investigated the gender variations between male and females in drug use, adherence to medication, and following the prescribed clinical guidelines (Marie & Sophy , 2014). The study size was of approximately 13.5 million men and 16 million women who had

a seamless eligibility to pharmacy benefit. It was found out that females were greatly compared males to utilize more than one medicines during the analysis (68% vs. 59%, respectively, $p<0.001$). Additionally, it was found that females took a lot of exceptional drugs, comparatively more than male counterparts (4.9 vs. 2.8 medicines annually, correspondingly, $p<0.001$). Variations in the drug use was analyzed for all ages and with different medication types. In most of the evaluated clinical metrics, men are found to be less than women in relation to adhering to use medications for chronic conditions, and are mostly not to receive the medical therapy well through good checking as instructed while at the health center. Another study conducted by Krigsman K. and Melander A. in 2007 which was investigating gender differences which was based on the reasoning for determinants of adherence to medication, a selection of aged patients who had at the minimum suffered a long-lasting ailment did not find any substantial variation in findings among females and males who had mental limits in reference to medical adherence (Krigsman & Melander , 2007). The authors analyzed the data using descriptive and inferential statistics including binary logistic regression model.

Level of Education

The levels of learning are critical in determining and boosting the health status of the populations since it improves the necessity for need health related matters, the dependence expenses related to health care are reduced. Education enhances and encourages healthy lifestyles and positive choices, maintains and nurtures human growth and human. Thus, higher education levels are related to more adherence to medical instructions and vice versa. The expected influence of educational level on adherence done through studies has brought out evidence that patients with advanced stages of educational are most probable to be of higher adherence. This is shown in a cross-sectional survey by Yavuz etal conducted at the UK in 2005 (Yavuz, Tuncer, & Erdogan, 2004). Instinctively there was the anticipation that people who attained advanced levels of educational will have gained greater information about the disease and required care hence be more adherent. Contrary to these findings, a quantitative investigation by DiMatteo in his of the effects of both structural and functional supports, found out that even greatly knowledgeable patients could not be able to comprehend statuses of their health or have certainty to the gains of adherence to therapy procedures (DiMatteo, 1995). More literature indicates that respondents who have a low level of schooling may have improved adherence (Senior, Marteau, & Weinman, 2004). A descriptive study conducted in the UK found that patients who had no formal educational were highly to be compliant in following cholesterol-lowering medication (Senior, Marteau, & Weinman, 2004). Low level

education patients are likely to have more trust with doctors and follow their advice to the later. From these results, it depicts that different educational levels are likely to have different predictions of medical compliance.

For example, one scientific study of this relationship found out that for individuals with an additional year of training are not likely to die in the next 10 years (Cutler, David , Adriana , & Tom , 2008). Another study in Sweden done in 2003, found out that, that age-set of males born between 1944 and 1954, and had one more year of education, decreased the threat of bad health by 18.5%. From a qualitative assessment which was done using a literature from the Medline database which run from 1970 to 2005, which was meant to explore the reasons that contribute to treatment adherence compared with patients' levels of education. The investigation found out that an additional years of schooling at the household level reduced child deaths by roughly 10 percentage points from a mean level of 22.5%. In the United States, for women who had enrolled in colleges for two years, this reduced the probability of smoking while pregnant by 5.8 percentage points. This is a significant improvement owing to the fact that on average, about 7.8% of the women in the sample would smoke while pregnant (Currie & Rosemary , 2002). To stay healthy and reap the benefits of such healthy investment, individuals invest in education (Cutler, David , Adriana , & Tom , 2008). Lastly, achievement in educational is correlated with high incomes via availability of good job chances and social connections, which given time transforms into enhanced spending in health and thus improved health outcomes. (Grossman & Michael, 1982).

2.3.2 Social and Economic Factors

Occupation

The impact of employment on patient's health holds specific significance because of the aggregate consequence of a patient's occupational duties which cover the life-time and since much of the decrease in health befall at senior ages. The status of an individuals' employment influences his health condition via direct effects like the physical involvement in the job (e.g., physical works, contact with heat and too much), psychosocial work strain, and societal care.

In review of how occupational status influences adherence, we study a cross-sectional experiment that was steered by Okoronko etal at the mature retroviral health center of the Nnamdi Azikiwe University Hospital which is in the southeast of Nigeria (Okoronkwo & Ijeoma, 2013). This analysis established that many working patients 92 (48.9%) had a higher chance of being non-compliant to drugs in comparison to those who artistes 95 (29.3%) and jobless groupings 41 (21.8%). The portrayed findings clearly imply that economically engaged

respondents recognized, among others, obliviousness 49 (53.3%), tiring program 42 (45.6%), and drugs effects at 38 (41.3%) as the reasons leading to non-adherence. Artistes and jobless people had lowest percentage for majority of the elements.

Being employed influences adherence indirectly through factors like pay, insurance for health, status, and power that are associated with the occupied job (Bosma, Stansfeld, & Marmot, 1988). The habits of peers at work also may influence adherence which consequently affects our well-being status. (Cheng, Kawachi, Coakle, Schwartz, & Colditz, 2000). In a qualitative one-on-one in-depth interview study found out that being fully engaged improves health condition through the financial, social and psychological benefits that improve health and thus the possibility of medical revisit leading to adherence. Those in permanent employment have chances of better health and having a good health strengthens the likelihood getting permanent occupation (Ross & Mirowsky, 1995) as illustrated a qualitative study by Ross and Mirowsky. The effects of occupational characteristics such as physical strain and low job control are negative and increase with age: late-career exposure to 1 year of high physical strain and low job control is comparable to the average health decline from ageing 16 and 6 months, respectively. It is can be well articulated that average health and life expectancy displays a clear gradient by the type of occupation (Michael G, Ferrie, Pekka , & Martin , 2005). A Systematic review of manual workers in the United States, for example, are 50% more likely to die within a given year than workers in managerial, professional, and executive occupations (Cutler, Fernandes-Llimos, Fromer, Benrimoj, & Garcia-Cardenas, 2018). In Europe, those who die as a result of doing manual work are more than non-manual workers through-out the distributions and the gap has grown over the years (Johan , Peeters, & Jan , 2003).

