DEMAND FOR NHIF COVER AMONG COMMERCIAL MOTORCYLISTS IN KANDUYI, BUNGOMA COUNTY

BY

KENNEDY SIMIYU SIRENGO

X53/82084/2015

A RESEARCH PROJECT SUBMITTED TO THE UNIVERSITY OF NAIROBI IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTERS OF SCIENCE IN HEALTH ECONOMICS AND POLICY

November, 2019.

Declaration

I declare that this research project is my original work and that it has not been presented for a degree award in any other university or institution.

Kennedy Simiyu Sirengo

Reg. No.: X53/82084/2015

Signature…….Date……

This paper has been submitted for examination with my approval as the University supervisor

Dr. Martine O. Oleche

School of Economics

Signature…….Date: ……

Acknowledgment

First, I would like to express my gratitude to my supervisor and mentor Dr. Martine Oleche for the constant feedback, support, and guidance on this paper. His constructive and candid feedback and suggestions were highly beneficial to me.

Secondly, I thank my classmates and friends for their continued support and challenge in enabling me to complete the paper.

Finally, I appreciate my parents and my sister Faith for their love and encouragement throughout my studies.

Dedication

This work is dedicated to my beloved parents

Mr. John Simiyu Sirengo

&

Mrs. Philly Phoebe Sirengo

Table of Contents

Declaration ii
Acknowledgment iii
Dedication iv
List of Tables vii
List of Figures viii
List of Abbreviations ix
Abstract x
CHAPTER 1: INTRODUCTION 1
1.1. Background on Commercial Motorcycle transport industry and NHIF 1
1.2. Patterns of NHIF Uptake 2
1.3. Statement of the Problem 3
1.4. Study Objectives 5
1.5. Justification 6
CHAPTER 2: LITERATURE REVIEW 8
2.1. Theoretical literature review 8
2.2. Empirical literature 10
2.3. Overview of Literature 13
CHAPTER 3: METHODOLOGY 14
3.1. Analytical Framework 14
3.2. Specification of Econometric model 15
3.3. Definition of variables 18
3.4. Diagnostic tests 20
3.4.1. Normality 20
3.4.2. Multi-collinearity 20
3.4.3. Heteroskedasticity 20
3.5. Data Source and Sample Selection 20
CHAPTER 4: DATA ANALYSIS AND DISCUSSION 22
4.1. Descriptive Statistics 22
4.2. Diagnostics Tests 23
4.2.1. Multicollinearity 23
4.2.2. Normality Test. 24
4.3. Regression Results and Interpretation. 24

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS 30
5.1. Summary of Findings 30
5.2. Conclusions 30
5.3. Policy Recommendations 31
5.4. Study Limitations 31
5.5. Recommendations for Further Study 32
References 33
Appendix 37
Questionnaire 37

List of Tables

Table 1: Registered NHIF members 2012/13-2016/17 (Numbers in '000s) 3
Table 2: Study Variable 18
Table 3: Descriptive Statistics 23
Table 4: Multicollinearity Test 23
Table 5: Shapiro Wilk Test Results 24
Table 6: Demand for NHIF Cover among Commercial Motorcyclists (Marginal Effects)..... 26

List of Figures

Figure 1: Motorcyclist Fatalities Trend in Kenya 4
Figure 2: Motorcyclist Fatalities Trend in Western Kenya 5
Figure 3: Optimal health stock 8

List of Abbreviations

BRM	Binary Regression Model
CBHI	Community-Based Health Insurance
CC	Cost of Capital
CDF	Cumulative Distribution Function
CHF	Community Health Fund
GDP	Gross Domestic Product
KNBS	Kenya National Bureau of Statistics
MAAK	Motorcycle Assembly Association of Kenya
MEI	Marginal Efficiency of Investment
NHIF	National Hospital Insurance Fund
NTSA	National Transport and Safety Authority
RR	Rate of Return
SACCO	Savings and Credit Cooperative Society
WTP	Willingness-To-Pay

Abstract

Motorcycle transport has been increasing in popularity in Kenya because of its convenience and speed. However, the commercial motorcyclists face many health risks and this mode of transport records the highest accident fatalities annually. Therefore, commercial motorcyclists need health insurance to cover their health costs and safeguard their daily income. Consequently, this study focused on the factors that determine NHIF demand among commercial motorcyclists in Kanduyi, Bungoma County (a county that records the highest motorcyclist fatalities in Kenya). The study used cross-sectional data on various variables through a questionnaire. Subsequently, the study applied the binary probit model to quantify the effect and sign that study variables had on NHIF ownership. The results showed that age, household size, level of education, income, emergency care visits, and access to NHIF information had a negative relationship with NHIF cover ownership. Contrastingly, marital status, chronic illness, and SACCO membership positively influenced the probability of owning NHIF cover. The government should collaborate with SACCOs and microfinance institutions in promoting NHIF information and services because these organizations are significant variables in determining NHIF ownership.

CHAPTER 1: INTRODUCTION

1.1. Background on Commercial Motorcycle transport industry and NHIF

Commercial motorcycle riders in this project refer to persons that earn income from the provision of transport services using motorcycles. Motorcycle transport services are popular especially in Africa due to the ability of motorcycles to access areas with poor road networks. Motorcycles are also fuel-efficient, convenient, and able to maneuver heavy traffic in urban areas. In 2009, the Kenyan government announced a duty waiver on motorcycles to improve transport and create employment among the youth. This waiver increased the number of registered motorcycles from 3,579 units in year the 2005 to 91,151 units in the year 2009 (KNBS, 2010).

The youth are increasingly venturing into commercial motorcycle transport both in rural and upcoming urban areas. A study done in Kisumu revealed that commercial motorcycle business increased the living standards noticeably and positively among the residents engaged in this industry (Olawo et al., 2014). Majority of the commercial motorcycle riders interviewed (52.8%) earn in a range of (201-500) Kshs daily from motorcycle transport, 20.8% of the riders earn (501 to 1000) Kshs daily, while 13.9% earn in excess of Kshs.1000 daily (Olawo et al., 2014).

The rise in the number of motorcycles has, in turn, contributed to a rise in road accidents that involve motorcycles. The World Health Organization approximates that 1.2 million fatalities occur annually because of road traffic injuries and 20-50 million people sustain varying degrees of injuries (WHO, 2016). Accidents involving motorcyclists lead with 23% of all fatalities and injuries globally and road traffic injuries lead as a major cause of mortality among youth, 15-29 years (WHO, 2016). By 2030, road traffic accidents are likely to rise to the category of top seven leading causes of death if there is no action (WHO, 2016).

NTSA estimated the annual impact of road traffic injuries as Kes. 14 billion in 2013 (NTSA, 2018). Kenya also records the highest number of motorcycle accidents among road traffic accidents. The number of commercial motorcycle fatalities increased six-fold from 44 in 2005 to 263 in 2009 while the number of seriously injured motorcyclists increased by 4.9 times (NTSA, 2018).

Western Kenya recorded a significant rise in commercial motorcyclists to replace commercial bicyclists as the main form of transport especially for short distances (Nyongesa, 2014). The high

frequency of motorcycle accidents has burdened families and the health system, prompting some hospitals in Western Kenya to develop a special department to handle motorcycle accident victims (Musungu, 2015).

The MAAK estimates that 99% of commercial motorcyclists make at least Kes. 1000 daily and 80% of them are under the age of 35 years (Matheka et al., 2015). These earnings show the ability to purchase NHIF cover, which is Kes. 500 monthly in premiums for informal sector workers (NHIF, 2018).

NHIF is a public insurance for healthcare in Kenya. NHIF came into existence as a division under the Ministry of Health in 1966 to offer health insurance cover exclusively for citizens employed in the formal sector (NHIF, 2014). An amendment of the Kenyan laws in 1972 allowed for membership to include persons in informal employment (NHIF, 2014). This amendment and structural changes in NHIF (declared a state corporation by the NHIF Act 1998), contributed to higher efficiencies and increased population coverage.

1.2. Patterns of NHIF Uptake

Regarding the patterns of NHIF uptake, approximately 13% of the Kenyan population contributes to NHIF (KNBS, 2018). These contributions account for approximately 4.8% of the current health expenditure (MOH, 2013). The fact that the poverty level in Kenya is over 40%, affordability of healthcare is a challenge (UNICEF, 2016). Out of pocket health expenditure is notably high, thereby exposing most Kenyans to risk of catastrophic expenditures (Nyorera & Okibo, 2015).

NHIF developed a strategic plan 2014-2018 with key focus areas as efficiency in the management of resources, increase coverage, improve customer experience, and quality management (NHIF, 2014). The informal employment sector is at the core of NHIF's expansion strategy. Being a mandatory cover for formal employment sector workers, there is complete coverage in this sector. The rising unemployment levels and an increase in entrepreneurship among Kenyans has catapulted the informal employment sector growth over the years. The Economic Survey 2018 estimates the informal sector to account for 83.4% of the people employed in Kenya (KNBS, 2018). In 2016, NHIF introduced an attractive package for informal sector employees in line with the coverage strategy (NHIF, 2018). The product dubbed NHIF SupaCover offers a wide range of services that include renal dialysis, outpatient, chronic illnesses, in-patient, and maternity services (NHIF, 2018). The insured utilize these services/benefits at a premium of Kes.500 per month,

making this cover the most affordable with the most benefits in the Kenyan health insurance market (NHIF, 2018).

