

INVESTIGATING THE DETERMINANTS OF ACCESS TO HEALTH CARE
SERVICES IN NAMIBIA

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS
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ABSTRACT

The argument concerning the link between household/individual, community characteristics and health services utilisation in extant literature is relatively broad. Using data adopted from the Namibia Household Income and Expenditure Survey (NHIES) conducted between April 2015 and March 2016, this thesis investigated the determinants of access to health care services in Namibia. The probit and multinomial logit regression analysis were used to estimate the effect of household/individual and community characteristics on access to health care services and health care provider choice in Namibia. The study finds that household income, gender, medical insurance, household place of resident and education status increase the probability of accessing health care services. It further reveals that household income, medical insurance, gender and education status significantly influences health care provider choice probability. Therefore, the study confirms that individual/household and community socioeconomic factors do affect health care utilization and significantly explain the choice between private, public and traditional/others health services in Namibia. The findings suggest that there is greater need to uplift the living conditions of people in rural areas, make health care provision accessible to all households in Namibia. Consequently, the study serves as an opportunity for policy makers to pay more attention to improving citizens' level of education, income and access to medical coverage which are some of the key determinants of access to health care services in Namibia.

DECLARATION

I, **Elina Haivela**, hereby declare that this study is my own work and is a true reflection of my research, and that this work, or any part thereof has not been submitted for a degree at any other institution.

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Elina Haivela

Ehaivela

October 2022

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Signature

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DEDICATION

To

My amazing husband Mr Phillipus Haivela and our daughter Faith Haivela.

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LIST OF ABBREVIATIONS

NHIES	Namibia Household Income and Expenditure Survey
WHO	World Health Organisation
NSA	Namibia Statistics Agency
NCDs	Non-Communicable Diseases
OOP	Out-Of- Pocket
MoHSS	Ministry of Health and Social Services
PSEMAS	Public Services Employee Medical Aid Scheme
NAMPHIA	Namibia Population-based HIV Impact Assessment
HBM	Health Behaviour Model
GLM	Generalized Linear Models
MNL	Multinomial Logit
LPM	Linear Probability Model
IIA	Independence of Irrelevant Alternatives
AIC	Akaike's information criterion
BIC	Schwartz's Bayesian information criterion

TABLE OF CONTENTS

ABSTRACT.....	i
DECLARATION.....	ii
DEDICATION.....	iii
ACKNOWLEDGEMENTS.....	iv
LIST OF ABBREVIATIONS.....	v
LIST OF TABLES.....	viii
LIST OF FIGURES.....	viii
CHAPTER ONE: INTRODUCTION.....	1
1.1 Background of the study.....	1
1.2. The institutional context.....	5
1.3. Problem statement.....	7
1.4. Objectives of the study.....	9
1.5. Hypotheses of the study.....	9
1.6. Significance of the study.....	9
1.7. Limitation of the study.....	10
1.8. Delimitation of the study.....	11
1.9. Organization of the study.....	11
CHAPTER TWO: LITERATURE REVIEW.....	12
2.1. Introduction.....	12
2.2. Theoretical Framework.....	12
2.3. Empirical review.....	15
2.3.1. Predisposing factors.....	16
2.3.2. Enabling factors.....	20
2.4. Conclusion.....	24
CHAPTER THREE: METHODOLOGY.....	25

3.1. Introduction.....	25
3.2. Data type and source.....	25
3.3. Description of Variables	26
3.4. Model Specification	27
3.4.1. The Probit Model	28
3.4.2. Multinomial Logit Model	31
3.5. Research ethics.....	33
3.6. Conclusion	33
CHAPTER FOUR: RESULTS AND DISCUSSIONS	35
4.1. Introduction.....	35
4.2. Descriptive statistics on socio-economic variables.....	35
4.3. Empirical Results	38
4.3.1. Probit Estimation Results.....	38
4.3.2. Multinomial Logit Model Results.....	40
4.3.2.1. Public relative to Traditional/others.....	41
4.3.2.2. Private relative to Traditional/others	43
4.4. Diagnostic Test	44
4.5. Summary of tests and decision on the estimation method	46
CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS	48
5.1. Summary of findings and conclusion.....	48
5.2. Recommendations.....	50
5.3. Further research	51
REFERENCES	53

LIST OF TABLES

Table 3.1 Description and measurement of variables	27
Table 4.1 Descriptive statistics on determinants of access to health care and health care services	37
Table 4.2 Probit marginal effect estimates on the determinants of access to health care services	40
Table 4.3 Multinomial logit marginal effect estimates on the determinants of health care provider choice	43
Table 4.4 Independence of Irrelevant Alternatives (IIA) Tests	47
Table 4.5 Measures of fit for MNL model on the determinants of health care provider choice	48
Table 4.6 Measures of fit for the probit model on the determinants of access to health care services	48

LIST OF FIGURES

Figure 2.1 Model of access to personal health care services	15
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CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Access to health services refers to the timely use of personal health services to achieve better health outcomes. Thus, comprehensive access to quality healthcare services is important for promoting and maintaining health, preventing, and managing diseases, decreasing unnecessary disability and premature death (World Health Organisation [WHO], 2015). Most of the disease burden associated with communicable diseases are found in highly endemic area of the Sub-Saharan Africa with woman and children under five years of age at the highest risk (Akweongo *et al.*, 2011). In addition, the prevalence rate of non-communicable diseases (NCDs) such as hypertension and diabetes in adults (25 years and above) was at 40% (WHO, 2012). However, access to healthcare in many African countries remains a challenge and preventable diseases such as malaria and diarrhea among others remains the leading cause of death in the continent. The most cited obstacles to accessing health care services in Africa remain the cost of health care, long distance to health facilities, inadequate and unaffordable transport systems, poor quality of care, lack of drugs and poor attitude of health service providers (Wandera *et al.*,2015; Rooy, *et al.*,2012; Hjortsberg, 2003; Amadhila, 2012).

Relative to many African countries, the distribution of healthcare services in Namibia is comparably good with 76% of the population living within a 10km radius of a healthcare facility (Christians, 2020). However, with the perceived high quality of care in hospitals

most patients bypass clinics and health centres leading to overcrowding and long waiting times in hospitals (Ministry of Health and Social Services [MoHSS], 2017). In rural communities, the average number of people per clinic is 5,780 and 58,825 people per district hospital (Christians, 2020). Health service providers in Namibia are grouped into private and public health systems. The private sector serves only 18% of the population (mostly those with medical aid funds) and the remaining 82% of the population rely on the public health system or out-of-pocket (OOP) expenditure in the private health sector (MoHSS, 2017). This points to the possibility of overcrowding and shortage of care provision in public health facilities which has a bearing on the healthcare seeking behavior of the population, especially the poor. For instance, shortage of vital medicines, equipment, and staff have been reported at major public healthcare facilities (Ngatjiheue and Amukeshe, 2020). Hence, despite the availability of health and social welfare, access to healthcare services remains a challenge to many Namibians. Among other reasons, this is due to the remoteness of the available facilities, shortage of health professionals, long waiting hours in health facilities, out of pocket expenditure towards travelling and accommodation, level of education and risk of losing their employment through absenteeism (Rooy, *et al.*, 2012).

Research evidence suggest that access to health care services is associated with access to medical insurance, gender, age, household size, income, education and whether an individual is from a rural or urban area (Hjortsberg, 2003; Rashid and Antai, 2014; Panezai *et al.*, 2017; Gyasi and Phillips, 2018). Concerning the gender aspect, women are found to have higher medical care service utilization than men, resulting in women spending

more than men on healthcare utilization (Patel and Chauhan, 2020). The level of poverty in rural areas is relatively higher than in urban cities, thereby suggesting that the level of affordability of health care services is higher among those in urban cities (Ramihantaniarivo, 2013). According to Chatterjee *et al.* (2018) individuals in the upper caste, those that are highly educated or have higher income, and those with larger families are more likely to seek care from a private health care facility. Whereas individuals who are experiencing higher economic dependence and those with chronic diseases tend to prefer public inpatient services. In the Grossman demand for health model (1972), individuals make choices regarding health care utilizations and demand healthcare services to restore their health capital and promote individual and household wellbeing.