Religious and Cultural Reasons

In health, there are factors that constitute someone's beliefs like his values, knowledge and attitudes towards the health care provision system. The earliest model proposed by Anderson emphasized the connection between personal beliefs and health (Hausmann, Laura, & Saadia , 2012). As it was in the way beliefs influence and impact health status, a cross-sectional study that was undertaken in Jordan to assess physical, mental, emotional and social health status of the participants. The study found out that cultural believes as vital in influencing the idea of self-breast examination for cancer assessment among female nurses (Alkhasawneh, 2007). Another review conducted in 2013 aimed at assessing the resultant results of cultural beliefs on adherence to medication. It involved patients who had chronic conditions and was spearheaded by Kretchy and Owusu-Daaku. The review depicted confident and strong relation

amongst adherence to treatment and the dangers associated with beliefs on sickness (Kretchy & Owusu-Daaku , 2013).

In a quantitative study in Ghana about compliance to hypertension treatment, 90% of the patients whom were in the Christian faith demonstrated greater levels of religiosity and spirituality. However, being spiritual and professing a religion was highly related with non-adherence (Kretchy & Owusu-Daaku , 2013). Another quantitative study done in the USA, exploring black Christina women who were attending church services, reading the bible and praying were found not to be adherent to treatment therapies as directed by doctors (Abel & Greer , 2017).

A cross-sectional study of adult patients infested with asthma which was to assess patients from Asia in 2014 was conducted on individuals' behaviors, perceptions, and the association with adherence to medication in China, Korea, Malaysia, Taiwan, Thailand and Vietnam. Individual patients who were found to be non-adherent used traditional herbs which they thought were better than inhalers. (Chiu , Boonsawat , & Cho , 2014).

In a cross-sectional study carried out by Nelson in 2001 on the influence of beliefs on health adherence depicted that good is a gift from God to his people (Nelson, 2001). It is usually prescribed in an interactive manner on congealing where practices and additional interrelated symbolic occasions such as reciting sacred writings, devotions, reflections, fasting, attending at services are observed by persons according to their specific beliefs and modes of social organization (Miller & Thoresen, 2003). Consistent religious systems minimise hopelessness, stimulates self-confidence, and fosters household and marital gladness. Religious worship also increases long life, advances a patients' chances of recuperating from diseases, and reduces the frequency of many ailments. A correspondence study conducted in the USA established that being spiritual helped in stress management which is helpful to care nurses (Campbell, 2013). Similarly, a Brazilian and an Iranian quantitative questionnaire based study found a strong correlation between religiosity and quality of life among nurses (Lucchetti, Espinha , & Oliveira , 2012). Due to religious beliefs, patients will thus either get encouraged to adhere to or not to depending on the religious subscription. According systematic review of the available evidence on traditional and religion competence in medical practice, "Religion and spiritual involvement are critical factors in a most of the patients who were seeking care. Unfortunately, health providers may not take religious beliefs into account when they are dealing with difficult medical decisions for patients and their families" (Schub & Smith, 2018). As communicated by Swihart & Martin, the existing beliefs on health have tremendous effects on health care

results. People normally associate with their spiritual and religious beliefs while examining results in medicines.

2.3.3 Healthcare and Therapy-Related Factors

Physician-Patient Relationship

The state of the relationship between a patient and doctor is additional significant factor which influences the state of patients' compliance in a postal questionnaire that was sent to unselected, community-based patients living with epilepsy in Americans (Buck , Jacoby, & Baker , 1997). A strong connection is based on patients' confidence in doctor's and responsiveness from the doctor. From literature research, the possible elements of compliance for the use of ICS for patients with asthma were identified (Lacasse & Archibald, 2005). Questionnaires with research questions associated to these determinants were administered to a selected group of patients from three subspecialty clinics, including two from university-affiliated centers. There is good compliance when physicians are emotionally connected to their patients and supportive, when they give reassurance of getting healed or respect, and finally when they treat patients as an equal partner (Lacasse & Archibald, 2005).

Communication to Patients

With improper communication posed from the healthcare providers to patients, there is a high likelihood to spearhead negative outcomes on patient's adherence (Apter , Boston, & George, 2003). Lim and Ngah in their qualitative one-on-one in-depth interviews study on the extent of non-adherence by hypertension patients across the populations showed in their study, felt that the physicians did not have any concern for the problems they had (Lim & Ngah, 2001). To add to that, many doctors who are at the top of giving instructions to patients maybe on the first list in decreasing expected confidence to patients who are supposed to take the prescribed treatment. This as a per a qualitative study which employed an in-depth interview method and used a discussion guide to analyze elements factors that connected to personal, family or community and health provider factors that may have led to poor adherence (Vlasnik & Aliotta , 2005). Such results like these portray the need for amicable link for the patient and the health centers through regularized passing of information. To establish a healthy association between providers and patients, the providers should involve their patients in drafting their treatment plans. They should also give them a thorough enlightenment about the disease and possible to be therapy to be administered (Gascon JJ, 2004). Effective exchange of ideas through

communication is also very significant critical to aid patients comprehend their sickness and treatment.

Convictions and faiths related to taking of given medicines and knowledge about the disease are significant estimators of compliance level for aged women. This explained by study results which was conducted by Molloy et al who were researching about women, and found out that understanding the illness well could contribute to enhanced medical adherence (Molloy & Gao, 2009). A cognitive study by Chen et al also pinpointed out that general factors such disease knowledge are key predictor of enhancing patient adherence (Chen, Tsai, & Lee, 2009). This is true since patients are mostly concerned about the existing danger in relation to the illness thus it looks good understanding the disease (Weinman, 1997). Those in sick conditions will be better off especially in chronic conditions, having the expected knowledge of the disease, since this will boost their personal capability in managing the disease and ultimately follow the given medical instruction. Greta disease knowledge on the disease is a high factor to boost adherence since the understanding is able to bring out the threat level of the disease thus follow medicines to the latter (Chen, Tsai, & Lee, 2009).

From the paper research written by by Woith and Rappleyea, they gave out submissions that patients required to be well informed about the condition they are suffering from which ultimately leads to improved and active participation in the healing process (Woith & Rappleyea , 2016). Patient's information that is given in relation to their disease and treatment they are being offered has always been inadequate. Most patients do not actually know what their role is in undertaking the medication which would lead to compliance (Iihara, Tsukamoto, & Morita, 2004). While others lack the information on the disease and outcomes of low adherence; or miss the general information about critical hospital visits (Lawson, 2005). A great number of patients would think that the taking of medication. Part of the care seekers believed the need for medication was occasional and thus would stop taking to explore if was really required (Bender & Bender, 2005). From these undertakings, it's becoming critical that educating patients would lead to improved compliance. Patients need to be counselled well enough to enhance compliance. (Gascon JJ, 2004).