Table 1 shows the number of registered NHIF members from 2012/13 to 2016/17 (KNBS, 2018). Generally, membership rose by 11.1% from 6,136,256 in 2015/16 to 6,804,900 in 2016/17 (KNBS, 2018). This was a reduction from the 16.5% growth experienced in the previous period (KNBS, 2018). The formal sector formed the bulk of NHIF membership (3,870,000 members) at 56.9 per cent of the total (6,804,900) membership. The informal sector membership recorded a 16% growth from 2015/16 to the subsequent year as compared to a growth of seven percent in the formal sector (KNBS, 2018).

Table 1: Registered NHIF members 2012/13-2016/17 (Numbers in '000s)

Financial year	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**
Formal sector	2,679.4	2,952.4	3,221.6	3,616.2	3,870.4
Informal sector	1,115.4	1,498.0	1,991.6	2,508.1	2,934.4
Total	**3,794.8**	**4,450.4**	**5,213.2**	**6,124.3**	**6,804.9**

Source: KNBS Economic Survey, 2018

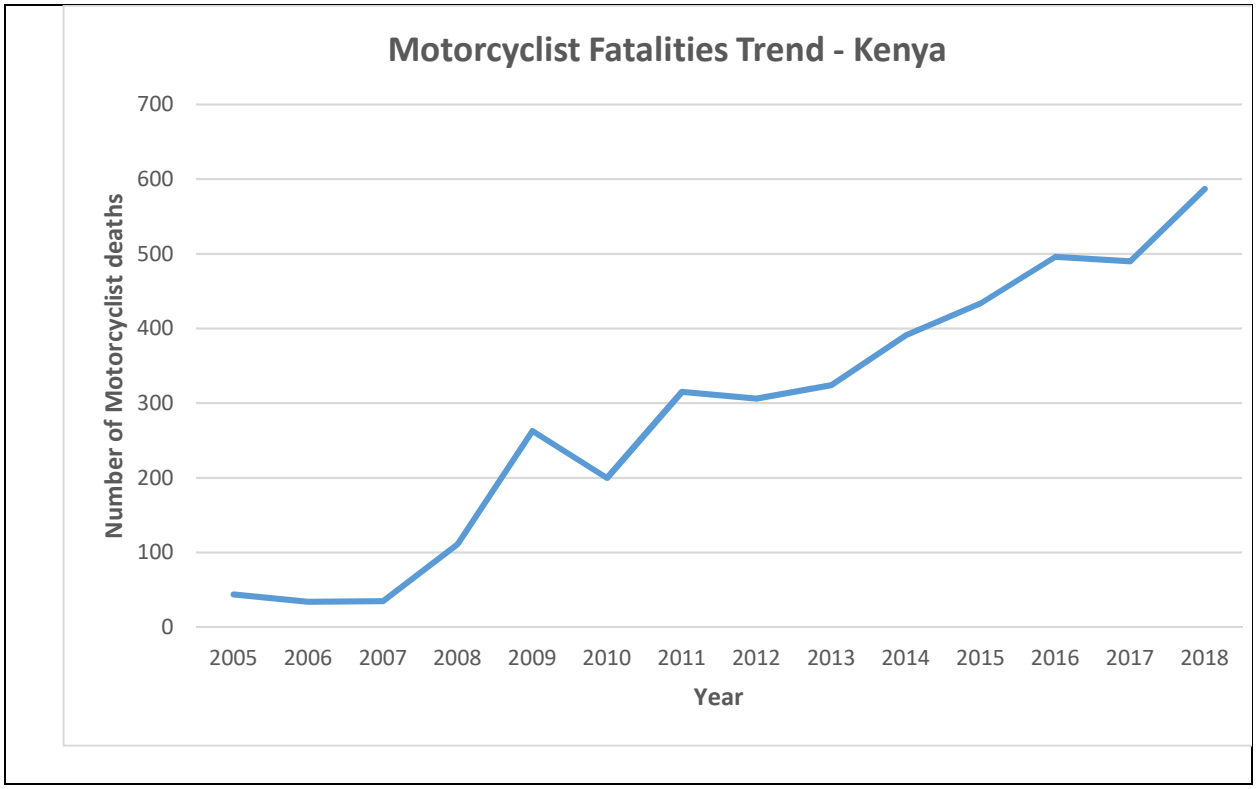
Commercial motorcycle riders form part of the vast informal employment sector in Kenya. These riders face many health risks ranging from respiratory problems to injuries resulting from their occupation (Ekpenyong et al., 2012). Given their daily income, commercial motorcycle riders need insurance cover to avoid catastrophic health expenditures for conditions that adversely affect their productivity.

1.3. Statement of the Problem

Insurance firms are unwilling to cover commercial motorcyclists because these motorcyclists have a 2.5 times higher chance of experiencing road accidents compared to motor vehicle drivers (Oino & Kuloba, 2011). The medical insurance coverage among commercial motorcyclists is 9%, motorcycle insurance coverage is 85%, and PSV insurance coverage is 80% (Oino & Kuloba, 2011). The least subscription for medical insurance among motorcyclists raises concern considering their high risk of accident-related injuries and respiratory problems (Ekpenyong et al., 2012). The unwillingness of most private health insurers to cover commercial motorcycle riders leaves them with NHIF cover as the viable option.

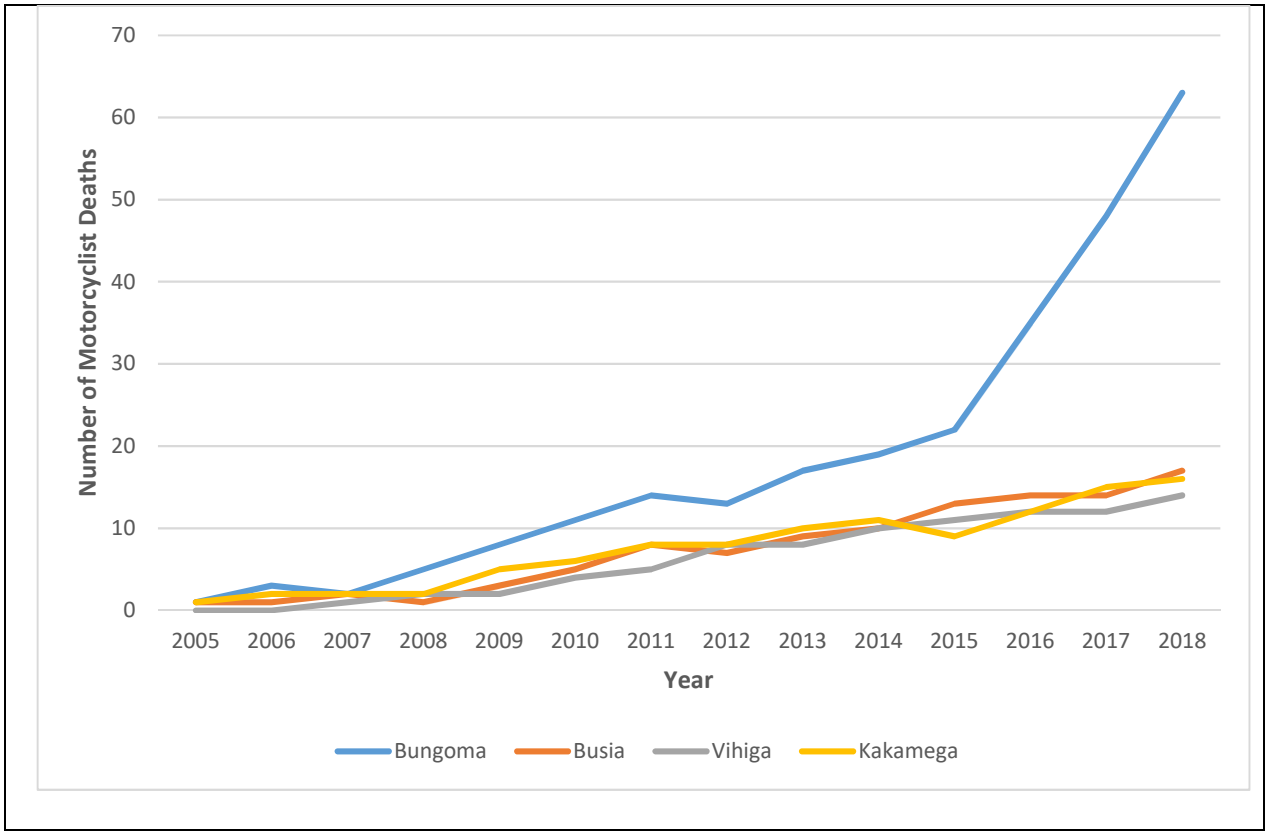
Bungoma County recorded the highest number of fatalities among commercial motorcyclists in Kenya (NTSA, 2018). However, the actual number of commercial motorcyclist accidents is likely to be higher as some of the accidents go unreported. Figure 1 shows the trend in motorcycle accident fatalities in Kenya (NTSA, 2018). The figure indicates a rapidly increasing number of fatalities resulting from motorcycle-related road accidents and injuries among motorcyclists. Similarly, Figure 2 indicates an increasing number of motorcycle accident fatalities in four counties of western Kenya. Bungoma County is the leading in the number of such fatalities as per figure 2. Previous studies on motorcyclists concentrated on the health effects of riding motorcycles and willingness of the riders to spend on insurance. However, the studies failed to comprehensively address the determinants of insurance uptake among motorcyclists, specifically commercial riders, and their focus was out of Kenya. The trend is likely to continue upwards as the motorcycle transport business continues to expand both in the rural and urban areas.