Several studies have investigated the determinants of access to healthcare services (Jensen and Ahlburg, 2002; Kabongo, 2015; Lepine and Nestour 2012; Fan and Habibov 2009; Masiye and Kaonga 2016; Panezai *et al.*, 2017; Guinness *et al.*, 2018; Wandera *et al.*, 2015). While previous studies have analyzed the determinants of access to healthcare in Namibia (Rooy, *et al.*, 2012; Amadhila, 2012; Rashid and Antai, 2014; Kaundjua 2019; Alegana *et al.*, 2012), however, they did not investigate what explains the observed differences in access to care in public and private health facilities. This study contributes to this existing literature in two ways. First, there is limited evidence on studies that measure the effects of household socioeconomic status on access to health care services in Namibia. Second, this study is one of the first to examine what explains the observed differences in access to care in public, private and traditional/others healthcare utilization in Namibia.

Melissa (2013) highlighted the factors influencing access to healthcare services. However, her study ignored the importance of the observed difference in access to care in public and private facilities. A study by Dias *et al.* (2008) postulated the determinants for health care utilization, but the study did not consider the demand side factors. Moreover, recent studies have increasingly engaged more vigorous methods to investigate the determinants of access to healthcare services (Fan and Habibov, 2009; Guinness *et al.*, 2018; Lepine and Nestour, 2012; Rooy, *et al.*, 2012; Alegana *et al.*, 2012; Kabongo, 2015; Wandera *et al.*, 2015; Masiye and Kaonga, 2016; Kaundjua, 2019). Findings from these studies suggested that distance to facilities, level of education, gender, out-of-pocket expenditure, age remain the most influential factors in determining access to healthcare services.

As mentioned earlier, a lot of studies have focused on the determinant of access to healthcare services with very limited evidence on household's choice between public and private healthcare facilities. While several studies have investigated the determinants of access to health care services in Africa (Dias *et al.*, 2008; Hjortsberg, 2003; Rooy, *et al.*, 2012; Delia, 2013; Kabongo, 2015; Wandera *et al.*, 2015; Panezai *et al.*, 2017), few studies have examined factors that explain the choice between private and public health facilities (Mukong and Burns, 2019). This study contributes to this body of literature by investigating the determinants of access to health care, focusing on the choice between private, public and traditional/others facilities in a country with one of the highest inequalities in the world. Such evidence is vital for public policies, not only for the government of Namibia, but also to economies with similar heterogeneity.

1.2. The institutional context

Situated in the South-western part of Africa, Namibia covers 824,000km² with a population of about 2.6 million and a population density is 3 inhabitants per square kilometer (Worldometers, 2022). Most of the population lives in six regions located in the northern part of the country, i.e. Oshana, Oshana, Oshikoto, Kunene, Erongo and Kunene. Namibia is ranked as an upper-middle income country. Namibia is in fact recognized as one of the most unequal societies in the world since the consumption of the richest 10% of households is estimated to be more than 20 times higher than that of the poorest 10% (WHO, 2015). Since independence, health continues to be a priority for the government of Namibia (WHO, 2010). Namibia had over 1,222 physicians in the public and private sector in 2019 (World Bank, 2019). However, due to as response to COVID-19, the Ministry of Health and Social Services has recruited a total of 3371 staff members of which 1703 are in permanent and 1668 are in temporary positions (MoHSS, 2020).

A majority of Namibian population relies on public health care facilities as they do not have health insurance, with only 18% of Namibian having access to medical insurance (MoHSS, 2017). Affordability is the main reason many individuals do not have access to health insurance in Namibia (Kaundjua, 2019). Majority of those who are insured are either in the highest income quintiles or middle-income quintiles and receiving an employer subsidy such as workers covered by Public Service Employee Medical Aid Scheme (PSEMAS), which insures civil servants (Gustafsson *et al.*, 2009). In Namibia, between 1992-2013 life expectancy at birth is 64 years and death rates have declined from

9.9 to 7.2 deaths per 1000 people. Records indicates that respiratory infections, HIV/AIDS and diarrhea are the top contributors of premature deaths (World Bank, 2019).

Namibia is facing challenges of communicable and non-communicable diseases. The burden of communicable diseases remains quite high and predominant, in spite of encouraging signs of decrease in the burden of HIV/AIDS, tuberculosis and malaria. For instance, HIV prevalence among the adults declined from 14% in 2013 to 12.6% in 2017 (Namibia Population-based HIV Impact Assessment [NAMPHIA], 2017). According to WHO (2019) Namibia has the second highest maternal mortality rate with HIV/AIDS contributing indirectly to 37% of maternal deaths. Due to the gaps in access to health care facilities between rural and urban areas, racial groups as well as between the rich and the poor, access to health services in the country is very unequal (WHO, 2012). Despite the number of available health and social welfare points, access to health care is a concern for many Namibians, basically due to remoteness, long distances to health facilities, poverty, and limited access to transport (Rooy, *et al.*, 2012). Older persons are believed to lack access to even basic health care and, crucially, to have less access to services than to younger age group (*ibid.*) and are deemed to be at particularly high risk of ill-health and disability from age-related chronic non-communicable diseases (Aboderin, 2011). Thus, ensuring access to health care, especially among the elderly is essential in improving their health.

More than half the health professionals in Namibia are employed in the private sector. There are about 17,500 registered health professionals including nurses, doctors, pharmacists and other specialist in the country. Of this total, 63% are employed in the

private sector, while only 37% are in the public sector (MoHSS, 2020). Moreover, there are chronic shortages of over 4000 frontline workers, within the public sector, in particular doctors and nurses. There are three hospital beds per 1000 patients and most rural residents' dependent on nurses than doctors for health care services. This thesis focused on the determinants of access to health care services with particular interest on what explain the public, private and traditional/others differential.

1.3. Problem statement

Access to health care is crucial for health status which in turn is important for development. Yet access to healthcare services remains a major challenge in many developing countries including Namibia where several factors have hindered access to healthcare services (Rooy, *et al.*, 2012). Many people in Africa continue to die from preventable and treatable diseases because of limited access to healthcare services. For instance, the crude death rate in Africa was 8.9% in 2015 (WHO, 2018). In addition, those in the upper class of the society and having higher levels of education, higher income and with larger family size are more likely to choose private health care, while those experiencing higher economic dependence, chronic diseases, and higher duration of hospitalization tend to prefer public inpatient services (Chatterjee *et al.*, 2018). In Namibia, the burden of communicable diseases remains quite high and predominant, despite the encouraging signs of decrease in the burden of HIV/AIDS, tuberculosis and malaria. Life expectancy at birth in Namibia is estimated at 64 years compared with the world average of 72.6 years in 2019 (World Bank, 2019). About 16.6% of the 55.86 million deaths worldwide occurred on the African continent; approximately 60.7 % of

these deaths were related to communicable, maternal, prenatal and nutritional diseases (World Mortality, 2019). Death rates in Namibia declined from 9.9 per 1000 in 1992 to 7.2 per 1000 people in 2013, with respiratory infections, HIV/AIDS and diarrhea considered as top contributors to the current premature deaths (World Bank 2019). Thus, improving access to healthcare services will reduce the health and economic burden of such diseases.

The gaps in access to health care exist not only between rural and urban dwellers but also between rich and poor and racial groups in Namibia. For example, based on the Namibia Household Income and Expenditure Survey (NHIES) for 2015/2016, the 9.8% of lower-income individuals suffered from an illness in 30 days before the survey compared to the 6.6% for affluent individuals. The probability of not seeking employment due ill-health was 6.7% for poorest compared to the 3.5 % for the wealthiest persons. About 37% of people in Namibia do not seek health care services when sick (Tjirera, 2018) and to reiterate, private sector serves only 18% of the population and the remaining 82% of the population rely on the public health system or out-of-pocket (OOP) expenditure in the private health sector (MoHSS, 2017).. This study contributes to existing literature by investigating the observed differences in access to care in public, private and traditional/others facilities.

1.4. Objectives of the study

The main objective of this study was to investigate the determinants of access to healthcare services in Namibia. Specifically, the study sought to:

- analyse the role of individual/ household and community socioeconomic and demographic factors on access to healthcare services in Namibia.
- examine the effect of individual/household and community socioeconomic and demographic factors on healthcare provider choice in Namibia.

1.5. Hypotheses of the study

H_{0a}: Individual/household and community socioeconomic and demographic factors do not affect access to healthcare services in Namibia.

H_{1a}: Individual/household and community socioeconomic and demographic factors do affect access to healthcare services in Namibia.

H_{0b}: Individual/household and community socioeconomic and demographic factors do not explain the choice between health care providers in Namibia.