There is an "inverted U" association amongst disease information and level of adherence present in and among adolescents. Part of those adolescent patients who had very little knowledge on their diseases portrayed low adherence, while the adolescent patients who were sufficiently and well informed about their illnesses and medicine instructions were in good

compliance. Nonetheless, there has never been any other related report observed for other age cohorts. To add to that, the details of how patient knew about diseases has also never been effective. In a study conducted in 2004 in Hong Kong, the researcher team could not find any relationship between information they had on diabetes and the levels of adherence to the same treatment. They found out that there was a big misunderstanding on what people knew about the disease and what they were actually doing (Iihara, Tsukamoto, & Morita, 2004). For patients who had low level of education, their compliance was also low to the given treatment. To the differing opinion, the patients who had higher levels of education had portrayed higher level of compliance which can be attributed to the understanding they have on the drug labels. Consequently the use of instructions on the medicine labels has been proved as another source of adherence especially if a patient is literate that he can be able to read and comprehend the written details (Balbay, Annakkaya, & Arbak, 2005).

Quality of Care

In explaining the quality of care, we explore a qualitative research which was performed at Valiaser Hospital of Tehran (Iran) in 2015, using the framework analysis method. The research used purposive sampling technique with data collection done for around 14 participants. Data was collected through semi-structured interviews. The study found out that quality has straight consequences for healthcare providers. (Mosadeghrad , 2014). Healthcare providers are constantly required to continue initiating treatment programs and plans that would lead to quality improvement in order to maintain strong patient satisfaction. The study findings from Mosadeghrad in 2014, forms aprt of good policy recomendtion which are critical to inputs of resources through supportive rules and regualtions (Mosadeghrad , 2014).

Similar findings are evident in a research paper done by Lagrosen in 2005, which he used a grounded-theory design to a compounded study of selected companies in the Sweden for the health-and-fitness industry (Lagrosen & Lagrosen , 2005). Data collection was conducted through in-depth interviews and observations which are qualitative in nature. This research findings show that improved quality through enhancing the structures and processes led to a reduced wastage, low reworks, and no delays, lowered costs of provision, achieving a great market segment, and boosted a positive company image (Lagrosen & Lagrosen , 2005). Consequently, this leads to improved healthcare productivity and profitability increase (Alexander JA, 2006). As a matter of fact, it’s important to keep improving on the quality through definition and measurement of the available healthcare services. For quality measurement is hard due to its subjective nature and intangible existence characteristics.

Quality definitions is quite varied and mostly will be taken as the perspective being taken and the context of consideration.

It's quite difficult to explain and quantity healthcare service quality than in other service sector. McLaughlin & Kaluzny did a qualitative review of how quality of health care affects medical adherence (McLaughlin & Kaluzny , 2006). He found out that there are distinctive healthcare service provision characteristics like heterogeneity, intangibility and simultaneity that make it challenging to define and measure its quality. Healthcare service is an untouchable product thus we cannot touch, feel, view, count, or measure like a processed good. For the manufactured goods which are tangible goods and can allow for quantitative measures of quality, since they can be sampled and tested for quality throughout the production process and in the later use.

Distance to Health Care Facility

The distance travelled by patients to reach health care facilities is a great determinant in association to adherence to therapy. The given distance to access health service is taken in the space gap between the patients' home and the travel time to access a health facility for services. The distance determines the travel cost and ease of access to healthcare services. Inaccessibility is likely to contribute to non-adherence to hospital visits (Abere Dessie Ambaw, Getahun, & Solomon, 2012). This is from a study conducted by Abere et al who did a cross sectional study on adherence to antihypertensive therapy and related factors in Ethiopia. The study findings indicated that longer distances of travel to healthcare centers encouraged non-adherence of patients to treatment and hospital back visits. Transport fees has been acknowledged as a barrier to full utilization of healthcare services where the distance is long and thus high likelihood of non-adherence to medication and seeking of care. For those with refills for medicine could miss their dosage as a result of the travel distances to the drug stores which ultimately upsets the adherence programs. (Abere Dessie Ambaw, Getahun, & Solomon, 2012). Findings from a study in Chicago found out that longer distances to pharmacies which were few made it difficult for citizens to make frequent drug refills thus led to high non-adherence (Abere Dessie Ambaw, Getahun, & Solomon, 2012). In the same study the distance to the nearby drugstore was longer for racial-ethnic subgroups which again influenced compliance to doctor instructions on drug use. A similar chart review was conducted by Desrosiers and Ibrahim to establish if the distance traveled by the patient would influence adherence (Desrosiers & Ibrahim , 2019). The review found out that longer distance to be travelled by patients was highly linked to the increased likelihood of non-adherence to treatment or follow-up plans as required by providers. The study did a comparison of patients who resided near the facility of

a dentist (10 miles) and those whose households were much far away than double the distance. The nearest patients were more likely to be adherent to treatment plans than those who were to travel long distances. The respondents from families which were to travel greater than 20 miles to the clinic were 7.38 times expected to be non-adherent to the treatment plan than those who traveled 0-10 miles.

2.4 Overview of Empirical Literature

Studies have found factors associated with adherence to hospital visits and medication such as; patient related factors (e.g. socio-economic characteristics, and perceptions and beliefs), illness-related factors (e.g. severity of illness and frequency of symptoms), medication-related factors (e.g. number of daily doses, efficacy, and side effects), and physician-related factors (e.g. patient-physician relationship).

Lim and Ngah in their qualitative one-on-one in-depth interviews study on the extent of non-adherence by hypertension patients across the populations depicted on their study, felt that the doctors lacked concern for their patient problems (Lim & Ngah, 2001). As portrayed in a longitudinal in-person quarterly survey that investigated the variations between women and men in use of medicine adherence to medication, and the following of the prescribed by the clinics (Marie & Sophy , 2014). The study found out that women were far much compliant to medication men in reference to the use one or more drugs during the analysis period. Being in full-time employment advances health thus promotes the advantage of being full-time employment (Ross & Mirowsky, 1995) as illustrated by a qualitative study by Ross and Mirowsky. Being in marital association highly influences patients' compliance with medication positively as found out by a qualitative review by Swett and Noones (Swett & Noones, 1989). The findings from this study found out that the assistance a patient can get from spouse is important in encouraging adherence to medication compared to those living alone.