Figure 1: Motorcyclist Fatalities Trend in Kenya



Source: NTSA, 2018

Figure 2: Motorcyclist Fatalities Trend in Western Kenya



Source: NTSA, 2018

Given the high risk of injury, respiratory illness, and mortality among commercial motorcycle riders, their low uptake of health insurance cover poses a problem worth investigating. Majority of the riders earn in accordance to their daily output and, therefore, their level of income varies depending on the day's workload (Olawo et al., 2014). Considering this fluctuation of income, an injury or illness will have a direct impact on the performance and hence daily income of a rider. A rider who is not insured will incur out of pocket expenditure at the time the rider is not able to generate income. NHIF cover at Kes. 500 monthly is affordable among commercial motorcycle riders as shown by their daily income of more than Kes.200 for over 85% of the riders (Olawo et al., 2014). This study determines the factors that influence demand for NHIF cover among commercial motorcycle riders.

1.4. Study Objectives

The general objective is to investigate the factors that determine the demand for NHIF cover among commercial motorcycle riders in Kanduyi. Study specific objectives include:

i. To establish the pattern of uptake of NHIF cover among commercial motorcyclists in Kanduyi
ii. To evaluate the determinants of NHIF insurance demand among commercial motorcyclists
iii. To generate policy recommendations from the study's findings

1.5. Justification

The motorcycle industry has transformed many lives by improving living standards and increasing economic activities in rural and urban areas of Kenya (Olawo et al., 2014). The high unemployment rate among the youth in Kenya has driven most of them into the informal sector, with a high preference for motorcycle transport. This form of transport is set to continue growing as most rural areas open up economically (Olawo et al., 2014).

Bungoma County ranks as the third largest county in population size (KNBS, 2014). Its large population size, poor road infrastructure, rugged terrain with hills and Mt. Elgon, unreliable public transport system, and economic reliance on agriculture, makes it a region that heavily places reliance on two-wheeled transport services (KNBS, 2014). Bungoma's strategic location on the Great North Road exposes it to heavy vehicular traffic and increased motorcycle transport (Singoro et al., 2016). The County's proximity to the Kenyan border with Uganda indicates a lot of borrowing in motorcycle transport services because Uganda embraced this form of transport ahead of Kenya (Singoro et al., 2016). The fact that Bungoma County recorded the highest number of motorcycle accident fatalities in 2018 and yet it is not as congested as Nairobi, makes Bungoma a county of interest for further investigation (NTSA, 2018).

Kanduyi Sub-county is the most populous (229,701 people) and most densely populated (721 persons/Km^2) sub-county in Bungoma County (KNBS, 2014). The sub-county is located along the Great North Road, with road networks connecting to Bungoma town, Malaba, and Chwele. Therefore, this network provides a hub of business for imported goods from Uganda, farm produce from Chwele, and urban utilities from Bungoma town. Commercial motorcyclists thrive in Kanduyi because of the high volumes of businesses and the high population size whose demand for transport is not met by the public service motor vehicles.

Most of the research done has focused on the safety of motorcyclists but none has explored the factors that influence their uptake of medical insurance given their risky occupation and financial implications of health costs in treating accident-related injuries. A study in Nigeria identified

commercial motorcycle riders as the most at risk for respiratory illness resulting from ambient polluted air among all road users (Ekpenyong et al., 2012). Road accident statistics in Kenya show motorcycle accidents as the leading cause of death in Kenyan roads, with 587 fatalities for motorcyclists in 2018 (NTSA, 2018).

The low uptake of medical insurance cover among motorcycle riders is an issue that needs critical assessment (Oino & Kuloba, 2011). NHIF's introduction of the SupaCover at Kes.500 monthly for a wide range of health services is a motivator for insurance uptake (NHIF, 2018). The motorcycle industry poses many health risks to the riders, but being one of the leading employers for the youth, needs investigation on the factors determining NHIF uptake to minimize catastrophic health expenditures among the riders who earn daily income. This study will identify the factors that influence the demand of NHIF cover among commercial motorcyclists to inform policymakers on strategies to increase coverage of this segment of informal sector workers in line with the NHIF Strategic Plan 2014-2018.

CHAPTER 2: LITERATURE REVIEW

2.1. Theoretical literature review

Grossman developed a model on the production of health, with a focus on how wage, age, and education influence an individual's health stock (Grossman, 1972). Health is a capital good that produces healthy days/time. He defined two major concepts in understanding the production of health: Marginal Efficiency of Investment (MEI) and Cost of Capital (CC).

$CC = r + d$ ……...……... (1)

Where r is the opportunity cost of investing in health and d is the rate at which health stock (the capital good in this case) depreciates.

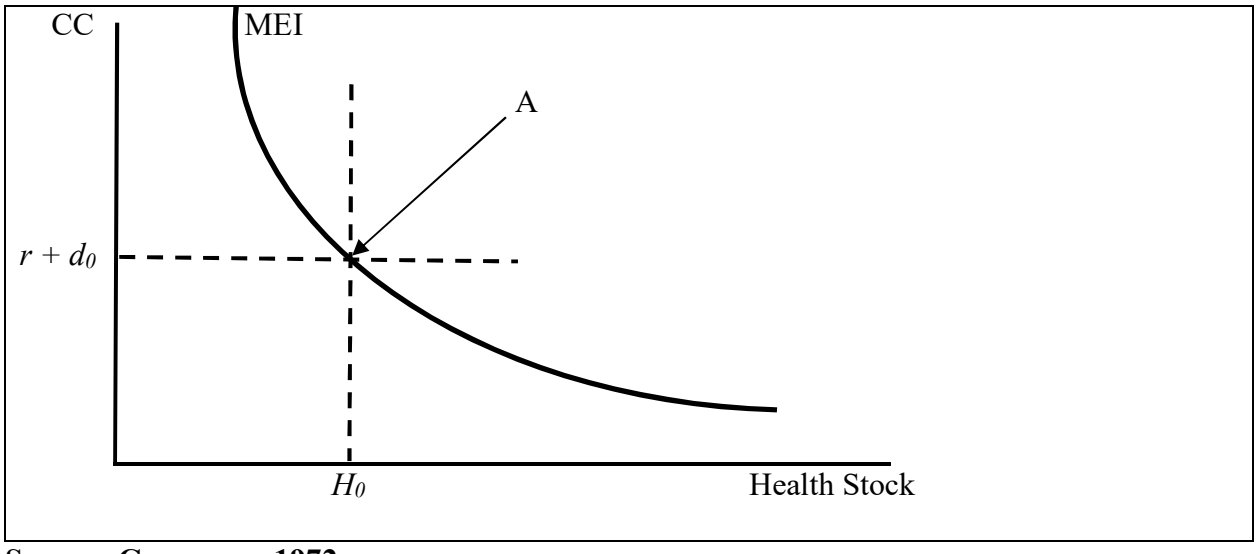
MEI, on the other hand, looks at the rate of return versus the cost of capital in defining purchase decisions. Generally, if the cost of a capital good is less than its rate of return, then the purchase decision is positive.

$CC \leq RR$ ……..…..……. (2)

Where RR is the rate of return on a capital good

Therefore, the most optimal health stock is achievable at point A as per Figure 3 (Grossman, 1972).

Figure 3: Optimal health stock



Source: Grossman, 1972

As an individual ages, the rate of depreciation d_0 increases, which in turn increases the cost of capital. This increment in the cost of capital reduces the optimal health stock of the individual. An increase in wage and education shifts the MEI curve outwards, thereby increasing an individual's optimal health stock (Grossman, 1972).

On the basis of the above model, the following is a health production function:

$H = f(I,J,K)$ ……. (3)

Where:

I – refers to healthcare

J - refers to inputs and characteristics that predispose or enable commercial motorcycle riders to acquire a given stock of health. These factors may include age, marital status, number of dependents, information, education, etc.

K – refers to the current health stock

Winssen et al., (2016) derived insights from behavioral economics to offer a rationale on the demand and ownership of social health insurance. They identified two possible explanations for social health insurance demand: insured's expectation on welfare gain and insured's suboptimal choices.

Under insured's expectation on welfare gain, key dimensions that influence demand for social insurance include loss aversion, debt aversion, uncertainty aversion, and liquidity limitations (Winssen et al., 2016). Loss aversion theory derives from the phenomenon that gains loom lesser than gains. The aggravation of losing a given amount of money supersedes the pleasure of gaining an equivalent amount. Losses may arise from out-of-pocket expenditures for the uninsured. Winssen et al., (2016) explain that welfare gain from the uptake of social health insurance decreases in the absence of loss aversion.

On debt aversion, individuals prefer to prepay for consumption and to receive payment after completion of work (Winssen et al., 2016). There are two motives behind the debt aversion behavior of consumers. First, individuals hope to enjoy consumption without trouble regarding payment concerns. Secondly, individuals would choose to avoid the distasteful experience of paying for already consumed products. Therefore, debt aversion predicts that individuals would

prefer to prepay for health consumption as it is in social health insurance where prepayments are done through monthly flat rate payments.