H_{1b}: Individual/household and community socioeconomic and demographic factors do explain the choice between health care providers in Namibia.

1.6. Significance of the study

Although there is increasing empirical literature on the causes of limited access to health care services in many African countries, there is shortage of empirical evidence in

Namibia. Several studies have investigated the determinants of access to health care services (Rooy, *et al.*, 2012; Masiye and Kaonga, 2016; Fan and Habibov, 2009; Guinness *et al.*, 2018; Kabongo, 2015; Wandera *et al.*, 2015; Panezai *et al.*, 2017), yet there is limited evidence on what explains the choice between public and private health care services. This study will contribute to this literature by investigating factors that explains the observed difference in access to care in public and private facilities in Namibia.

The findings from this study can be used by the government to uplift the living conditions of people in rural areas and make health care provision accessible to all household in Namibia. In addition, the study can assist the Ministry of Health and Social Services to scale up measure to increase household access to health care worker and health facilities in all the 14 regions of Namibia. Moreover, this research is important in educating individuals and households on the importance of utilizing health care services.

1.7. Limitation of the study

This study analysed the determinants of access to health care focusing on the demand-side rather than on the supply side factors. However, it should be noted that access to health care is a function of both demand and supply factors but unfortunately, most datasets do not have information on the supply side factors such as quality and price of health care services (Kabongo, 2015). With this caveat in mind, it is not always possible to control for supply side factors; thus, they are excluded from the analysis. Therefore, the study focused only on the demand side factors that necessitate access to health care services in

Namibia. The Namibia Household Income and Expenditure Survey (NHIES) for 2015/2016 was incomplete as there was no information on supply-side factors. However, the exclusion of supply side factors does not undermine the focus of this study.

1.8. Delimitation of the study

This study used the Namibia Household Income and Expenditure Survey (NHIES) for 2015/2016 to investigate the determinants of access to health care services. This is a nationally representative cross-sectional survey with comprehensive information on household socioeconomic and demographic characteristics including utilization of healthcare services.

1.9. Organization of the study

The remainder of the study is organised as follows: Chapter Two presents the literature review which discusses relevant literature, from the motives and theoretic considerations to empirical studies. Chapter Three discusses the research methods which include discussion of the data used, the empirical strategy and ethical considerations. Chapter Four discusses the empirical results and discussions. The conclusion summarises what the study sought to achieve, what it found and where it diverges or converges from existing evidence. It goes further to make recommendations and suggest possible areas for further research. This is presented in Chapter Five.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

This chapter reviewed related literature that guides the study's problem and purpose. The study investigates the determinants of access to health care services in Namibia. The theoretical and empirical approaches on the determinants of access to health care services are reviewed in this chapter.

2.2. Theoretical Framework

There are two theories that are suggested for the analysis of health care utilization. These include the Grossman (1972) framework and Andersen and Newman (1973) framework. Grossman (1972) based his model on demands for health and health care, by describing how individuals make choices regarding health care utilization. In this framework, the utilization of health care is chosen as an attempt to improve the health status. This means that, when individuals fall sick, they demand health care for the restoration of their health capital. This model suggests that higher wages lead to a substitution of medical consumption for time or resources invested in health promotion or prevention. According to this theory, individuals demand medical care and their own time to produce health. Individual (i) health status depends on the amount of health care consumed (hc), time (t) and other determinants of health (z) as illustrated as follow:

$$H_i = f(hc, t, z) \tag{2.1}$$

Thus, health care enters a household's utility function directly and indirectly through improvement in health status (Grossman,1972). The relationship between health care utilisation and utility function is given as:

$$U_i = u(X_i, hc_i, H_i (hc, t, z)) \quad (2.2)$$

Where X_i represent all other goods and services in the consumption basket of the individual, hc_i is the amount of health care consumed. Medical care is a source of utility through better health outcomes and source of disutility through resulting side effects during the consumption of health care (Evan, 1984). According to Acton (1973) two goods enter the individual's utility function: medical services, m , and a composite X , for all other goods and services. To reiterate, following Acton (1973), using an assumption of fixed proportions of money and time to consume m and X and the full wealth assumption is considered and specified as follows:

Maximize

$$U = U(m, X) \quad (2.3)$$

Subject to a budget constraint;

$$(p + wt)m + (q + ws)X \leq Y = y + Wt \quad (2.4)$$

Where p and q are money prices for medical services, m and x are composite for all other goods and services, t and s are own time inputs per unit of m and x , w is earnings per hour, y is non earned income, Y is total (full) income and t is total amount of time available for market and own production of goods and services. Given Equation 2.4, Grossman structural demand for medical care can be derived as follows:

$$M_i = f(H_i, w_i, P, t, s, x, Y, Z_i) \quad (2.5)$$

Where H_i is the stock of health and Z_i is the individual/household socioeconomic and societal characteristics.

Andersen and Newman (1973) conceptual Framework of health services utilization

In unison with Equation 2.5, Andersen and Newman (1973) outline a conceptual framework for health services utilization which is determined by three key factors: enabling, predisposing and need factors as shown in Figure 2.1. and discussed subsequently.

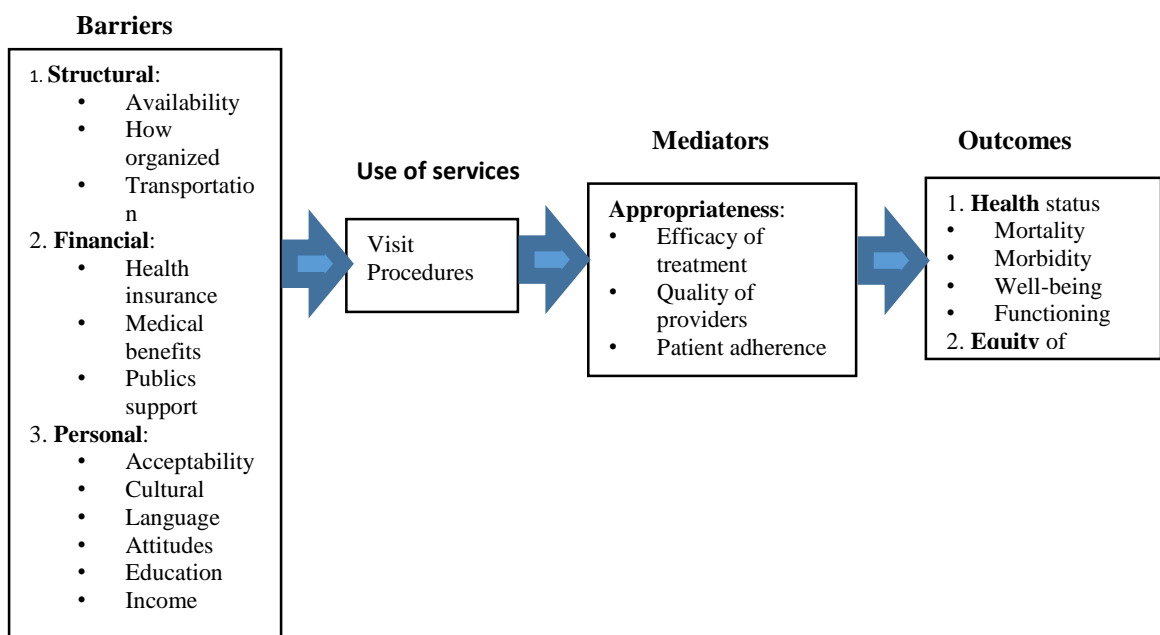


Figure 2.1: Model of access to personal health care services.

Source: Andersen and Newman, 1973

This study is based on this framework and is mainly interested in the household and individual characteristics. Considering that the health care system is well coordinated to satisfy the whole population of a given locality, the level of health care an individual consumes is dependent on the predisposition to health services, ability to secure the services, and the level of illness (Mukong, 2015). Andersen and Newman (1973) briefly described and suggested variables that can be used to operationalize each of these components. Predisposition factors determine the level of health services used and they are classified into demographic, social structure, and belief variables. Demographic characteristics include sex, age and marital status. The social structure comprises of household size, education, occupation, religion, and residential type. Household characteristics and the community in which the household resides can affect the ability of individuals to secure health services. Enabling factors are categorized into both household and community attributes. As such, household enabling factors are measured by wealth, health insurance and whether or not the source of care is accessible. The attributes of community comprise of health personnel to population, the ratio of health facilities, price of health services and whether or not the individual is from rural or urban community. Based on the predisposing and enabling factors, the use of health services happens when the individual perceives sickness.