A chart review conducted by Desrosiers and Ibrahim found out that increased distance that's travelled to healthcare facility is associated with an increase in the levels of non-adherence to therapy as instructed by providers (Desrosiers & Ibrahim , 2019). With reference to quality of healthcare services, there is a qualitative research study conducted in Iran, which intended to identify factors influencing the quality of medical services provided by Iranian physicians. It was an exploratory in-depth individual interviews. The study found out that quality has direct impacts compliance (Mosadeghrad , 2014). Healthcare service quality is related to the way patients get satisfied and their level of loyalty.

From this literature evidence, more than 30 per cent to 60 per cent of patients will terminate their hospital visits or taking of medication prematurely without doctors' approval (Lingam & Scott, 2002). The aim of this study therefore is to bring into perspective, the factors that influence compliance to repeat hospital visits and medication in Kenya.

CHAPTER THREE
RESEARCH METHODOLOGY

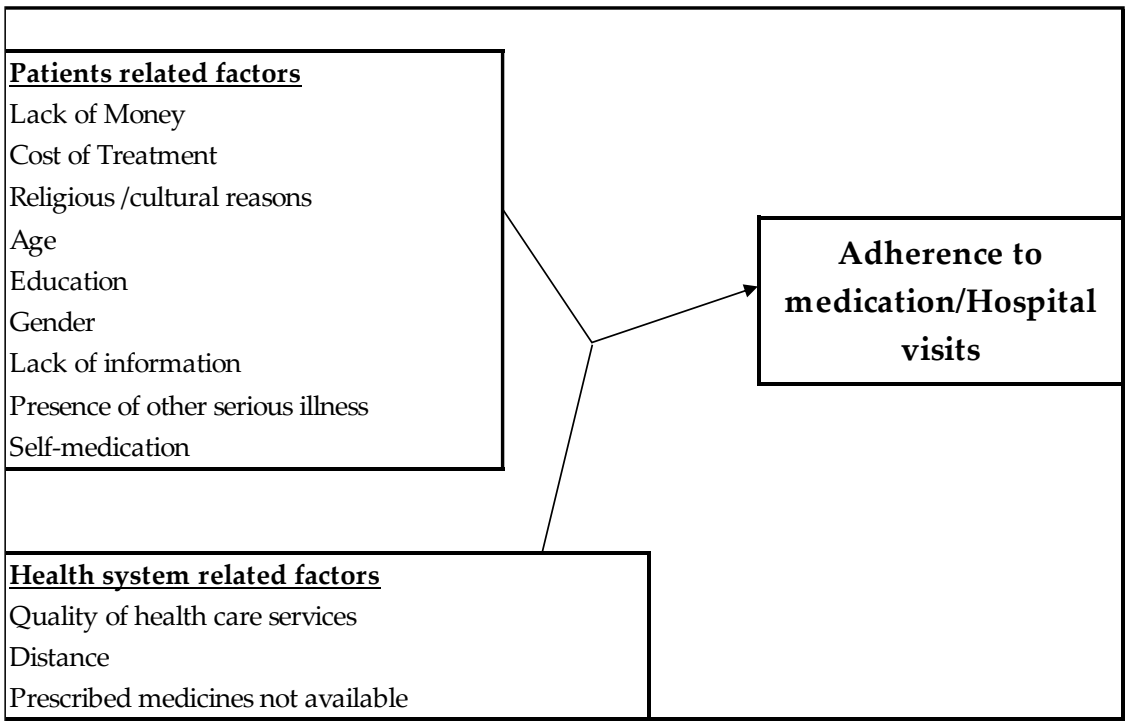
3.1 Introduction

This chapter covers the conceptual framework, empirical model, definition and measurement of variables, econometric approach, data sources and sampling methods.

3.2 Conceptual Framework

From the literature review on that factors that contribute to patient non-adherence to the required repeat hospital visits the dependent and independent variables are represented as below-;

Figure 2.1: Conceptual Framework



3.3 The Model specification

The Probit model

This study employed a binary probit regression model in the estimation of the degree of adherence to required repeat hospital visits and medication. This is as a result of the normal distribution of the data. This assumption is shouldered on the previously carried out studies.

Since the study was to analyze the factors (the independent variables) that contribute to adherence to required repeat hospital visits. Adherence to repeat hospital visits and medication was taken as the dependent variable while factors that's influence it (the independent variables) are presumed to have a relationship which is linear and are likely to have inverse standard normal distribution as shown below;

$$y_i^* = \alpha + \beta x_i + \varepsilon \quad (1)$$

Where y* = the unobserved dependent variable (Medical Compliance)

x_i = vector of independent variables (see table 1)

β = vector of parameters to be estimated

ε = error term

The observed outcome variable (y) is associated to the unobserved outcome variable (y_i^*) variable as follows:

$$y_i = \begin{cases} 1 \; if \; y_i^* > \tau \\ 0 \; if \; y_i^* \leq \tau \end{cases} \quad (2)$$

Where τ is the threshold, while medical compliance is y = 1 and non-compliance is y = 0. The cumulative distribution function of the probit model is then be expressed as:

$$prob(y_i) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x_i\beta} e \frac{-(x_i - x_i\beta)^2}{2} dx = \Phi x_i \beta \quad (3)$$

Equation 4 shows the probability of compliance:

$$\Pr(y_i = 1) = \Phi(x_i\beta') \quad (4)$$

Where; $\Phi(x_i\beta')$ is the cumulative distribution function that is used to calculate the maximum likelihood function (L) as follows:

$$\mathrm{L} = \prod_{y=0} \Phi(-x_i\beta') \prod_{y=1} [1 - \Phi(-x_i\beta')] \quad (5)$$

The marginal effects at the mean of the probit model ($\frac{\partial y}{\partial x}$) will be calculated as follows:

$$y = \Phi(\beta_0 + \beta_1 x_1 + \beta_1 x_1 + \beta_1 x_1 + \cdots + \beta_n x_n) \text{ so} \quad (6)$$

$$\frac{\partial y}{\partial x} = \beta_i \phi(\beta_0 + \beta_1 x_1 + \beta_1 x_1 + \beta_1 x_1 + \cdots + \beta_n x_n) \quad (7)$$

The probit model was been deduced based on the coefficients or marginal effects. Positive coefficients have shown that an increase in the independent variable increases the predicted probability while negative coefficients have shown a decrease in the predicted probability for every increase in the independent variable.