Ambiguity aversion predicts that individuals prefer prospects with known probabilities as opposed to those with unknown probabilities. In decision-making on health insurance uptake, ambiguity aversion might foster a preference for taking a health insurance cover. On liquidity constraints, individuals prefer to pay monthly premiums to cover for their health consumption to avoid the unpleasant experience of inability to pay for catastrophic health costs.

Winssen et al., (2016) therefore conclude that the presence of debt aversion, ambiguity aversion, liquidity constraints, and loss aversion are associated with welfare gain in ownership of health insurance.

The other explanation on why individuals take social health insurance is that individuals make suboptimal choices (Winssen et al., 2016). In this case, being uninsured by the social health insurance program is theoretically viewed as an optimal position. Aspects that might contribute to suboptimal choices include limited knowledge, decision avoidance, and social comparison.

Limited knowledge implies that individuals are unaware of what they get insured against and costs covered by the social insurance scheme (Winssen et al., 2016). Lack of this knowledge makes it difficult to trade-off the premium charged by the social insurance scheme against the health services covered by the scheme. The difficulties in trade-off resulting from inadequate knowledge expose individuals to the potential of making suboptimal choices. Additionally, making tradeoffs is a complex process that requires certain cognitive skills.

Decision avoidance involves postponing choices or adopting a relaxed approach that involves neither change nor inaction. Choice and information overload also contribute to decision avoidance (Winssen et al., 2016). Individuals are likely to revert to the status quo if faced with many choices. Under social comparison, individuals tend to conform and imitate to peer choices, which may extend to decisions to purchase social health insurance cover.

2.2. Empirical literature

Khan and Ahmed (2013) conducted a study on the impact of educational approaches on the willingness to contribute to health insurance among workers in the informal sector. The study found that there was a higher willing-to-pay (WTP) among the employees who participated in the

educational intervention than those that did not (Khan & Ahmed, 2013). Therefore, they concluded that educational interventions could increase the demand for health insurance among informal sector employees (Khan & Ahmed, 2013).

In another study on WTP for CBHI among informal sector employees in urban Bangladesh, major key determinants of WTP identified were: monthly income, educational level, occupation, and geographical location (Ahmed et al., 2016). Individuals with only primary education had 26.9% lower WTP than those with higher education levels, and WTP increased by 0.196% for every 1% rise in monthly income (Ahmed et al., 2016).

A study on WTP in rural Vietnam indicated that households' average WTP exceeds their costs for self-treatment and community healthcare. The study established that the average WTP for about 80% of the participants sufficiently pays for the low variety of insurance premiums in operating health cover programs (Lofgren et al, 2008). Nevertheless, the average WTP in rural Vietnam would be adequate to finance approximately half of all the household healthcare costs (Lofgren et al, 2008). The major variables identified to determine WTP were income, age, health care needs, and educational level, with age having a negative relation to WTP (Lofgren et al, 2008).

Baicker et al., (2015) studied behavioral hazards associated health insurance ownership. In their study, the noted that patients who regularly visited the hospital for emergency services were likely to have insurance cover. Some of the patients had non-emergency medical issues but still demanded emergency services because they had health insurance. Consequently, the study noted that the introduction of copayments reduced the behavioral hazard associated (Baicker et al., 2015).

Contrary to the studies mentioned above, education was not a significant factor that determines WTP for social health insurance in China (Bärnighausen et al., 2007). Being a male, without permanent employment, or a migrant significantly decreased WTP for social health insurance (Bärnighausen et al., 2007). The study done in China predicted that at a price same as the average premium for formal sector staff, about 35% of staff in the informal sector will take up basic health insurance (Bärnighausen et al., 2007). Subsidies and modifications in insurance benefits should effectively increase social health insurance coverage (Bärnighausen et al., 2007). Bärnighausen et al. (2007) also noted that adverse selection was unlikely to be a major problem if the social health insurance includes informal sector workers.

A systematic review of WTP for social health insurance among middle and low-income countries found the average WTP of individuals to be 1.18% of GDP per capita (Nosratnejad et al., 2016). An increase in family members, income, and education level steadily associated with high WTP while an increase in age correlated with reduced WTP for health insurance (Nosratnejad et al., 2016).

The proportions of people willing to pay for community health insurance was much lower in the rural communities (less than 7%) than in the urban communities of Nigeria (Onwujekwe et al., 2009). The study noted that the higher the socioeconomic status of a group, the higher the quoted WTP amount, and similarly, the urbanites indicated higher WTP in comparison to rural dwellers (Onwujekwe et al., 2009). Being male, a higher education level, and previous use of health insurance positively correlated with higher WTP (Onwujekwe et al., 2009).

In Ghana, 66% and 70% of uninsured and partially insured households respectively, could manage to pay for full national health insurance cover (Kusi et al., 2015). Nonfinancial health insurance attributes also influenced the uptake of insurance cover. The households (29%) found to be unable to afford full health insurance cover had lower socio-economic status with larger household sizes (Kusi et al., 2015).

Another study in Ghana revealed that a significant number of individuals did not subscribe to the national health insurance because of poor quality of service (58%), inadequate finances (49%) and preference to other insurance products (23%) (Boateng & Awunyor-Vitor, 2013). Majority of the uninsured respondents (18.2%) were between the age of 24 and 34 years (Boateng & Awunyor-Vitor, 2013). However, the study considered age as a non-significant factor in determining the demand for insurance. Individuals who were married or once married had a higher probability of having the national health insurance cover than those that never married (Boateng & Awunyor-Vitor, 2013).

In Nigeria, a study to identify the socio-economic factors that impact health insurance demand found out that religion negatively influenced the uptake of insurance (Ibok, 2012). Marital status, age, access to health insurance knowledge, education level, marital position, income, household size and profession had a significant positive influence on demand for health insurance (Ibok, 2012).

An assessment of the participation, knowledge, and preferences in community-based health insurance schemes (CHBI) among informal sector workers in Cameroon showed very low participation in the schemes (Noubiap et al., 2013). Lack of awareness and inadequate knowledge about the basic concepts of CBHI was the main reason for low participation (Noubiap et al., 2013). Solidarity based community associations were recommended as prime areas for awareness creation on CBHI schemes because most informal sector workers belonged to these associations (Noubiap et al., 2013).

In Tanzania, the National Health Insurance Fund succeeded the leadership and control of the CHF in 2009 (Borghi et al., 2013). The direction towards universal health coverage and universal healthcare access inspired the take-over (Borghi et al., 2013). This reform in Tanzania showed that informal sector schemes could benefit from amalgamation with formal sector insurance schemes through supervision, improved data systems, increased coverage, and management support (Borghi et al., 2013). However, harmonization of legal frameworks and management of administrative costs are essential for maximum benefits to the schemes and informal sector workers (Borghi et al., 2013).

Only 10% of residents in Kenya's urban informal settlements had NHIF cover, less than one percent had private health insurance cover, while 89% were uninsured (Kimani et al., 2012). Contrary to the findings of Onwujekwe et al in Nigeria, females were more likely to take NHIF cover than males in Kenya's urban informal settlements (Kimani et al., 2012). Residents employed in the formal sector were highly likely to have NHIF cover in comparison to those working under informal employment (Kimani et al., 2012). Membership in microfinance organizations such as SACCOs and local groups for savings & investment were important factors that influence access to health insurance (Kimani et al., 2012).

2.3. Overview of Literature

The theoretical and empirical literature identify similar factors that influence demand for social insurance in informal sector employment. These factors include the price of the social insurance cover, level of income, presence of chronic conditions, age, marital status, family size, membership in SACCOs, education level, knowledge gaps, and emergency care visits. This study shall incorporate these factors in assessing demand for NHIF cover among commercial motorcyclists in Bungoma County.

CHAPTER 3: METHODOLOGY

3.1. Analytical Framework

The analytical framework of this study applies insights from the Grossman model and the theory of consumer demand. In budget constraint decision-making, a rational consumer allocates resources among products to maximize utility. A commercial motorcycle rider maximizes his/her utility as follows:

$U = f(C,H)$ ……(4)

Where: U refers to the utility of a commercial motorcycle rider

C refers to the consumption of other goods by the commercial motorcycle rider

H refers to the health stock of the commercial motorcycle rider

Maximization of the utility function above is subject to a budget constraint and health production function that relies on other inputs purchased to produce health. The health production (H) function is as shown below:

$H = f(I,J,K)$ ……..……..(5)

Where I is direct health and healthcare inputs, J represents the health-promoting goods and services, and K is the current stock of health.