2.3. Empirical review

Several empirical works on access to health care are available in extant literature. A brief overview of empirical literature in support of the variables chosen under Andersen and Newman (1973) Health Behavioural Model (HBM) are discussed in this section.

2.3.1. Predisposing factors

Many studies have been carried out in both developed and developing countries and the results obtained vary significantly. Research has established that age, gender, past illness, education, household size and social network are the strongest determinants of access to health care. Jensen and Ahlburg (2002) reviewed family size, unwanted, and child health and health care utilization in Indonesia using a univariate probit. They found that unwanted children at birth are more likely than their counterparts to become ill and less likely to receive treatment for illness. In a related study, Fan and Habibov (2009) examined the determinants of accessibility and affordability of health care in post-socialist Tajikistan using Poisson and Ordered Logit regression models. They found that poverty, chronic illness and disability are the most important determinants of health care utilization and affordability. The premise of this study considers that there is an urgent need for health care reforms in order to ensure equality in accessibility and affordability for the entire population.

Panezai *et al.* (2017) investigated factors affecting access to primary health care services in Pakistan through a gender-based analysis that focuses primarily on health needs. Data from 302 respondents and logit model, bivariate analysis was employed. They found that women access Primary Health Care services more than men. The study recommended that policymakers take measures to improve access to Primary Health Care services through the formulation of gender-responsive policies and strategies. In another related study, Jong *et al.* (2015) investigated the determinants of prenatal health care utilization by low-risk

women in primary midwifery-led care in Netherlands using a prospective cohort study. The study employed longitudinal data from the population-based deliver study with 20 midwiferies. Their findings suggest routes that can target interventions to women who are at risk of not using prenatal prevention and care services adequately.

Guinness *et al.* (2018) employed Andersen's Health Behavioural Model to investigate the determinants of health care utilization in Timor-Leste. They found that rural households were less likely to go to hospital than urban households. Furthermore, those in the poorest quintile were less likely to use more expensive hospital services than those in higher income quintiles. The study suggested that health care reforms need to reduce the other costs of health care, such as distance barriers, to address these inequities. Chatterjee *et al.* (2018) reviewed the factors affecting the choice of health care utilization between private and public services among the elderly population in India. These scholars found that the elderly belonging to upper caste and having higher levels of education, higher incomes, larger family size are more likely to choose private care, while those experiencing higher economic dependence, chronic diseases, and higher duration of hospitalization tend to rely on public services. The study suggested that understanding the preferences of the population over hospital services may help policymakers to better understand their health care needs.

Wandera *et al.* (2015) reviewed determinants of access to health care by older persons in Uganda using generalized linear models (GLM) with the poisson family and the bivariate regression analysis. These scholars found that access to health care in 30 days before the survey reduced for older persons from poor household with some walking difficulties.

They further added that, access to health care in 30 days before the survey for older persons increased for those who earned wages. Furthermore, Parmar and Banerjee (2019) reviewed how supply - and demand – side interventions influence equity in maternal healthcare utilization in Senegal. The study used three rounds of Demographic Health Surveys covering the period 1992 to 2010. They found that there is no significant difference in health care utilization between educated and uneducated mothers. Their study suggested that policymakers involved in the design of health programmes should pay closer attention to issues of inequity in health care utilisation.

Moreover, Patel and Chauhan (2020) studied gender differential in health care utilization in India. The study used Ageing and Adult Health data and a bivariate analysis and multivariate regression. They found that both males and females are preferring private hospital over public hospital for inpatient as well as outpatient care. The study suggested that it is essential to incorporate more women friendly measures in health facilities.

Kamiya (2011) investigated woman’s autonomy and reproductive health care utilization from Tajikistan using bivariate probit model. The study found that women’s autonomy as measured by women’s decision-making on household financial matters increases the likelihood of antenatal and delivery care use. Mukong and Burns (2020) examined the role of social networks on antenatal care utilization in Tanzania. The study used the Demographic and Health survey data for Tanzania and multinomial logit. They found that social networks increase the probability of early antenatal check-up and antenatal

completion. The study suggested that as governments design policies to promote health care use, there is a need for population sensitization, through the media, and other channels that reach community groups or religious centers directly.

Amadhila (2012) investigated barriers to accessing health care for physically impaired population in Namibia using a qualitative research methodology. The study found that there were problems related to lack of transportation facilities. The study suggested that policymakers and health professionals should go beyond minimum requirements set by law to make facilities and services available usable to the greatest extent possible. Rashid and Antai (2014) conducted a population-based study that analysed the determinant of maternal healthcare utilization in Namibia. They used multivariate logistic regression analysis. Their study pointed out the importance of education, wealth index, place of residence and marital status as essential factors in explaining the utilization of maternal health care services. The study suggested that there is a need to explore means that increase maternal health service utilization especially among the less educated and poor women in rural areas.

Kaundjua (2019) investigated barriers affecting access to health information and health care services among the deaf community in Namibia. The study used a qualitative approach and found that the implementation of regulatory and policy frameworks surrounding disability are still hindered by structural inequalities, social prejudices and stigmatization of deaf community. The study suggested that changes should be made in

structural and social arrangements to make sure the deaf people receive equitable health care services. Namasivayam et.al. (2012) analysed the role of gender inequalities in access to health care services: a population-level of Namibia, Kenya, Nepal, and India. They used multivariate logistic regression analysis. They found that women more educated than their partner in Namibia and women with less education than their partner in Nepal were less likely to access skilled antenatal care compared to women with the same level of education as their partner. The study suggested that there is an urgent need for concerted and sustained efforts to change the harmful traditional values if several of these countries were to meet Millennium Development Goal-5. Alegana *et al.* (2012) also reviewed spatial modelling of healthcare utilization for treatment of fever in Namibia. They used Malaria Indicator Survey data of 2009. The study found out that the prevalence of fever was among children under the age of five who do not use public health facility during episode of fever in northern Namibia. The study demonstrates the potential of routine household survey. Although those studies made positive contribution to the body of knowledge of the health system in Namibia, they have ignored the importance of observed difference in access to care in public and private facilities which is a gap that this study sought to fill.

2.3.2. Enabling factors

Several studies have found that income, health insurance, community health facility, price of health care services, regions, distance to facility and place of stay (rural-urban) are important determinants of access to health care. Hjortsberg (2003) analysed health care seeking behavior of the sick in Zambia, using a Multinomial Logit selection model. The study found that the health care seeking behavior of individuals depends on the level of

income, access to health insurance, type of illness and distance to a health facility or access to transport facilities. Sato (2012) investigated the socio-economic status use of modern and traditional health care services in Ghana. This study used bivariate probit modelling and ordered logit. The study found that rising income is associated with modern care use whilst decreasing income is associated with traditional care use. The study suggested that policy should incorporate traditional care into the general utilization framework.

Qian *et al.* (2010) analysed determinants of the use of different types of health care provider in China. The study used multinomial logit model. The study found that insured patients are less likely to use private hospitals and more likely to use community health services centers. The study suggested that there is considerable work to be done to encourage those with more serious illness to seek professional help. Vikum *et al.* (2012) examined socioeconomic inequalities in health care utilization in Norway. This study used concentration indexes as methods and found that overall, there was pro-rich and pro-educated inequity in utilization of both private medical specialists and hospital outpatient care.

Lepine and Nestour (2012) analyzed the determinants of health care utilization in rural Senegal. These scholars used the likelihood ratio test for a nested model. They found that the demand for curative care is price-inelastic and suggests that policies that will reduce the price of medical services to increase the health care use are not likely to be effective. Kabongo (2015) investigated the determinants of access to health care services in Africa

using panel data from 37 African countries for the period 1995-2012. The study used a dynamic panel autoregressive distributed lags (ARDL) model and finds that a long run and short run stable relationship exists between access to health care and income. The study suggested that income is an important determinant of access to health care and should be the focus of policy making to improve such access to health care in African countries.