From the KHHEUS 2018 data, this project took compliance to repeat hospital visits as a response variable with age, gender, marital status, education level, status of employment, distance to healthcare provider and quality of care as the predictor variables.

3.4 The Model to be estimated

The factors that contribute to patient adherence and the degree of adherence to required repeat hospital visits was analysed using a probit regression model. The model presumed a cumulative distribution function which has a standard normal distribution. The study focussed on whether you made all repeat visits or not. The main purpose of study was to decipher the dependent variable as the likelihood of making all the required repeat visits or not with the presence of the explanatory variables. A linear relationship between the latent variable Y and explanatory variables (xi) is assumed.

The model is as follow:

$$RHV(y) = \beta_0 + \beta_1\, age + \beta_1\, gender + \beta_1\, (marital\ status) + \beta_1\, (education\ level) + \beta_1\, (status\ of\ employment) + \beta_1\, (distance) + \beta_1\, (quality) + \varepsilon$$

Where *RHV*= Repeat Hospital Visits

b0= the constant

b1=the coefficients

ε=the error term

The **ε** which represents the error term of the model, highlights the way observed data in this survey might differ from the actual population. The error term includes everything that separates this model from actual reality. This means that it reflects nonlinearities, unpredictable effects, measurement errors, and omitted variables.

3.5 Definition, Measurement and Expected Sign of the Variables

The definitions and measurements of the variables are as shown in Table 1. The study independent variables of comprise of economic associated factors, patients' associated factors, and health system associated factors.

Table 3.1: Definition, Signs and Measurement of the study Variables

Variables	Definitions	Measurements	Expected sign
Dependent Variable			
Repeat Medical & Hospital Visits	**The subsequent hospital visits after the initial visit**	Enquiry on whether the respondent made all the hospital-visits that were required and if not gives the reasons for not making all the visits	
Independent Variables			
Age	Number of complete years of life	Continuous variable	Positive (+)
Gender	Whether male or female	0 if Male 1 if Female	Positive (+)
Marital Status	The state of having a partner/spouse. (married, single, divorced, separated, widowed)	0 if married1 if not married	Positive (+)
Distance	The length of from patients home to the nearest health facility in kilometers	0 if Long distance to healthcare facility 1 if short distance to healthcare facility	Negative (-)
Religious /cultural reasons	Whether Christian, Islam or Hindu or Traditional	0 if religious 1 if not religious	Positive (+)
Quality of health care services	Whether the quality healthcare services are high or poor	0 if poor quality 1 if high quality	Positive (+)
Cost of Treatment	Whether cost of services is low(affordable) or high	1 if affordable quality 1 if not affordable	Positive (+)
Education Level	The highest successfully completed level of formal learning which includes No education, Primary level, secondary level and tertiary level	1 if no education, 0 if otherwise	Positive (+)
		1 if primary education, 0 if otherwise	
		1 if secondary education, 0 if otherwise	
		1 if tertiary education, 0 if otherwise	
Occupation	This is the status of employment and covers whether an individual is economically engaged or not	Dummy variable:	Positive (+)
		0 if not working,	
		1 if working	

3.6 Data Source

For the purpose of this study, I used data from the Kenya Household Health Expenditure and Utilization (KHHEUS) Survey 2018. The 2018 Kenya Household Health Expenditure and Utilization Survey (KHHEUS) is the fourth in a series of similar national surveys undertaken in 2003, 2007 and 2013 that focuses on health service use, out-of-pocket spending on health and the factors that influence health care use and expenditure. The report provides county-level information to inform policies at the county level.

The sample for the 2018 KHHEUS was intended to provide estimations for various indicators at National and County levels. The target sample size for the survey was 37,500 households

drawn from 1,500 (923 in rural and 577 in urban areas) clusters. Sampling was done through a two-stage stratified design which involved the selection of clusters in the first stage and a systematic sample of 25 households from each sampled cluster in the second stage. The survey utilized the fifth National Sample Survey and Evaluation Program (NASSEP V) household-based master sampling frame which is created and maintained by the Kenya National and Bureau of Statistics (KNBS). Since the sample is not self-weighting, weights were applied on the data during analysis in order to make the sample representative of the target population. The survey used Computer Aided Personal Interview (CAPI) for data collection. Data collection was successfully done in the 47 counties.

From the KHHEUS 2018 data collection tool, question 18, enquired whether a patient who was sick and visited or consulted with a healthcare provider made all the visits recommended by the provider.

3.7 Estimation Issues

3.7.1 Multi-collinearity

This occurs when it becomes difficult to gauge the impact of the explanatory variables on the response variable resulting to unstable parameter estimation. This study detected multi-collinearity by use of Variance inflation factors (VIF) and the correlation matrix.

3.7.2 Heteroscedasticity

This study tested the presence of heteroscedasticity that happens in a case where the variance of the error term is not homogenous for all observations. This was tested using the Breusch pagan test and variance was found to be homogenous as shown in the chapter that follows.

CHAPTER 4
DATA ANALYSIS, INTERPRETATION AND DISCUSSION OF RESULTS

4.1 Introduction

This chapter presents data analysis, interpretation and discussion of results. The analysis results of the factors that affect compliance to repeat hospital visits medication. The analysis is given in descriptive terms and inferential statistics that affect medical compliance. The descriptive statistics, diagnostic pre-estimation tests, estimation of the binary probit model and the odds ratio were derived using Stata.

4.2 Descriptive Statistics

The summary of descriptive statistics of the variables used in the analysis is presented in table 4.1.