This gives us the following budget constraint expression:

$P_cC + P_iI + P_jJ = Y$ ……..…… (6)

Where: P_c refers to the price of consumption goods

P_i refers to the premium paid to purchase NHIF cover

P_j refers to the price of other inputs consumed to promote health e.g. gym fees

Y refers to the income of the motorcycle rider

The equations (4), (5), and (6) assist to develop a Lagrange function as follows:

$L = f(C, H) + Y_1[H - f(I, J, K)] + Y_2 (Y - P_cC + P_iI + P_jJ)$ ……..……..……(7)

The solution equation (7) generates the below reduced demand function for NHIF cover among commercial motorcycle riders

$D_1 = f(Y, K, P_c, P_i, P_j)$ ……(8)

Where D_1 is the demand for NHIF

3.2. Specification of Econometric Model

This study employs a binary probit model in the analysis of the determinants of demand for NHIF cover among commercial motorcycle riders, with a limit interval of (0,1). The model will assist explain the dependent variable as the probability of deciding to purchase NHIF cover or not, given other independent variables. The study assumes that there exists a linear relationship between the latent variable y' and explanatory variables X_i as illustrated by the model below:

$y' = X_i \beta + \varepsilon$ ……...……..… (9)

Where: y' is the unobserved latent variable that ranges between -∞and ∞

X_i is the vector of independent variables

β is a vector of parameters to be measured

ε is the error term

A link to the latent variable y' and the observed binary variable y is achieved by the following measurement equation:

$y = 1$ if $y' > K_0$

0 if $y' \leq K_0$……(10)

Where: y is the probability of having NHIF cover (1 if there is ownership of NHIF cover, 0 if not covered)

K_0 is the critical point of the index y', that when exceeded, an individual will acquire NHIF cover

The study assumed in equation (9) that a person's decision to purchase NHIF cover is dependent on unobservable scale index y'. As mentioned, the probit model assumes that y' is continuous, normally distributed and random, with the same variance and mean as K_0, estimation of parameters

β_s is possible to provide information regarding the index (Mukras, 1993). Cumulative distribution function (CDF) can be used to compute the probability that $y' \leq K_0$ or $y' > K_0$. The probit model in this study will assume that errors are standard normally distributed $\varepsilon \sim N(0,1)$ resulting in a probability distribution function (pdf) shown below:

$$\Phi(\varepsilon) = \frac{e^{-x(x)/2}}{\sqrt{(2\pi)}} \quad \text{………………………………………………………...…………………(11)}$$

Where Φ is the CDF for standard normal distribution

Based on the normality assumption, a definition of the Binary Regression Model (BRM) is achieved to transform Xβ into a probability (Green, 2002). The following assumptions shall apply in the specification of the BRM:

$K = 0$

$E(\varepsilon/X) = 0$

$Var(\varepsilon/X) = 1$ (probit model)

Assuming K = 0 in equation (5) and showing that Y=1 when y'>0, the following equations can be developed:

$pr(Y = 1|X) = pr(y' > 0/X) = pr(X\beta + \varepsilon > 0/X)$ …………………….……..……………….(12)

Where pr is probability

In a symmetric distribution of study's error term, the following can be shown:

$pr(Y = 1|X) = pr(\varepsilon > -X\beta|X) = pr(\varepsilon \leq X\beta)$ ……………………………..……………..……..(13)

Since this is the CDF of the error distribution assessed at Xβ, we can develop the following equation:

$pr(y = 1/X) = F(X\beta)$ ………………………..……………………………………………….(14)

the equation (14) above illustrates that the probability of ownership of NHIF cover by a commercial motorcyclist given the values of independent variables X is the CDF evaluated at Xβ. This study's probit model is given by the CDF illustrated below:

$$pr\,(y = 1) = \Phi\,(X\beta) = {}_{-\infty}\int^{X\beta} \frac{e^{-t(t)/2}}{\sqrt{(2\,\pi)}}\,dt \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.(15)$$

Therefore, an interpretation of the probabilities and their changes is achievable. The estimates denote the effect of an additional unit of the explanatory variable, on the inverse of the normal cumulative density of the odds of having NHIF, not on the probability of having NHIF itself. The study will report the results as predicted probabilities to assess the magnitude and economic significance.

The following is the multivariate regression model for the demand of NHIF (DNHIF) among commercial motorcycle riders:

$DNHIF = f\,(CMR, HD, HM, P_{H,} Po_{H})$ ………..………………………………………………. (16)

Where CMR – Commercial Motorcycle Rider occupation, HD – Household and Demographic characteristics, HM – Household Medical characteristics, P_H - NHIF monthly premium, Po_H - Average monthly premium of NHIF cover.

The multivariate equation will be as follows:

$DNHIF = \beta 0 + \beta_1 NC + \beta_2 EDU + \beta_3 AGE + \beta_4 HOU + \beta_5 HCN + \beta_6 INF + \beta_7 SAC + \beta_8 MAR + \beta_9 EM + \mu$ ……………………………..……………………..……………..……................….... (17)

Where;

DNHIF = NHIF Cover Ownership

INC = income of a commercial motorcycle rider

EDU = level of education

AGE = Age of the commercial motorcycle rider

HOU = Household size

HCN = chronic illness

INF = Access to NHIF Information

SAC = membership in a SACCO/microfinance institution

MAR = Marital status

EM = Emergency care visits

μ = Error term

3.3. Definition of variables

Table 2: Study Variable

Dependent Variable		
Variable	**Definition and measurement**	**Expected sign**
NHIF Cover ownership	Ownership of NHIF cover, 1 if a commercial motorcycle rider has NHIF cover, 0 if without NHIF cover	
Independent Variables		
Variable	**Definition and measurement**	**Expected sign**
Income	Average daily income	We expect a positive sign with a rise in average income (Lofgren et al, 2008).
Level of education	Numbers of years completed in school	We expect a positive sign as the level of education increases (Ahmed et al., 2016). As the level of education increases, the likelihood of taking health insurance cover increases (Lofgren et al, 2008).
Age	Age of the commercial motorcycle rider	We expect a negative sign as the age of the respondents increase (Lofgren et al,

		2008). Age is considered negatively correlated to health insurance demand (Nosratnejad et al., 2016)
Household size	The number of people under a commercial motorcyclist's household	We expect a negative sign for the demand for NHIF as household size increases (Kusi et al., 2015).
Chronic illness	Presence of chronic illness in a commercial motorcycle rider or their household (1 if yes, 0 if no)	Presence of chronic conditions is likely to influence positively demand health insurance (Lofgren et al., 2008).
Access to NHIF Information	Access to knowledge and information about NHIF cover and benefits (1 if yes, 0 if no)	Access to information about health insurance products is likely to influence positively the demand for health insurance (Khan & Ahmed, 2013). This variable is significant in the demand for health insurance (Noubiap et al., 2013).
SACCO membership	Membership in a SACCO or microfinance institution (1 if yes, 0 if no)	We expect a positive sign for commercial motorcycle riders that are members of SACCOs or microfinance institutions (Kimani et al., 2012)
Marital status	Marital status of the commercial motorcycle rider (1 if married, 0 if single)	We expect a positive sign for motorcyclists who are married (Boateng & Awunyor-Vitor, 2013)

Emergency care visits	The number of times a commercial motorcyclist visited a health facility for occupational-related emergency care services with the recent 12 months	We expect a positive sign for motorcyclists who have the most number of emergency care visits (Baicker et al., 2015)

Source: Author's Computation and Literature Review

3.4. Diagnostic tests

3.4.1. Normality

This test assesses the data characteristics assume a normal distribution and evaluates the probability of a random variable in the data set to be normally distributed. In testing normality, the study shall use the Shapiro Wilk test.

3.4.2. Multi-collinearity

Multi-collinearity occurs when one predictor variable in a data set can, with a substantial accuracy level, be predicted in a linear way by other variables in a multiple regression model. This phenomenon may cause the problem of unreliable regression coefficients. The study shall use the variance inflation factor (VIF) to test the subject.

3.4.3. Heteroskedasticity

Heteroskedasticity refers to a situation where the variability of a dependent variable is unequal across diverse ranges of the independent variable values. This results from the non-constant nature of some standard errors of a variable over time, which may adversely affect the coefficients in regression modelling. This research shall use Stata software to measure heteroskedasticity by applying the Breusch–Pagan test.

3.5. Data Source and Sample Selection

A survey using questionnaires will assist to generate data required for this study. The participants in the study will be commercial motorcycle riders in Kanduyi Sub-county. The study derived its sample size from the total population of 1847 commercial motorcyclists of Kanduyi Constituency (KNBS, 2014). Using Cochran (1963) sample size formula, the study established an appropriate sample size as 275 commercial motorcyclists, at 5% margin of error, 30% expected sample proportion, and 95% confidence level.

The estimate sample n_o would be $(Z^2pq)/e^2$ where Z is the z-value, p is the expected sample proportion, q is 1-p, and e the error margin. Therefore, n_o is:

$[1.96^2(0.3*0.7)]/(0.05^2) = 323$ people

Since the total population of commercial motorcyclists is 1847, the appropriate sample size n for this population would be as follows: $n_o/\{1+[(n_o-1)/N]\}$ where n_o is the sample estimate and N is the total population. Thus, the sample size for this study shall be:

$323/\{1+[(323-1)/1847]\} = 275$ commercial motorcyclists.

CHAPTER 4: DATA ANALYSIS AND DISCUSSION

This chapter analyzes the data on the determinants of demand for NHIF insurance cover among commercial motorcyclists in Kanduyi, Bungoma County. The study shall use descriptive statistics to evaluate the motorcyclists' demographic characteristics and binary regression to accomplish the study's objectives.

4.1. Descriptive Statistics

The study involved a sample of 275 commercial motorcyclists, all of whom were men. The mean number of participants owning NHIF cover was 12.73% (35 participants). Out of the 35 who owned NHIF cover, 65.71% (23 subjects) were 30 years of age and older. The average age of the participants was 30.58 years. The study noted that 54.91% of the subjects were married. The married participants contributed to 68.50% of the total participants owning NHIF cover. Further, the study found the average number of people in a household was 5.