Gyasi and Phillips (2018) analysed demography, socioeconomic status and health service utilization among older Ghanaians. The study utilized a large representative dataset from a 2016/17 Ageing, Health, Psychological Wellbeing and Health-seeking Behaviour Study (AHPWHB) using multiple logistic models. The study found that living in urban areas decreases the odds of formal healthcare use but increased self-care across genders; married women were less likely to utilize formal and traditional healthcare as compared to married men who predominantly accessed formal healthcare. Zere *et al.* (2007) looked at equity in health care in Namibia using principal components analysis and data from the Namibia demographic and health survey of 2000. They found that regions with higher levels of need currently receive fewer resources than do regions with lower need. The study suggested that the Ministry of Health and Social Services should abandon the historical incrementalism method of budgeting or resource allocation and adopt a more appropriate allocation mechanism that incorporates measures of need for health care. On the other hand, scholars like Rooy, *et al.* (2012) analyzed barriers to accessing health services among people with disability in rural northern Namibia. Semi-structured interviews were used to collect information from 25 respondents living with disability. They found out

that, it was difficult to walk to health centers for treatment due to lack of transport, money to pay for treatment and distance. The study suggested that there is a need to consider the unique issues affecting access to health care for people who are living with disability to achieve equitable access to health care services.

Mukong and Burns (2019) investigated the bargaining power within couples and their health care provider choice in Tanzania. The study used Tanzanian Demographic and Health survey (2010) and a nested multinomial logit model. They found that cooperation in household decision-making and low incidence of domestic violence significantly increase the probability of private facility use. The study suggested that a policy option that encourages cooperation between couples, reduces domestic violence and/or ensures female empowerment is more likely to enhance the use of reproductive health services. Masiye and Kaonga (2016) examined the determinants of health care utilization and out-of-pocket payments in the context of free public primary healthcare in Zambia. The study employs a multinomial logistic regression on the expenditure survey data of 2014. They found that, household per capita consumption expenditure is significantly associated with increased odds of seeking formal care and rural residence is associated with reduced odds of seeking formal care. The study suggested that the benefits of free public health care may not reach the poorest proportionately, which raise implications for increasing access in sub-Saharan African countries. These studies controlled for enabling factors but ignored the important of observed difference in access to care in public and private facilities which is a gap that this study sought to fill.

2.4. Conclusion

Even though there is abundant evidence documenting the determinants of access to health care services, focus has been on utilisation of health care (Patel and Chauhan, 2020; Hjortsberg, 2003; Kamiya, 2011; Gyasi and Phillips, 2018) with limited evidence on the determinants of health care provider choice (Chatterjee *et al.*, 2018; Mukong and Burns, 2019; Qian *et al.*, 2010). This study ought to contribute to the literature in three ways. First, it is among the few studies that have quantified the determinants of access to health care in Namibia. There is limited evidence on studies that measure the effects of household characteristics on access to health care services in Namibia and this study contribute to this literature. Finally, the study is one of the first to investigate the observed difference in access to care in public and private facilities in Namibia.

CHAPTER THREE: METHODOLOGY

3.1. Introduction

This chapter highlights the methodology that was used to answer the set objectives. The section outlines the sources and type of data used, possible diagnostic tests, the estimation approaches used and the economic theory that guides the empirical specification. The chapter also discusses the measurement of variables used and eventually adherence to the research ethical practices.

3.2. Data type and source

The data for this study was extracted from Namibia Household Income and Expenditure Survey (NHIES) conducted by the Namibia Statistics Agency (NSA) between April 2015 and March 2016. This is the most recent national representative survey with detailed information on health care utilization behaviour of individual and personal characteristics. The main objective of the survey (NHIES) was to provide data on measures and the level of living conditions of Namibians using household income and spending patterns and other indicators.

The 2015/2016 Namibia Household Income and Expenditure survey used a two-stage stratified sampling design where 864 clusters were carefully chosen in the first stage and the second stage involves a selection of households of which a total sample of 10,368 households were selected. Of the 10,368 households, 10,090 were successfully

interviewed. The data was collected for a twelve months' period consisting of thirteen survey rounds to account for seasonal changes that may affect household's expenditure patterns. In addition, the survey provided information on age of the individual, gender, medical insurance coverage, household income, household size, household place of resident (rural and urban area), education status, distance to health care facility, healthcare seeking behavior and health care provider options such as private, public health care and traditional/others.

3.3. Description of Variables

The dependent and independent variables used in the analysis are discussed in Table 3.1.

The discussions focused mainly on how these variables are measured.

Table 3.1: Description and measurement of variables

Variable description and measure		
Variable	Description and measurement	Level
	Dependent variables	
Access to health care	Visit to a healthcare facility in the past 12 months, dummy, yes = 1 and no = 0'	Individual
Health care provider choice	Health care provider choice - Public, Private or traditional/others is coded as follows: Traditional /others = 0, Public =1 and Private = 2,	Individual
Independent variables		
Gender	Gender of the individual is coded as follows: Female = 1 Male =0	Individual

Age of the individual	Continuous variable measured in years	Individual
Household place of resident	Household place of resident is defined as follows: Urban = 1 Rural = 0	Household
Education status	Individual educational status coded as follows: No formal education = 0 Primary education = 1 At least secondary = 2	Individual
Medical insurance coverage	Individual/household member has medical insurance coded as: Has medical aid coverage = 1 and = 0, otherwise	Individual
Average household size (N)	Continuous variable and is the number of members of the household in which an individual belongs.	Household
Average household income per capita	Continuous variable and is a log of household per capita income (N\$/household per year)	Household
Distance to health care facilities	Continuous variable and is the average distance (kilometers) to the nearest health facility.	Household

3.4. Model Specification

This study adopted a probit model and a multinomial logit model (MNL) to answer the first objective and second objective respectively. The outcome variable for the probit

model is access to health care services, while health care provider choice which consists of private, public, and traditional/others is outcome variable for the MNL model. The predictor variables are enabling and predisposing factors such as household income, gender, education status, household size, distance to health care facility, medical insurance, household place of resident (rural or urban) and age of the individual. The specifications of these two models are discussed in Section 3.4.1 and 3.4.2 respectively.

3.4.1. The Probit Model

The probit model is a statistical probability model for binary outcome variables. Probit analysis is based on the cumulative normally distributed standard errors. The binary dependent variable, y , takes on the values of zero and one. The probit analysis provides statistically significant findings of which individual/household socioeconomic and demographics factors increase or decrease the probability of seeking health or visiting a healthcare facility. The probit regression was used to predict the effect of these covariates on access to healthcare proxy by a binary outcome equivalent to one if the individual visited a health facility when sick in the last 12 months. Let P_i represent the probability of health care access by the individual, then the equation to be estimated is:

$$P_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon_i \quad (3.1)$$

Where, β_i , $i = 1, 2, 3, \dots, n$, are Parameters to be estimated, ε_i is a randomized error, P_i is the probability of access to health care among individuals ($P_i = 1$ if the person has access and 0 otherwise). Equation 3.1 is estimated using the probit model to determine the

probability of access to health care and factors that influence access to health care in Namibia.

Binary outcome models have a common structure. The dependent variable, Y_i , takes only two values (as defined in Table 3.1), so its distribution is unambiguously the Bernoulli, or binomial with one tail, with a probability of P_i ; and can be estimated using the logit and probit models. The logit and probit functions are symmetric around zero. The probit model overcome the problem of linearity between the dependent variables and independent variables. Also, compared to logit, the probit model determines the likelihood that an item or event will fall into one of a range of categories by estimating the probability that observation with specific features will belong to a particular category (Kumar, 2022).

Equation 3.1 can be represented as follows:

$$\Pr(V_i = 1/X_i) = \beta_0 + \beta X_i + \varepsilon_i \quad (3.2)$$

where V_i is the probability of any visit to a health facility or health worker in the last 12 months by individual i , α is the intercept and β is a vector of coefficients, X_i is a set of observed individual/household and community characteristics, including the age of the individual, level of education, marital status, gender, medical insurance coverage, household income, household place of resident and household size, distance to health care facility and community variables, including whether the individual is from an urban area and μ_i is the error term. It is important to mention that individuals who belong to the same household share the same unobserved characteristics; thus, there might be a high degree

of homogeneity in health seeking behaviour among these individuals (Lepine and Nestour, 2012).

In addition, the probit model overcome the challenges of Linear Probability Model (LPM) (Carpena, 2016). For example, Carpena (2016) states that the challenges of linear models are such that they have proven to be inappropriate for the analysis of a dichotomous outcome variables. The three main problems associated with the estimation of the linear probability model include the heteroscedasticity (the violation of constant variance of the error term), non-normal errors, and the fact that the predicted probabilities can fall outside the unit interval (Carpena, 2016).