Table 4.1: Descriptive Statistics

Variable	Observations	Mean	Std. Deviation	Minimum	Maximum
Dependent Variable					
Making all the required repeat hospital visits	**4,822**	**0.23**	**0.42**	**0**	**1**
Independent Variables					
Sex (Female)	2,969	1.62	0.49	0	1
Christian	3,811	2.15	1.07	1	4
Islam	834	1.39	0.49	1	4
No religion	177	2.13	0.25	1	4
Age	4,822	33.93	24.24	0	99
Distance(KMS)	4,822	15.02	3.39	1	99
Urban Residence	1,869	1.39	0.49	1	2

Marital Status : Married	2,301	2.81	1.44	1	2
Quality of health care services; Satisfied	4,822	2.85	2.04	1	2
Employment : Working	1,706	4.78	3.22	1	2
Never went to School	1,202	4.03	2.78	1	4
Primary	2,185	3.28	2.75	1	4
Secondary	994	2.77	2.53	1	4
University	441	1.76	2.58	1	4

Out the total respondents of 4,822, 74.16% were found to have made complete all the repeat hospital visits that were required. This shows a significant level of compliance in Kenya, with approximately 25.8% failing on full visits and medication.

On gender matters, 62% of the respondents were female while 38% were men. Studies show a relationship between gender and compliance to medical therapy. The age variable of the data set is however a discreet variable and was collected in respondent's completed years. The oldest respondent was 99 years while the youngest was below one year. The mean age of the respondents under analysis was approximately 34 years. The average distance to nearest health facility from respondent's home was 15 kilometers. Data analyzed shows that 61% of residents live in the rural areas whereas 39% were based in urban areas. On matters quality, 90.8% of respondents were satisfied with the quality of care that they received from visited health facilities. A high number of respondents have at least gained some formal education training. From the data most respondents have at least attended school with only 17.9% having never went to school for ages above 3 years. Primary and secondary school attendance was 39.9%, and 20.6% respectively. Respondents who have reached post-secondary education are 9.1%. From the mean on education, it is clear that most respondents have some basic education having reached secondary school on average.

In regards to marital status, 47.7% of the respondents are married meaning they have a spouse or partner. The status of patients' employment affects their monetary and socio-economic status of which is significant in inducing the adherence to repeat hospital visits. The analysis results indicate that 35.6% of respondent were working.

4.3 Diagnostic Pre-Estimation Tests

The study aimed at achieving reliable and valid estimates sought to analyze the factors that influence patient adherence to the required repeat hospital visits in Kenya. From the survey findings, a lot of factors have been elicited some of which had been pointed out from literature review. The following tests were executed to find out the strength of data wellness. Breusch Pagan test for correlation variance inflation factors and heteroscedasticity.

4.3.1 Correlation Analysis

To test tested for correlation among the independent variables by examining the correlation coefficient. The regression model was analyzing the factors that influence patients making all the visits that were required. The independent variables analyzed are sex (female), religion (having a religious belief or none), age in years, distance (in kilometers), type of residence, marital status, quality of health care services (satisfied with services), occupation and education level. From the analysis, the results show no any association among the independent variables in the study since the Pearson's correlation coefficient is less than 1 and greater than -1 as shown in table 4.2 below for all the explanatory variables analyzed.

Table 4.2: Correlation Matrix on Explanatory Variables

Model Variables	**Sex (Female)**	**Christian**	**Islam**	**Age in years**	**Distance(KMS)**	**Urban Residence**	**Marital Status: Married**	**Quality of health care services (Satisfied)**	**Employment : Working**	**Primary School Education**	**Secondary School Education**	**University Education**
Sex (Female)	1.0000											
Christian	-0.1391	1.0000										
Islam	-0.4444	-0.0066	1.0000									
Age in years	-0.5086	0.0457	-0.0240	1.0000								
Distance(KMS)	-0.6511	-0.0173	-0.0377	-0.0016	1.0000							
Urban Residence	-0.1391	-0.0232	-0.0645	-0.0624	-0.0231	1.0000						
Marital Status : Married	-0.1600	-0.0557	-0.0036	-0.0036	-0.0454	-0.0530	1.0000					

Quality of health care services (Satisfied)	-0.4560	-0.0530	-0.0453	-0.0225	-0.0530	-0.0677	-0.0036	1.0000				
Employment : Working	0.5300	0.0016	-0.0236	-0.0232	0.0016	-0.0645	-0.0253	-0.0624	1.0000			
Primary School Education	-0.4580	-0.0253	-0.0645	-0.0624	-0.0231	-0.0215	-0.5863	-0.0530	-0.0645	1.0000		
Secondary School Education	-0.0363	-0.0568	-0.0628	-0.0236	0.0046	-0.0032	-0.0256	-0.0463	-0.0868	-0.0148	1.0000	
University Education	-0.0521	-0.0235	-0.0590	-0.0241	-0.0248	-0.5963	-0.0577	0.0038	-0.0238	-0.0236	0.0046	1.0000

4.3.2 Multi-Collinearity Diagnostics Tests of the Model

To examine if there is multi-collinearity, the Variance Inflation Factor (VIF) was used**.** The VIF in a regression model usually measures the correlation and strength of correlation between the predictor variables in the study. If the value is 1 it implies there is no correlation between a given predictor variable and other predictor variables in the model, while value between 1 and 5 indicates moderate correlation whereas a value greater than 5 indicates potentially severe correlation. From the study results, the VIF for most of the factors is 1 and thus indicates that multi-collinearity is not going to be an obstruction in the regression model.

Table 4.3: Collinearity Statistics of the Model

Model Variables	Tolerance	VIF
(Constant)	.995	1.005
Sex (Female)	.995	1.005
Christian	.994	1.006
Islam	.995	1.003
Age	.993	1.007
Distance(KMS)	.994	1.006
Urban Residence	.993	1.007
Marital Status : Married	.995	1.004
Quality of health care services (Satisfied)	.991	1.007
Employment : Working	.995	1.006
Primary School Education	.992	1.007
Secondary School Education	.993	1.003
University Education	.994	1.002

4.3.3 Tolerance Test

Tolerance test a very useful tool for diagnosing multi-collinearity in a model thus checking whether the variables are too closely related. Weisburd & Britt state that anything under 0.20

suggests serious multi-collinearity in a model (Weisburd & Britt, 2014). In this model, the study results show tolerance at 0.99 which is a sign of low multi-collinearity in the variables of the model as shown in Table 4.3 above.

4.3.4 Test for Heteroscedasticity

To examine if there is the presence of heteroscedasticity in the model, an examination of Breusch Pagan was asssed. Table 4.5 illustrates the test results which points the test statistic (chi square) is 27.83 with a probability of 6.54%. The p value is significant hence we reject the null hypothesis that there is constant variance (homoscedasticity).