The sample recorded an average number of years in schooling as 13.19. Majority of the subjects (65.7%) who had NHIF cover had schooled for 13 years or less. Regarding their average daily income, the study noted that the commercial motorcyclists earned Kes.735.64. Only 17 subjects mentioned that they suffered or had someone suffering from a chronic illness in their household. However, 4 out of those 17 had NHIF cover.

On emergency care treatment, the motorcyclists recorded an average of at least one incidence that necessitated them to pursue emergency care in the 12 months preceding the survey. Although 95 motorcyclists recorded 2 or 3 emergency cases, only 4 of them had NHIF cover. About 58.55% of the participants confirmed that they had access to information about NHIF and its benefits. Eighty percent (28 members) of the participants with NHIF cover confirmed access to NHIF information.

Despite having 20.73% of the participants with membership in SACCOs, the Sacco members accounted for 62.81% of the subjects owning NHIF cover. Table 4 summarizes the descriptive statistics of the study.

Table 3: Descriptive Statistics

	Mean	Std. Deviation	N	Min	Max
NHIF Cover ownership	.1273	.3339	275	0	1
Age	30.5818	9.0217	275	18	50
Marital status	.5491	.4985	275	0	1
Household size	4.8255	2.0232	275	1	8
Years of schooling	13.1855	2.0393	275	10	17
Income	735.6364	185.9162	275	500	1000
Chronic illness	.0618	.2413	275	0	1
Emergency care visits	1.0764	1.1389	275	0	3
Access to NHIF Information	.5855	.4935	275	0	1
Sacco membership	.2073	.4061	275	0	1

Source: Author's Computation

4.2. Diagnostics Tests

4.2.1. Multicollinearity

Multicollinearity is an indicator of the possibility that independent variables have perfect a correlation with each other. Consequently, the study examined the variance inflation factors and tolerance levels to investigate the presence of multicollinearity. Table 5 shows the tolerance and VIF at different levels for the variables that formed the regression model.

Table 4: Multicollinearity Test

Variable	**VIF**	**1/VIF**
Age	4.21	0.237606
Marital status	2.56	0.391208
Household size	1.94	0.516558
Access to NHIF Information	1.80	0.556532
Income	1.53	0.653792
Sacco membership	1.37	0.732516
Emergency care	1.28	0.779728
Chronic illness	1.24	0.804619
Level of education	1.05	0.952143
Mean VIF	**1.89**	

Source: Author's Computation

VIF greater than 10 indicates the presence of severe multicollinearity (Belsley et al., 1980). On the other hand, tolerance (1/VIF) that is less than 0.10 further confirms the presence of multicollinearity (Menard, 1995). From the values depicted in Table 5, the VIF and tolerance figures are within the recommended limits. The VIF figures are below 10 and the tolerance figures are above 0.1. Therefore, the variables do not present cases of multicollinearity.

4.2.2. Normality Test.

Table 6 shows the Shapiro Wilk test outcomes for normality test. The W statistic ranges from 0 to 1, where 1 indicates perfect normality (Lantz et al., 2016). Generally, a threshold of 0.7 in the W statistic indicates normal distribution (Lantz et al., 2016). From Table 6, the variables show the W statistic above the threshold showing that they are normally distributed.

Table 5: Shapiro Wilk Test Results

Variable	Observations	W	V	z	Prob>z
NHIF Cover Ownership	275	0.95556	8.765	5.074	0.00000
Age	275	0.95069	9.726	5.317	0.00000
Marital status	275	0.99969	0.062	-6.496	1.00000
Household size	275	0.98605	2.753	2.367	0.00897
Level of education	275	0.97638	4.659	3.597	0.00016
Income	275	0.97136	5.650	4.048	0.00003
Chronic illness	275	0.89979	19.768	6.975	0.00000
Emergency care visits	275	0.98612	2.738	2.355	0.00927
Access to NHIF information	275	0.99918	0.161	-4.264	0.99999
Sacco membership	275	0.97885	4.172	3.339	0.00042

Source: Author's Computation

4.3. Regression Results and Interpretation.

The study estimated both the average and marginal effects for the variables. From the computations of the marginal effects for the independent variables, there was a change in the probability of owning NHIF cover as the variable values shifted.

For assessing the overall probit model goodness of fit, the study applied the Wald Chi-Square Tests. Table 7 confirms that the probit model fit the data well. This is because the p-value (Prob > chi2) of 0.0000 associated with the Wald Chi-Square of 45.37 is less than 0.05% (the significant level) as per econometric interpretation (Johnston & DiNardo, 1997). Therefore, the Wald Chi-Square results indicated the overall goodness of fit for the model. The McFadden's adjusted pseudo R Squared of 39.50% indicates the level of suitability of the model and the independent variables in explaining the variations in the dependent variable. Given that ownership of insurance cover is a variable that mainly depends on human behavior, the R squared lower because of the unpredictability and complexity of human actions and perceptions (Walker & Smith, 2016). Consequently, the recorded Pseudo R Squared is a sufficient percentage considering the reliance of the study on human behavior.

Table 7 shows the average marginal effects of the variables in the study on the likelihood of a commercial motorcyclist owning NHIF cover. The dy/dx outcomes indicate the probability of commercial motorcyclist owning NHIF as a function of the independent variables. The significant variables as per the study's 5% significance level were household size, emergency care visits, and Sacco membership. Subsequently, the study considered the variables that were not significant as follows: age, marital status, level of education, income, chronic illness, and access to NHIF information.

Table 6: Demand for NHIF Cover among Commercial Motorcyclists (Marginal Effects)

	dy/dx.	Std. Err.	Z	P>|z|	[95% Conf. Interval]
Age	-.0037193	.0039381	-0.94	0.345	-.0114378 .0039992
Marital status	.0714937	.0549057	1.30	0.193	-.0361195 .179107
Household size	-.0251344	.0118967	-2.11	0.035	-.0484515 -.0018173
Level of education	-.009473	.0086524	-1.09	0.274	-.0264314 .0074855
Income	.0002342	.0001239	1.89	0.059	-8.60e-06 .000477
Chronic illness	.0155922	.0761352	0.20	0.838	-.13363 .1648145
Emergency care visits	-.0839729	.0206033	-4.08	0.000	-.1243547 -.0435912
Access to NHIF Information	-.0387454	.0473319	-0.82	0.413	-.1315142 .0540235
Sacco membership	.2561431	.0407677	6.28	0.000	.1762398 .3360464
Binary Probit regression	Number of obs = 275				
	Wald chi2(12) = 45.37				
	Prob > chi2 = 0.0000				
Log pseudolikelihood = -72.492363	Pseudo R2 = 0.3084				
Level of significance = 5%					

Source: Author's Computation

Age has a negative relationship with NHIF ownership among commercial motorcyclists as per Table 6. An increase in the age of a commercial motorcyclist reduces their chance of owning NHIF cover. Consequently, an increase in a commercial motorcyclist's age causes a decline in the probability of owning NHIF by 0.37%. Therefore, holding other factors constant, the study results indicate that NHIF ownership among older commercial motorcyclists reduces by 0.37%. From Table 6, the Z-value for age indicates that it is not a significant variable because the magnitude of the value (0.94) is less than the critical value (1.96). Moreover, the p-value for age is 0.345, which is greater than 0.05 confirming that the variable is non-significant. The findings were similar to those of Lofgren et al (2008) who found a negative relationship between age and ownership of insurance cover. Further, the results agreed with a negative correlation between age and uptake of social insurance in a study of middle and low-income countries (Nosratnejad et al., 2016).

Marital status showed a positive influence on the ownership of NHIF among the respondents. The results indicate that there is a 7.15% chance of owning NHIF cover among married commercial motorcyclists. Consequently, a change in marital status from single to married increases the probability of NHIF ownership by 7.15%. Marital status' Z-value is 1.30, which is less than the critical value (1.96). Therefore, marital status is a non-significant variable. The p-value further confirms the non-significance with its value of 0.193 being greater than 0.05. These study results concur with the outcomes of Boateng & Awunyor-Vitor (2013) study, which noted a positive relationship between age and ownership of the national health insurance.

There was a negative relationship between the number of people in a household with ownership of NHIF cover among commercial motorcyclists. As the number of household members increased, the probability of a respondent owning NHIF cover reduced by 2.51%. Further, the Z-value for household size is -2.11, indicating that the variable is significant because the value's magnitude is greater than the critical value (1.96). As a confirmation of the significance of household size as a variable in this study, the p-value of 0.035 is less than 0.05. The negative sign of this variable concurs with a study in Ghana that noted the same relationship between household sign and ownership of national health insurance cover (Kusi et al., 2015).

Regarding the level of education, this study recorded a negative relationship between the variable and ownership of NHIF. Additional years of schooling reduced the probability of taking NHIF cover by 0.95%. However, the variable was not significant because the magnitude of the Z-value (1.09) fails to exceed or equal the critical value (1.96). The p-value further confirms the non-significance because the variable's value is 0.274, which exceeds 0.05. Contrary to these findings, a study in Bangladesh noted a positive relationship between the number of years of schooling with ownership of health insurance cover (Ahmed et al., 2016).