The probit marginal effects of the determinants of access to health care are determined by getting the differential of the probability of access to health care and it is given by:

$$\delta = \frac{\partial p_i}{\partial x_i} = F'(x_i \beta_i) \beta_1 \quad (3.3)$$

Every region of β enters every marginal effect both through probabilities and through weighted average. Hence, the marginal effects from the probit model, which measure the probable change in the probability of accessing a qualified health care worker during the last illness in the past 12 month, with respect to a unit change in an independent variable. The significant value indicates that a change in the independent variable has a significant influence on the access to health care at a given point (Sigei *et al.*, 2015). To test the proposed hypotheses, both descriptive statistics and probit regression model were used. The estimated probit equation is specified as follows:

$$Hcare = \beta_0 + \beta_1 GENDER_i + \beta_2 AGE_i + \beta_3 MEDCOVER_i + \beta_4 HHSIZE_i + \beta_5 INCOME_i + \beta_6 EDUSTATUS_i + \beta_7 RESIDENCE_i + \beta_8 DISTANCE + \varepsilon_i \quad (3.4)$$

3.4.2. Multinomial Logit Model

The multinomial logit regression was used to predict the effect of the covariates on health care provider choice options. The dependent variable is choice of a health care provider given in categories of public option, private option and traditional/others. The predicting variables include distance to facility, household place of resident, age of the individual, household income, household size, gender, education status, medical insurance. The outcome, y_i , for individual i is one of m alternatives. Let P_{ij} represent the probability of health care provider choice by individual and the equation to be estimated is given by:

$$P_{ij} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon_i \quad (3.5)$$

Where, β_i , $i = 1, 2, 3, \dots, n$, are Parameters to be estimated, ε_i is a randomized error, P_{ij} is the probability of health care provider options among individuals, i ($P_{ij} = j$ if the person chooses alternative j , conditional on the regressors, x_i , and where $j = 1, 2, \dots, m$, are alternatives. The decision-maker is assumed to have an unobservable preference or utility for each alternative, which is made up of a deterministic component and a random component. The model assumes that the distribution of the random component can be determined and that a decision-maker chooses the option with the greatest utility. Under the standard MNL model, a decision-maker i will choose option n out of N possible alternatives with probability given as:

$$P(Y_i = n) = \frac{\exp(x_{in}^T \gamma)}{\sum_{k=1}^N \exp(x_{ik}^T \gamma)} \quad (3.6)$$

where Y_i is the decision choice of individual i . The vector X_{in} contains the explanatory variables (gender, distance to facility, education status, medical insurance, household place of resident, age of the individual, household size and household income) that describe the decision choice of alternative n and those characteristics of the patient making the decision which might affect their choice behaviour. It is assumed that each patient places the same weight on the attributes, X_{in} , which is denoted by the vector γ , to be estimated. The random component of the utility is assumed in an MNL model to have independent and identically distributed errors drawn from a Gumbel distribution. The multinomial logit model was applied to identify the factors that influence health care provider choice in Namibia. The multinomial logit model is the most widely used model for unordered responses; it models the response probability as a function of explanatory variables.

The drawback of the MNL model is the independence from irrelevant alternatives property. This property states that the ratio of the probabilities of choosing any two alternatives is independent of the attributes of any other alternative in the choice set. The independence of the errors implies the property of independence of irrelevant alternatives (IIA). Health care provider choice is the response variable in the multinomial logistic regression. Underneath public health care option are three replicates of the predictor variables, representing the models that are estimated: Public relative to Traditional/others and Private relative to Traditional/others. These are the estimated MNL regression coefficients and the referenced level, respectively, for the model. An important feature of the multinomial logit model is that it estimates $k-1$ coefficients, where k is the number of

alternatives of the outcome variable. In this study, Traditional/others is used as the referenced category, therefore, estimated coefficients for the private and public alternatives are derived. Since the parameter estimates are relative to the reference group, the standard interpretation of the multinomial logit is that for a unit change in the predictor variable, the logit of outcome m relative to the reference group is expected to change by its respective parameter estimate (which is in log-odds units) given other variables in the model are held constant.

3.5. Research ethics

The study used NHIES 2015/2016 data from Namibia Statistics Agency. The data was not fabricated in any manner. NSA procedure stipulates that the respondents were briefed about the purpose of the study, content, duration, potential risks, and benefits associated with participation. Participation in the survey was voluntary, and only participants who were willing were interviewed. During the survey process, the participants could decide to withdraw from the research. NSA provided participants with detailed information confirming that their personal identity would not be published or made available to anyone.

3.6. Conclusion

The chapter outlined the methodological approach that was employed to achieve the research objectives. The theoretical perspective was used to support the problem statement and data analysis, thereby connecting the existing knowledge and the researcher's findings

in order to bring along a favourable increase in health care access. The purpose of gaining access to personal health care is to achieve one or more of an array of possible health outcomes—not only avoidance of untimely death and relief of acute symptoms but also maintenance of long-term functioning and relief from anxiety about the meaning of symptoms. The probit regression and multinomial logit models were used as the main research strategies to help achieve the objectives of the study by making use of data adopted from a structured questionnaire administered by NSA during the Namibia Household Income and Expenditure Survey (NHIES) conducted between April 2015 and March 2016 for the whole of Namibia. The data were processed and analysed using statistical package Stata computer programs. The descriptive analysis and econometric models (such as the probit and multinomial logit models marginal effects which capture the random effects) were used to obtain more robust results of the study. The ethical consideration was also reported in the chapter.

CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.1. Introduction

This chapter presents the results from the empirical analysis based on the methodological approaches discussed in Chapter 3. The chapter consists of three parts. The first part shows the summary statistics of individual and household characteristics for the full sample and for the sub-samples and how they relate to dependent variables (access to health care services in the past 12 months). Some of these characteristics include household size, household income, age of the individual, education status, medical insurance, gender, place of residence (rural and urban households) and distance to the facility. Results from the probit and multinomial logit (MNL) models illustrating how these variables affect the probability of access to health care services and health care provider choice are presented in the second part. Finally, the chapter concludes by evaluating the post-estimation test in validation of the econometric techniques used in this study.

4.2. Descriptive statistics on socio-economic variables

Table 4.1 presents descriptive statistics for socio-economic and demographic variables important in influencing access to health care and choice of health care provider. From the survey data, about 49.38 percent of the respondents are male, while 50.62 percent are female, representing a slight majority. From the gender perspective, about 41 percent of those with access to health care services are males compared to 59 percent that are females. The mean comparison or mean difference is statistically significant with a chi-square probability value of 0.018, suggesting that females are significantly more likely to

seek health care services than their male counterparts. The results show that about 57.63 percent of the respondents are from rural areas of which only 26 percent of those with access to health care services are from rural areas. On the other hand, 42.37 percent of the individuals are from urban areas, over 74 percent of those with access to health care are from urban areas. This suggests significant inequalities in access to health care between rural and urban dwellers.

Table 4.1: Descriptive statistics on determinants of access to health care services

Variable	Sub variables	Full sample (10 090)	Health care access (mean care access)	Difference in mean (p-value)*
Dependent variables				
Access to health care(%)	Have access	59.73		
	No access	40.27		
Health care provider choice(%)	Public	78.05		
	Private	16.37		
	Traditional/others	5.59		
Independent variables				
Gender(%)	Female	50.62	0.59	0.018
	Male	49.38	0.41	
Age of individual	Average age of the individual (N)	42.0		
Household place of resident (Residence)(%)	Urban	42.37	0.74	0.000
	Rural	57.63	0.26	
Education status (%):	No formal education	18.54	0.20	0.000
	Primary	25.96	0.28	

	At least secondary	47.77	0.52	
Medical insurance (%)	Covered	17.65	0.67	
	Not covered	82.35	0.33	
Average household size	Average household size (N)	5.0		
Average distance to health care facility	Average distance to the nearest health care facility(km)	9.12		
Average household income per capita	Average household income per capita (NAD/hh/year)	N\$ 26,940.48		

Note: * the p-value is for the Pearson Chi2

At least 47.77 percent of the individuals have some secondary education and makes up 52 percent of those with access to health care services. Only 17.65 percent of the population have medical insurance and they constitute 67% of those with access to health care services. Table 4.1 results show that the average household size is 5.0. On average, the household annual income per capita is reported to be N\$ 26,940.48. The results further show that the average distance travelled by households to the nearest health care facility to access health care services is 9.12 km. Concerning health care provider choice makes up 78.05 percent of the individuals utilize public health care services, while about 16.37 percent use private health care services and the remainder of 5.59 percent opted for traditional or other services. Approximately 59.73 percent of the respondents accessed health care services, while 40.27 percent of the individuals did not access to health care services in the 30 days prior to the survey. The mean differences are statistically

significant at 0.05 level because the p-value for the student t-test which test for the difference in means are all less than 0.05 level.