Table 4.4: Test for Heteroscedasticity

Breusch Pagan test / Cook - Weisberg test for heteroscedasticity	
Ho: Constant variance	
chi2(10) = 27.83	**Prob>chi2 = 0.0684**

4.4 Econometric Estimation

Considering the test of goodness of fit to determine if there are any additional independent variables that are significant by chance, the following results are revealed. First, the p value for the link test regression is 0.12382 indicating that the model has been correctly specified. Our variable of interest that is adherence to repeat hospital visit is highly significant with a p value of 0.0068 given the 95% confidence level. This shows the joint significance of the independent variables which explains up to 12.38% of the change in dependent variable.

Table 4.5: Probit Regression Results

Model	**Coefficients**	**Standard Error**	**z**	**P Values**	**95.0% Confidence**
Sex (Female)	.052	.0364	2.461	0.07576*	.252
Christian	.015	.0248	1.167	0.5801	.235
Islam	.012	.0250	1.174	0.5600	-.212
Age in years	.134	.0281	1.684	0.1580	.012

Distance(KMS)	-.654	.0515	-3.674	0.0012***	.264
Urban Residence	.525	.0325	1.202	0.1315	.329
Marital Status : Married	.048	.0411	2.611	0.1251	.252
Quality of health care services (satisfied)	.433	.0189	4.136	0.000312***	.329
Employment : Working	.429	.0425	3.743	0.00112***	.244
Primary School Education	.237	.0219	5.684	0.00033*	-.012
Secondary School Education	.365	.0241	2.215	0.026*	.018
University Education	.667	.0432	1.974	0.0417**	.011
(Constant)	**7.382**	**.2651**	**27.839**	**0.00684*** **	**6.862**
Probit regression	Number of Observations		=	4,822	
	Wald chi2(7)		=	27.84	
	Prob>chi2		=	0.068	
Log pseudo likelihood		-	**Pseudo R^2**	=	**0.123**
Standard Errors in parenthis ***p<0.01, **p<0.05, *p<0.1					

The p value and the log likelihood chi square ratio are 0.0068 and 0.123 respectively. This shows joint significance of the independent variables in explaining the factors that contribute to patient adherence to required repeat hospital visits in Kenya. Around 12.3% of the change in adherence to required repeat hospital visits in Kenya is elucidated by the independent variables.

The results of the probit model shows that distance, higher levels of education, quality of health care services employment and gender as significant factors in relation to adherence to repeat visits. The distance travelled to the nearest health facility, which is measured per kilometer is more likely to influence adherence to required repeat visits negatively for every increase by a kilometer. The employed people are more likely to be adherent to required repeat visits than those not employed. For any increase in the quality of healthcare services, is highly likely to improve adherence to required repeat hospital visits. Also, those with university education and other forms of higher learning are more likely to adhere to repeat hospital visits and those with primary education and lower are less likely to adhere to required repeat hospital visits. For the

case of gender, women are generally adherent to repeat visits than men. Other factors like age, marital status, place of residence and religion show insignificant influence on the likelihood of influencing the adherence to repeat hospital visits.

The probability of adhering to all the required repeat hospital visits depends on the marginal effects generated from the different independent variables which show change in the model. The average marginal effects are shown in table 4.6 below.

Table 4.6: Marginal Effects of Regression Factors

Model Variables	**dy/dx**	**Std. Error**	**z**	**P>z**	**95.0% Confidence Interval**
Sex (Female)	.03950	.01640	2.461	0.0576	.252
Christian	.01220	.02480	1.167	0.5801	.235
Islam	.01116	.02500	1.174	0.5600	-.212
Age in years	.01111	.02810	1.684	0.058*	.012
Distance(KMS)	-.18150	.05154	-3.674	0.0012***	.264
Urban Residence	.03930	.01000	1.202	0.0315	.329
Marital Status : Married	.04780	.04110	2.611	0.0251	.252
Quality of health care services (satisfied)	.12243	.01885	4.136	0.000312***	.329
Employment : Working	.13119	.04250	3.743	0.00112***	.244
Primary School Education	.03500	.02190	5.684	0.00033*	-.012
Secondary School Education	.04760	.02410	2.215	0.026*	.018
University Education	.09610	.04323	1.974	0.0417**	.011
Key ***p<0.01, **p<0.05, *p<0.1					

Interpretation of Marginal Effects

Table 4.6 above shows the average and marginal effects of the probit model as affected by independent variables. The distance to health facilities, higher levels of education, quality of health care services, employment and gender are found to be significant. The average effect of distance is -18.1 meaning that the probability of a person making all repeat visits within an increase in distance is 18.1% less. In relation to employment status, the average marginal effect is 0.131 for those working. This means that working influences adherence to repeat visits by 13.1% more than those not in employment. Additionally, increased quality of health care

services which is likely to influence improvements in adherence to repeat hospital visits by 12.2%. Also, having a higher levels of education impacts positively on the model by 9.6% more than those without. The different variability in ages also is showing significant influence on adherence to repeat hospital visits by 1.1%. In relation to gender parities, women are seen to influence in making all required repeat visits and have a positive impact on the model by 4.0% greater than men. The probability of married person adhering to repeat hospital visit 4.9% more than unmarried person. The influence on religion is depicted through the marginal effect on Christianity and Islam faith which positively influence adherence to repeat visits by 1.2% and 1.1% respectively more than those without any religious affiliation. In addition to the above, other factors that are in the model, residing in urban areas is likely to influence adherence by 3.9% more than living in the rural areas.

4.5 Discussion of Results

This research project pursued to analyze factors that influence patient adherence to required repeat visits in Kenya. Based on the model specification and regression results, it is evident that distance, higher levels of education, quality of health care services and employment as significant factors in relation to adherence to repeat visits.

From the findings reveal that distance to health centers is the greatest likely to impact adherence to repeat hospital visits. These results are consistent with what Desrosiers and Ibrahim found out in 2019 in their study, where an additional kilometers of distance was related with an improvement in the likelihood of non-adherence to treatment. Increase in the distance travelled by a patient is interrelated with an increase in cost of transport leading to a higher likelihood of non-adherence to required repeat hospital visits (Desrosiers & Ibrahim , 2019).