On income, the commercial motorcyclists that earned higher income were more likely to take NHIF cover. However, the chance of taking insurance increased by a small percentage (0.02%) when income increased. Further, income was not a significant variable as shown by its Z-value (1.89) that is less than 1.96, the critical value. Additionally, the p-value of 0.059 supports the non-significance outcome of this variable because the value is greater than 0.05. Similarly, Lofgren et al (2008) noted a positive relationship between income and ownership of health insurance in Vietnam.

The presence of person living with a chronic ailment in a commercial motorcyclist's household increased his likelihood of acquiring NHIF cover. Such presence of chronic illness would increase the probability of purchasing NHIF cover by 1.56%. The Z-value for chronic illness is 0.20, which is less than 1.96. Therefore, chronic illness is a non-significant variable in this study. Similarly, the p-value for the variable is 0.838, which exceeds 0.05 showing that the variable is not significant. Lofgren et al (2008) also noted a positive relationship between the existence of chronic ailments and ownership of health insurance.

Assessing the relationship between the number of times a commercial motorcyclist sought emergency care and ownership of NHIF cover, this study found a negative relationship between the two variables. As the number of emergency services that a commercial motorcyclist sought increased, the probability of taking NHIF cover reduced by 8.40%. The variable's Z-value (-4.08) confirms that emergency care visits is a significant variable in this study. This is because the value's magnitude is greater than the critical value (1.96). The p-value counterchecks the interpretation of the Z-value and confirms the variable as significant because its value 0.000 is less than 0.05. The findings of this study contrast with another study that noted a positive relationship between the number of emergency care visits and ownership and utilization of health insurance (Baicker et al., 2015).

Commercial motorcyclists who had access to information about NHIF benefits were less likely to own NHIF as compared to those without such information. The probability of owning NHIF cover reduced by 3.87% as the commercial motorcyclist had more access to NHIF information. However, the variable was not significant because its Z-value magnitude (0.82) was less than 1.96 (critical value). Similarly, the p-value (0.413) shows that access to NHIF information is not a significant variable because the value exceeds 0.05. The study outcome for access to health insurance information on demand for health insurance differs with that of a study that Khan & Ahmed (2013) did, which noted a positive relationship between the two variables.

Finally, SACCO membership had a positive relationship with NHIF ownership. Commercial motorcyclists who were members of formal and informal SACCOs were 25.61% likely to own NHIF cover. SACCO membership was a significant variable because its Z-Value exceeded the critical value (6.26>1.96). The p-value also showed that SACCO membership was significant in this model because its value low at 5% level of significance (0.000<0.05). The results concur with

the findings of Kimani et al (2012) that found a positive relationship between membership in SACCOs/microfinance institutions and NHIF ownership.

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter shall summarize the contents of the study, draw conclusions from the study results and propose policy recommendations for adoption. Finally, the chapter shall cover the suggested areas for further research.

5.1. Summary of Findings

The problem statement indicated the highest fatalities in the country among commercial motorcyclists from Bungoma County. This study reviewed the literature on demand for public and social health insurance among commercial motorcyclists and informal sector workers. The study then proceeded to collect data from a sample of commercial motorcyclists and applied descriptive statistics and binary probit model to investigate their determinants of NHIF demand.

From the study findings household size, emergency care visits, and Sacco membership are significant factors that influence demand for NHIF among commercial motorcyclists in Kanduyi. On the other hand, marital status, level of education, income, chronic illness, and access to NHIF information were not significant factors influencing NHIF ownership.

Age had a negative relationship with NHIF ownership. Therefore, older commercial motorcyclists were less likely to own NHIF cover. However, marital status indicated a positive relationship with NHIF ownership, where married commercial motorcyclists were more likely to have NHIF cover. Household size, level of education, and income showed a negative relationship with NHIF ownership.

Commercial motorcyclists that had a household member living with a chronic illness were more likely to have NHIF cover. Emergency care had a negative relationship with NHIF ownership. Consequently, commercial motorcyclists that demanded more emergency care services were less likely to have NHIF insurance cover. Further, commercial motorcyclists that had access to information about NHIF were less likely to take the cover. Finally, commercial motorcyclists that belonged to a SACCO or a microfinance institution were more likely to own NHIF cover.

5.2. Conclusions

Commercial motorcyclists face many risks from respiratory issues to fatal accidents. Given their daily income and continued exposure to health hazards, an illness or accident may incapacitate

them from working and contributing towards the economy. Additionally, their absence from work may cause them to experience financial difficulties. Therefore, possession of health insurance is critical for the commercial motorcyclists to avoid catastrophic health expenditures and financial challenges associated with incapacitation. Considering that NHIF cover has a wide range of benefits and offers the least monthly premium for all health insurance options in Kenya, one would expect that most commercial motorcyclists would own the cover. However, the findings of this study indicated a small portion (12.73%) of the participants owning NHIF cover. Consequently, it is critical to review and consider the factors that influence the uptake of NHIF cover among commercial motorcyclists as discussed in this study, so that more of them can take up health insurance, improve access to healthcare, and avoid catastrophic health expenditures.

5.3. Policy Recommendations

Currently, the government of Kenya is undertaking initiatives to promote universal health coverage. One of the key strategies to the achievement of universal health coverage is NHIF cover for all people. From the findings, commercial motorcyclists are likely to take NHIF cover when they have a household member with a chronic illness. This is an adverse behavioral effect on health insurance ownership. Consequently, the government should sensitize people on the importance of having NHIF cover even when they do not have a chronic patient in their household.

Since the household size is a significant factor in determining the demand for NHIF, the government should create awareness on family planning services. Further, the government should provide access to the family planning services so that informal sector workers can have smaller household sizes and, therefore, save funds for health insurance.

Finally, NHIF and the government should use SACCOs and microfinance institutions as conduits for information and subscription to NHIF. Given their critical positive influence on NHIF ownership, these institutions can increase NHIF uptake among informal sector employees.

5.4. Study Limitations

The study lacked a comparison study on NHIF demand among commercial motorcyclists in Kenya. Additionally, the researcher faced difficulties convincing the participants to share personal details and participate in the study. This is because this was the first research that most of them were participating. However, the researcher assured them of the confidentiality and ethical standards of the research, which encouraged their participation.

5.5. Recommendations for Further Study

This study included the presence of chronic illness in the households of commercial motorcyclists and emergency care visits as variables that influence ownership of NHIF. Future studies should review further how these variables influence the demand for NHIF because there is scanty literature on these variables. The two variables are critical in understanding behavioral dynamics and current health needs in the evaluation of demand for NHIF cover.

.

References

Ahmed, S., Hoque, M., Sarker, A., Sultana, M., Islam, Z., Gazi, R., & Khan, J. (2016). Willingness-to-Pay for Community-Based Health Insurance among Informal Workers in Urban Bangladesh. *PLOS ONE*, *11*(2), e0148211. http://dx.doi.org/10.1371/journal.pone.0148211

Baicker, K., Mullainathan, S., & Schwartzstein, J. (2015). Behavioral hazard in health insurance. *The Quarterly Journal of Economics*, *130*(4), 1623-1667.

Bärnighausen, T., Liu, Y., Zhang, X., & Sauerborn, R. (2007). Willingness to Pay for Social Health Insurance Among Informal Sector Workers in Wuhan, China: A Contingent Valuation Study. *BMC Health Services Research*, *7*(1). http://dx.doi.org/10.1186/1472-6963-7-114

Belsley, D. A., Kuh, E. & Welsch, R. E. (1980). Identifying Influential Data and Sources of Collinearity. *Regression Diagnostics*. New York: Wiley.

Boateng, D. & Awunyor-Vitor, D. (2013). Health Insurance in Ghana: Evaluation of Policy Holders' Perceptions and Factors Influencing Policy Renewal in the Volta Region. *International Journal For Equity In Health*, *12*(1), 50. http://dx.doi.org/10.1186/1475-9276-12-50

Borghi, J., Maluka, S., Kuwawenaruwa, A., Makawia, S., Tantau, J., & Mtei, G. et al. (2013). Promoting Universal Financial Protection: A Case Study of New Management of Community Health Insurance In Tanzania. *Health Res Policy Sys*, *11*(1). http://dx.doi.org/10.1186/1478-4505-11-21

Cochran, W. G. (1963). *Sampling techniques* (Second Ed). New York: John Wiley & Sons.

Ekpenyong, C., Ettebong, E., Akpan, E., Samson, T., & Daniel, N. (2012). Urban city Transportation Mode and Respiratory Health Effect of Air Pollution: A Cross-sectional Study Among Transit and Non-transit Workers in Nigeria. BMJ Open, 2(5), e001253. http://dx.doi.org/10.1136/bmjopen-2012-001253

Grossman, M. (1972). On the Concept of Health Capital and the Demand for Health. Journal Of Political Economy, 80(2), 223-255. http://dx.doi.org/10.1086/259880

Hammer, J., & Dinardo, J. (1997). Econometric methods (fourth). USA: McGraw Hill.