4.3. Empirical Results

4.3.1. Probit Estimation Results

This sub-section presents empirical results from probit model. The marginal effect estimates from the probit model are presented in Table 4.2. The results show that variables such as, medical insurance, household income, gender, education status, household place of resident are major enabling and predisposing factors that affect access to health care services in Namibia and are all statistically significant at 1% and 5%. The results suggest that individuals with medical insurance are more likely to have access to health care services compared to their counterparts without medical insurance. Specifically, having medical insurance increases the probability of accessing health care services by 7.3 percentage points. These findings are in line with earlier study by Hjortsberg (2003) which found that the health care seeking behavior of individuals depends on access to health insurance.

Table. 4.2: Marginal effect estimates on the determinants of access to health care services.

Variables	Marginal effect
Medical insurance	0.073 (0.021)**
Distance to health care facilities	0.023 (0.401)
Household size	0.002 (0.320)
Log of household income per capita	0.053 (0.041)**
Household place of resident:	
Urban	0.063 (0.000)***

Gender:	
Female	0.061 (0.033)**
Age of the individual	-0.053 (0.720)
Education status:	
Primary	0.533 (0.336)
At least secondary	0.075 (0.041)**

Note: The results based on the Probit regression, with healthcare access as the dependent variable. *** significant at 1%, ** significant at 5% and * significant at 10% respectively. Probability values in parenthesis

The probability of having access to health care services increases with the level of household income. A percentage increase in household income per capita significantly increases the probability of accessing health care services by 5.3 percentage points holding other factors constant. This means affluent households are more likely to have access to health care services than household with no income. These findings coincide with evidence from study conducted in Uganda and Zambia by Wandera *et al.* (2015) and Hjortsberg (2003) respectively, which found that access to health care increases for those who earned wages or with high level of income.

Concerning educational attainment, individuals who completed at least secondary education are more likely to have access to health care services compared to their counterparts without formal education. Precisely, having at least secondary education increases the probability of accessing health care services by 7.5 percentage points. This is similar to the work of Guinness *et al.* (2018), which found that individuals who have completed secondary education were more likely to have access to health care services than those who completed primary education or not having been to school at all.

From gender perspective, being female increases the probability of accessing health care services by 6.1 percentage points. This means that females are more likely to have access to health care services than their male counterparts. These findings correspond to the findings of an earlier study conducted in Pakistan by Panezai *et al.* (2017) which found that women access primary health care services more than men. It is evident that urban dwellers are more likely to access to health care services than their counterparts staying in rural areas. The results suggest that staying in urban area increases the probability of accessing health care services by 6.3 percentage points. This is similar to findings by Guinness *et al.* (2018) in Timor-Leste and Masiye and Kaonga (2016) in Zambia that found that rural households were less likely to seek hospital care than their urban counterparts.

4.3.2 Multinomial Logit Model Results

To address the second objective, a multinomial logit model was used and the estimated results from the MNL model is presented in Table 4.3. The results clearly show the factors influencing the probability of health care provider choice. In Table 4.3, traditional/others forms of health care is set as the reference group, and estimated results for private relative to traditional/others care and public relative to traditional/others care are presented. Since the parameter estimates are relative to the reference group, the standard interpretation of the multinomial logit is that for a unit change in alternative m relative to the reference group because of a change in a given covariate holding other covariates in the model constant.

Table 4.3: MNL marginal effect estimates on the determinants of health care provider choice

Variables	Marginal effects	
	Public	Private
	Medical insurance	0.064 (0.000)***
Distance to health care facilities	-0.001 (0.340)	0.000 (0.252)
Household size	0.017 (0.311)	-0.052 (0.222)
Log of household income per capita	0.067 (0.043)**	0.083 (0.034)**
Gender:		
Female	0.066 (0.032)**	0.072 (0.082)*
Age of individual	-0.051 (0.252)	0.076 (0.128)
Household place of resident:		
Urban	0.018 (0.131)	0.005 (0.233)
Education status:		
Primary	0.522 (0.222)	-0.044 (0.832)
At least secondary	0.077 (0.082)*	0.131 (0.001)***

Note: The multinomial logit model results with health care provider choice as the dependent variable. *** Significant at 1%, ** significant at 5% and * significant at 10% respectively. Probability values in parenthesis.

4.3.2.1. Public relative to Traditional/others

In Table 4.3, it is evident that being female increases the probability of choosing a public relative to traditional/others health care facilities by 6.6 percentage points, holding all other variables in the model constant. This means that females are more likely to use a public health care facility than traditional/others health care facilities. This finding is in line with findings from a study done in Ghana by Gyasi and Phillips (2018) which found that women were less likely to utilize traditional health care than other health care facilities.

The results suggest that individuals with medical insurance are more likely to use a public health care facility than traditional/others health care facilities. In detail, having medical insurance increases the probability of choosing a public relative to traditional/others health care facilities by 6.4 percentage points. This is similar to the findings from a study done by Qian *et al.*, (2010), which found that insured patients are more likely to use community health care service centers or public health care facilities than others health care facilities.

The probability of choosing a public relative to traditional/others health care facilities increases with the level of household income. A percentage increase in household income increases the probability of choosing a public relative to traditional/others health care facilities by 6.7 percentage points, holding other factors constant. This means that households with high incomes are more likely to use a public health care facility than traditional/others health care facilities. This is similar with evidence by Guinness *et al.* (2018) and Sato (2012), who found that as income rises, utilization of traditional care decreases and public health care are subsidizing the rich more than the poor.

Regarding educational attainment, individuals who completed at least secondary education are more likely to use a public than traditional/others health care facilities. Specifically, having at least secondary education increases the probability of choosing a public relative to traditional/others health care facilities by 7.7 percentage points. This is

similar to the findings by Guinness *et al.* (2018), whose study found that individuals who completed secondary education were more likely to use public hospitals.

4.3.2.2. Private relative to Traditional/others

The results suggest that individuals with medical insurance are more likely to use a private health care facility than traditional/others health care facilities. Specifically, having medical insurance increases the probability of choosing a private relative to traditional/others health care facilities by 9.2 percentage points. These findings are in line with a study done by Mukong and Burns (2019) which found that individuals who have health insurance are more likely to choose private health care facility than other health care facilities. From the gender perspective, being female increases the probability of choosing a private relative to traditional/others health care facilities by 7.2 percentage points, holding other variables in the model constant. This means that females are more likely to use a private than traditional/others health care facilities. These findings correspond to the findings of an earlier study conducted in India where females preferred private hospitals than other health care facilities (Patel and Chauhan, 2020).

Regarding educational attainment, individuals who completed at least secondary education are more likely to use a private than traditional/others health care facilities. Precisely, having at least secondary education increases the probability of choosing a private relative to traditional/others health care facilities by 13.1 percentage points. This is similar to findings by Vikum *et al.* (2012) and Chatterjee *et al.* (2018), who found that

individuals with higher levels of education are likely to choose private health care facilities than other health care facilities.

The probability of choosing a private relative to traditional/others health care facilities increases with the level of household income. A percentage increase in household income increases the probability of choosing a private relative to traditional/others health care facilities by 8.3 percentage points, holding other factors constant. This means that households with higher incomes are more likely to use a private health care facility than traditional/others health care facilities. These findings are in line with the evidence in studies conducted by Chatterjee *et al.*, (2018); Guinness *et al.*, (2018) and Sato, (2012) which found that as income rises, utilization of traditional care decreases and individuals with higher income are more likely to use private health care facilities than others health care facilities.

4.4. Diagnostic Test

A stringent assumption of the multinomial logit models is that outcome categories for the model have the property of independence of irrelevant alternatives (IIA). The assumption requires that the inclusion or exclusion of categories does not affect the relative risks associated with the regressors in the remaining categories (Long and Freese, 2014, pp. 407-411). From Table 4.4 the tests confirm that IIA has not been violated and therefore the categories for health care provider choice are relevant.