The analysis results have shown that an increase in the quality of health care services highly influences adherence to repeat hospital visits. The quality in health care is what guarantees getting the desired health outcomes and thus improved quality of care enhances adherence. These results confirm what Mosadeghrad in his research found out that quality has direct implications for healthcare providers to sustain high levels of satisfaction to patient (Mosadeghrad , 2014).

From the analysis, individuals who had attained a higher levels of education are more adherent to repeat hospital visits. These results agree with what Dimatteo found in his study that highly learned respondents could fathom their sicknesses or trust in the gains of remaining adherent to their therapy regimens (DiMatteo, 1995). The level of education helps patients to better understand and adhere to medication and repeat visit instructions. The patients are literate and

comprehend medicine descriptions and thus are good enough to follow all the given instructions.

According to the results, having some form of employment improves on adherence to required repeat hospital visits. It enables patients to take care of healthcare costs, buying of medicines, paying for transport and even can afford some medical insurance. In spite of this, the study findings are inconsistent with a Nigerian study by Okoronkwo and Ijeoma conducted in 2013, who found out that working patients 92 (48.9%) had a great possibility of drug missing compared with the artistes 95 (29.3%) and jobless patients 41 (21.8%) (Okoronkwo & Ijeoma, 2013).

The results from this study show variation in gender on how it influences adherence to repeat visits. Women are more likely to be adherent to repeat hospital visits than men. The results thus conform to what Marie and Sophy found out in 2014 in their longitudinal in-person quarterly survey in the United States, which evaluated the differences between women and men in use of medicines. They found out that women were significantly more likely than men to use one or more medications during the analysis period (68% vs. 59%, respectively, $p<0.001$), and women used more unique medications, on average, than men medication adherence, and prescribing alignment with clinical guidelines (Marie & Sophy , 2014).

CHAPTER 5
STUDY SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter study includes the summarized results with essential findings and recommended policy from the analysis.

5.2 Summary of the Study

In chapter one, I set out to analyze the factors that contribute to patient adherence to the required repeat hospital visits in Kenya. From the literature in previous, I was able to come up with the demographic and socio-economic factors that influence patient adherence to the required repeat hospital visits. The cross-sectional data collected during the Kenya Household Health Expenditure and Utilization (KHHEUS) Survey 2018 by Kenya National Bureau of Statistics (KNBS) was used. Based on literature, a binary probit regression model was used since the data follows a normal distribution.

The study findings indicate great association amongst the dependent and the independent variable and thus a good area of study. There are so many demographic and socio-economic factors that may influence patient adherence to the required repeat hospital visits. In this study, we analyzed how the surveyed variables from the data set influence patient adherence.

This study summary thus gives a direction to adherence as per the results. The findings reveal that significant variables contributing to repeat visits found are distance to health facility, the quality of health care services, cost as influenced by occupation (ability to pay), education and gender variability. Distance to health care services is associated with cost of transport and this poses as an additional cost despite the health care costs. Access to health services especially in rural areas in Kenya remains a challenge, in terms of the transport infrastructure and the availability of quality health care facilities.

The quality of health entails waiting time for the visits, ease of getting prescriptions filled, being diagnosed by qualified doctors. The availability of trained healthcare workers within health facilities is a factor to consider in quality. It also includes an effective, safe and people-centered health care system which is timely, equitable and integrated efficiency in its operations. By having some form of employment implies the ability to pay for the respective health care costs. These costs range from transport costs, medical costs of consultation, buying of drugs and therapy treatments. Some jobs will offer medical insurance and thus differentiates between having a strong contract than having to do menial jobs.

Education will enable patients to read and understand doctor instructions. It enables patients to understand directions for taking medications, understood the scheduling of their next appointment. Education will kill language barriers and make patients be able to comprehend the medical information thus more compliance.

Men and women will have differences in the way they adhere to required repeat visits. Results from this analysis show that women are highly likely to be adherent than men. Women are referred to as careful and weak, thus find it wise to adhere to medication than men who assume high masculinity and avoid drug taking and visiting hospitals.

5.3 Conclusions

In conclusion, the findings of this analysis indicate the factors that are related to adherence/compliance to required repeat hospital visits and medication are distance to health facility, the quality of health care services, cost as influenced by occupation (ability to pay) education and gender variability. Among these factors, distance, financial capability and age play a vital role in determining the level of compliance. The distance to the nearest health facility would cover the transport costs involved between the patients' home and the health facility. If this distance is long, it can be a hindrance to adherence to repeat hospital visits. Distance is usually covered up by increasing the number of health facilities within the vicinities of the residences of the population. In the case of quality of health care, findings show that improved quality is a prerequisite to adherence to repeat visits. Health care providers should this aim at improving the level of satisfaction to patients through increased quality. Education is a very critical factor in determining adherence. Promotion of literacy beyond secondary school education is a gain towards making the patients adherence to repeat hospital visits. Due to the difference in gender, women are more adherent compared to men, thus this study provides an opportune moment to inculcate a culture of adherence to men.

5.4 Recommendations

It is worth noting that there is still need to improve the levels of compliance to repeat hospital visits in Kenya. This study has found out long distances are hindrance to adherence to repeat visits. It thus critical for policy makers to aim at shortening the distance to health facilities by creating more within the neighborhoods of households especially in rural areas. This can also be enhanced by creating other enabling infrastructures like efficient roads and other transport systems.

Higher levels of education are key in determining adherence to repeat hospital visits. Investing in education starting from primary through tertiary institutions to better the education levels. This will forester the literacy levels and thus will help in improving adherence to repeat visits. Government needs to invest in activities that yield job opportunities. This will make citizens get more job opportunities in order to improve on the ability to pay for healthcare services.

There is need to ensure that the focus is on the patients and the care experienced by patients is of high quality and effective, as well as safe. Furthermore, in a country like Kenya where health services are devolved, there could be county-based compliance programs. These could include combining patient education and behavior-modification components, which will help improve compliance. The physicians working at the health facilities to be encouraged to give advice to patients and logical instructions to patients in a language they can understand. This will lead to patients adopting well to the day today drug routines assigned which ultimately elicits them to participate in self-monitoring, and providing educational materials that promote overall good health in connection with medical treatment.

5.5 Areas of Further Research

This study focused on analyzing the factors that contribute to adherence to repeat hospital visits. More research is needed to identify the role of health literacy skills and the impact to overall health, wellness and longevity. There is a real opportunity for the health research community to influence the policy direction of the government through direct engagement of both public and political audiences.

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