Ibok, N. (2012). Socio-Economic and Demographic Determinants of Health Insurance Consumption. *Canadian Social Science*. http://dx.doi.org/10.3968/j.css.1923669720120805.1836

Khan, J. & Ahmed, S. (2013). Impact of Educational Intervention on Willingness-To-Pay for Health Insurance: A Study of Informal Sector Workers in Urban Bangladesh. *Health Econ Rev*, *3*(1), 12. http://dx.doi.org/10.1186/2191-1991-3-12

Kimani, J., Ettarh, R., Kyobutungi, C., Mberu, B., & Muindi, K. (2012). Determinants for Participation in a Public Health Insurance Program Among Residents of Urban Slums in

Nairobi, Kenya: Results From a Cross-Sectional Survey. *BMC Health Services Research*, *12*(1). http://dx.doi.org/10.1186/1472-6963-12-66

KNBS,. (2010). Kenya Economic Survey 2010 Highlights (1st ed.). Nairobi: KNBS. Retrieved from http://www.knbs.or.ke/index.php?option=com_phocadownload&view=category&download=75:economic-survey-2010&id=16:economic-survey-highlights&Itemid=563

KNBS,. (2014). The 2009 Kenya Population and Housing Census (1st ed., pp. 194-197). Nairobi: Kenya National Bureau of Statistics. Retrieved from http://www.knbs.or.ke/index.php?option=com_phocadownload&view=category&download=582:volume-1a-population-distribution-by-administrative-units&id=109:population-and-housing-census-2009&Itemid=599

KNBS,. (2018). Economic Survey 2018 (1st ed). KNBS. Retrieved from https://www.knbs.or.ke/download/economic-survey-2018/

Kusi, A., Enemark, U., Hansen, K., & Asante, F. (2015). Refusal to Enrol in Ghana's National Health Insurance Scheme: Is Affordability the Problem?. *International Journal For Equity In Health*, *14*(1), 2. http://dx.doi.org/10.1186/s12939-014-0130-2

Lantz, B., Andersson, R., & Manfredsson, P. (2016). Preliminary tests of normality when comparing three independent samples. *Journal of Modern Applied Statistical Methods*, *15*(2), 11.

Lofgren, C., Thanh, N., Chuc, N., Emmelin, A., & Lindholm, L. (2008). People's Willingness to Pay for Health Insurance in Rural Vietnam. *Cost Eff Resour Alloc*, *6*(1), 16. http://dx.doi.org/10.1186/1478-7547-6-16

Matheka, D., Faraj, A., Kipsaina, C., & Witte, J. (2015). Road Traffic Injuries in Kenya: A Survey of Commercial Motorcycle Drivers. *Pan African Medical Journal*, *21*. http://dx.doi.org/10.11604/pamj.2015.21.17.5646

Menard, S. (1995). Sage University Series on Quantitative Applications in the Social Sciences. *Applied Logistic Regression Analysis.* Thousand Oaks, CA: Sage.

MOH,. (2013). Kenya National Health Accounts 2012/13 (1st ed., pp. 13-15). MOH. Retrieved from http://www.healthpolicyproject.com/pubs/523_KenyaNHA.pdf

Mukras M.S. (1993). Elementary Econometrics. Theory, Application and Policy. *East Africa Education Publishers Ltd*. 162-163

Musungu, T. (2015). Assessing the Training and Safety Status of Motorcycle Transportation in Kakamega County In Kenya (1st ed.). JKUAT. Retrieved from http://ir.jkuat.ac.ke:8080/bitstream/handle/123456789/1611/LUCHIDIO,MUSUNGU%20THEOBALD-MSC%20OSH-2015.pdf?sequence=1&isAllowed=y

NHIF,. (2014). Strategic Plan 2014 - 2018: Sustainable Financing towards Universal Health Coverage in Kenya (1st ed.). NHIF. Retrieved from http://www.nhif.or.ke/healthinsurance/

NHIF,. (2018). National Hospital Insurance Fund. Retrieved 28 February 2019, from http://www.nhif.or.ke/healthinsurance/

Nosratnejad, S., Rashidian, A., & Dror, D. (2016). Systematic Review of Willingness to Pay for Health Insurance in Low and Middle Income Countries. *PLOS ONE*, *11*(6), e0157470. http://dx.doi.org/10.1371/journal.pone.0157470

Noubiap, J., Joko, W., Obama, J., & Bigna, J. (2013). Community-Based Health Insurance Knowledge, Concern, Preferences, and Financial Planning for Health Care Among Informal Sector Workers in a Health District of Douala, Cameroon. *Pan African Medical Journal*, *16*. http://dx.doi.org/10.11604/pamj.2013.16.17.2279

NTSA,. (2018). National Transport and Safety Authority. *NTSA*. Retrieved 28 February 2019, from http://www.ntsa.go.ke/index.php?option=com_content&view=article&id=237

Nyongesa, N. (2014). Factors Influencing Motorcycle Transport on Creation Of Employment Opportunities in Kenya; A Case of Bungoma South Subcounty, Bungoma County (1st ed.). University of Nairobi. Retrieved from http://erepository.uonbi.ac.ke:8080/xmlui/bitstream/handle/11295/74330/Nadwoli_Factors%20Influencing%20Motorcycle%20Transport%20on%20Creation%20of%20Employment%20Opportunities%20in%20Kenya.pdf?sequence=3&isAllowed=y

Nyorera, E. & Okibo, W. (2015). Factors Affecting Uptake of National Hospital Insurance Fund Among Informal Sector Workers: A Case of Nyatike Sub-County, Kenya. *International Journal Of Economics, Commerce And Management*, *Vol. III, Issue 3*(ISSN 2348 0386). Retrieved from http://www.ku.ac.ke/schools/business/images/stories/research/dr_ngugi/factors_affecting_uptake.pdf

Oino, T., & Kuloba, R. (2011). Assessment of The Challenges & Risks Facing The Motorcycle (Boda Boda) Industry in Kenya and Implications for Insurance Regulation. *Insurance Regulatory Authority*, Kenya.

Olawo, W., Ochieng, I., Ombok, B., & Opondo, F. (2014). The Effect of Increased Investment in Bodaboda Business on Economic Empowerment of People in Kisumu West District. *European Journal Of Business And Management*, *Vol.6, No.39, 2014*(ISSN 2222-2839 (Online). Retrieved from http://www.iiste.org/Journals/index.php/EJBM/article/viewFile/18833/19155

Onwujekwe, O., Okereke, E., Onoka, C., Uzochukwu, B., Kirigia, J., & Petu, A. (2009). Willingness to Pay for Community-Based Health Insurance in Nigeria: Do Economic Status and Place of Residence Matter?. *Health Policy And Planning*, *25*(2), 155-161. http://dx.doi.org/10.1093/heapol/czp046

Singoro, B., Obiri, J., Wakhungu, J., & Were, E. (2016). Causes and Trends of Public Transport Motorcycle Accidents in Bungoma County, Kenya. International Journal Of

Multidisciplinary Academic Research, Vol. 4, No. 1, 2016(ISSN 2309-3218), 37 - 39. Retrieved from http://www.multidisciplinaryjournals.com/wp-content/uploads/2016/01/FULL-PAPER-CAUSES-AND-TRENDS-OF-PUBLIC-TRANSPORT-MOTORCYCLE-ACCIDENTS-IN-BUNGOMA-COUNTY-KENYA.pdf

UNICEF,. (2016). Kenya at a Glance. UNICEF. Retrieved 13 December 2016, from https://www.unicef.org/kenya/overview_4616.html

Van Winssen, K., van Kleef, R., & van de Ven, W. (2016). The Demand for Health Insurance and Behavioural Economics. *The European Journal Of Health Economics*, *17*(6), 653-657. http://dx.doi.org/10.1007/s10198-016-0776-3

Walker, D. A., & Smith, T. J. (2016). Nine pseudo R2 indices for binary logistic regression models. *Journal of Modern Applied Statistical Methods*, *15*(1), 848-854.

WHO,. (2011). Motorcycle-related road traffic crashes in Kenya Facts & figures. *WHO*. Retrieved 13 December 2016, from http://www.who.int/violence_injury_prevention/road_traffic/countrywork/factsheet_kenya.pdf

WHO,. (2016). Road Traffic Injuries (1st ed.). WHO. Retrieved from http://www.who.int/mediacentre/factsheets/fs358/en/

Appendix

Questionnaire

Please fill in your response or tick next to the appropriate answer.

Section 1: Demographic Information

1. Age:…….
2. Please select your marital status.

   Married ……..… Single ……....

3. How many individuals live under your household?.....
4. Years of school completed:……..
5. What is your average daily income? Kes…….

Section 2: Health Needs and NHIF

6. Do you suffer from any chronic illness?

   Yes…. No….
7. If yes to 6 above, please specify the condition/s?

   .....
8. Does any of your household members suffer from a chronic illness/es?

   Yes…. No….
9. If yes to 6 above, please specify the condition/s?

   ……..
10. How frequent did you seek emergency care resulting from motorcycle related incidents in the past one year?.....
11. Do you have access to knowledge about NHIF cover and its benefits?

    Yes …… No …….
12. If yes to question 11, please select the source/s of knowledge and information.

    Social media.… Mainstream media…. Peers and friends…. Family…. Hospital Staff….

    Other (specify)….
13. Are you covered by NHIF?

    Yes…. No….
14. Please share your monthly premium payment for NHIF Kes.500…… Kes. 0……

15. Are you insured by a private health insurance company?

    Yes…. No….

16. Please share your monthly premium payment for NHIF Kes.500…… Kes. 0……

Section 3: Occupational matters

17. Are you a member of a SACCO or microfinance institution?

    Yes ……. No ……...

18. If yes to question 9, please name the institution/s.

    ……..…