Table 4.4. Independence of Irrelevant Alternatives (IIA) Tests

Omitted	chi2	d.f	p>chi2	Evidence
Public	14.091	10	0.970	for Ho
Private	9.377	10	0.578	for Ho
Traditional(others)	6.987	10	0.755	for Ho

A standard procedure is to use information criteria. Two standard measures are Akaike's information criterion (AIC) and Schwarz's Bayesian information criterion (BIC). Smaller AIC and BIC are preferred because higher log likelihood is preferred. This study used AIC model selection to distinguish among a set of possible models describing the relationship between the dependent variable and independent variable. Table 4.5 and 4.6 provide a satisfactory summary of the estimated models (Multinomial and Probit) and their performance. The diagnostic for the AIC and BIC is all smaller compared to results of possible estimated models that provides correctly predicted probabilities.

Table 4.5: Measures of fit for MNL model on the determinants of health care provider choice

McFadden's R ² : 0.003	McFadden's Adj. R ² :	0.002
Maximum Likelihood R ² : 0.002		
AIC: 0.513	AIC*n:	24285.67
BIC: -340900.00	BIC':	69.88

Table 4.6: Measures of fit for the Probit model on the determinants of access to health care services

McFadden's R ² : 0.006	McFadden's Adj. R ² :	0.005
Maximum Likelihood R ² : 0.004		
AIC: 0.604	AIC*n:	34600.456

BIC: -458678.67	BIC':	58.15
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4.5 Summary of tests and decision on the estimation method

To re-iterate, the probit model was used to examine the determinants of health care utilisation while the multinomial logit model was used to investigate the determinants of health care provider choice. The results presented in Table 4.2 reveal that household income, medical insurance, gender, household place of resident and education status have positive and significant effect on access to health care services. For example, the probability of having access to health care services increases with the level of household income. These findings coincide with evidence from studies done in Uganda and Zambia by Wandera *et al.* (2015) and Hjortsberg (2003) respectively, who found that access to health care increases for those who earned wages or with the level of income.

The results presented in Table 4.3 also reveal that household income, medical insurance, gender, and education status have a significant impact on health care provider choice. For example, regarding educational attainment, individuals who completed at least secondary education are more likely to use a private than traditional/others health care facilities. This is similar to the findings by Vikum *et al.* (2012) and Chatterjee *et al.* (2018), who found that individuals with higher levels of education are likely to choose private health care facilities than other health care facilities.

Akaike's information criterion (AIC) and Schwarz's Bayesian information criterion (BIC) were used to measure the fitness for the probit model on the determinants of access to

health care utilization and for multinomial model on the determinants of health care provider choice. The previous literature on the factors influencing the choice of health care provider did not consider the tests of Independence of Irrelevant Alternatives (IIA) (Patel and Chauhan, 2020; Chatterjee *et al.*, 2018; Sato,2012; Vikum *et al.*,2012; Qian *et al.*,2010). Therefore, this study confirms that the IIA has not been violated by estimating multinomial logit model.

The review of previous studies on the determinants of access to health care services in Namibia ignored the importance of the observed difference in access to care in public, private and traditional/others health care facilities by investigating the factors that affect access to health care utilization only (Rooy, *et al.*,2012; Amadhila, 2012; Rashid and Antai, 2014; Kaundjua, 2019; Alegana *et al.*, 2012). This study confirms what explain the difference in access to care in public, private and traditional/others health care facilities by using Multinomial logit model. The study examines whether individual/household and community socioeconomic and demographic factors do affect access to health care services and explain the choice between private, public and traditional/others health care providers in Namibia and concludes that individual/household and community socioeconomic and demographic factors indeed affect access to health care utilization and explain the choice between health care service providers in Namibia.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary of findings and conclusion

This study complements existing evidence on the determinants of access to health care services by using data from the Namibia Household Income and Expenditure Survey (NHIES) conducted between April 2015 and March 2016. The literature suggests growing evidence on the determinants of access to health care and health care provider choice (Hjortsberg, 2003; Chatterjee *et al.*, 2018; Kabongo, 2015; Masiye and Kaonga, 2016; Panezai *et al.*, 2017; Amadhila, 2012; Gyasi and Phillips, 2018; Guinness *et al.*, 2018; Jong *et al.*, 2015; Rooy, *et al.*, 2012). Evidence from these studies further highlights the importance of household size, place of stay (urban or rural), medical insurance, household income, distance to health care facility, age of the individual, gender and education status as strong determinants of access to health care services and factors influencing the choice of health care providers. However, while several studies have investigated the determinants of access to healthcare services in Namibia (Rooy, *et al.*, 2012; Kaundjua 2020; Alegana, *et al.*, 2012), there is dearth of empirical evidence on what determinant the observed difference in access to care in public, private and traditional/others health care facilities.

The current study contributes to this body of literature by investigating the determinants of access to health care services, focusing on the choice between private, public and traditional/others facilities in a country with one of the highest inequalities in the world. The probit and multinomial logit models were used as the main estimation strategies to

help achieve the objectives of the study by making use of data adopted from a structured questionnaire administered by NSA during the Namibia Household Income and Expenditure Survey (NHIES) conducted between April 2015 and March 2016. The study confirms that individual/ household and community socioeconomic factors do affect health care utilization and significantly explain the choice between private, public and traditional/others health services in Namibia. Covariates such as household income, gender, medical insurance, household place of resident and education status were statistically significant and increases the chance of access to health care services. The study further reveals that household income, medical insurance, gender and education status significantly influences the choice of health care provider. It became evident through the research that many of the variables were suitable for analysing the access to health care services and the choice of health care provider, even though each variable had a different degree to which it was able to determine access to health care services and the choice of health care provider.

Furthermore, the study concludes that access to health care services depends on medical insurance, household income, gender, household place of resident and education status. Likewise, the choice of health care provider in Namibia can be influenced by household income, medical insurance, gender and education status. This suggest that individual/household and community socioeconomic and demographic factors do affect health care utilization and they significantly explain the choice between private, public and traditional/others health services in Namibia.

5.2. Recommendations

In the Namibian context, enabling factors and predisposing factors (i.e. household income, medical insurance, gender, household place of resident and education status) have been identified as most important factors influencing the likelihood of accessing health care services and this answers the first objective and hypothesis of this study. Concerning the health care provider choice, factors such as household income, medical insurance, gender, and education status were significant and addresses the second objective and hypothesis for this study. These findings provide some policy implications. For instance, there is a greater need to uplift the living conditions of people in rural areas, make health care provision accessible to all households in Namibia. The Ministry of Health, and Social Services should scale up the measure to ensure proximity to healthcare workers and health facilities in Namibia. This study suggests that the government should strengthen primary health care system in Namibia to provide long-term care to all women and men, and efforts should be taken to improve the health conditions of the elders.

Furthermore, findings from the access to health care services and choice of health care providers are in line with literature in developed and developing countries demonstrating that income for most households is one of the barriers to gaining access to the personal health care system and choice of health care provider. Lack of transportation, and place of resident are some of the many hurdles that may stand between someone who is sick and access to health care. The analysis from this study confirmed some of the findings in the literature, consequently, the results could be used to advocate additional measures for health care reforms that could be used to reduce the other cost of health care (Guinness *et*

al., 2018) and the price of medical services (Lepine and Nestour, 2012), to address these inequities.

Drawing on the study's findings and given the key role of access to health care services and the choice of health care provider in the improvement of a population's health, it is recommended that policy makers pay more attention to improving citizens' level of education, household income, access to medical insurance, rural development which are some of the key determinants of access to health care and choice of health care provider in Namibia. Furthermore, improvement of the quality of life for people is crucial in any strategy for the new life and improvement of access to health care and the choice of health care provider. Moreover, this study should serve to encourage further research on the determinants of access to health care services in other developing countries apart from the determinants under focus in this discussion.

5.3 Further research

Whereas findings from this study are interesting, there are few limitations that must be considered. The study could therefore be extended in several ways. First, while access to health care services could be investigated by considering Andersen and Newman (1973) framework for health service utilization, this study was based on this framework, and it was only interested in the household and individual characteristics. Therefore, further research should consider studying the need factors of the Andersen and Newman 's Health Behavioral Model. Second, this study has only tackled the demand-side factors

influencing access to health care. It would be interesting to study access to health care services as function of both demand and supply factors. Therefore, there it is recommended that policy makers should be commitment to ensure that future dataset contain information on supply side factors.

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