CONTINGENT VALUATION AND DETERMINANTS OF HIV COUNSELLING AND TESTING SERVICE IN LAGOS STATE OF NIGERIA

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THESIS SUBMITTED IN FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

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CONTINGENT VALUATION AND DETERMINANTS OF HIV COUNSELLING AND TESTING SERVICE IN LAGOS STATE OF NIGERIA

ABSTRACT

HIV/AIDS is one of the major health concerns faced by the world and in particular sub-Saharan Africa. With a population of about 182 million people in 2017, Nigeria ranks second by a number of people in the world living with HIV/AIDS (3.2 million) after South Africa (7.1 million). Amongst the continuum of HIV/AIDS programmes established to curtail the impact of the epidemic, HIV Counselling and Testing (HCT) service is prominent because of its strategic role as a gateway between prevention and care. It is a service aimed to assist Nigeria to achieve the UNAID's 90-90-90 HIV/AIDS targets and 2030 Sustainable Development Goals (SDGs) in health. However, HCT service in Nigeria is faced with many challenges, such as inadequate funding, low utilisation, HIV-related stigma, and discrimination. There has been a paucity of research into these areas leading to inadequate evidence to support policy decision-making. Thus, this thesis has three broad aims: firstly, to employ the contingent valuation method of economic evaluation to assess the quantum of payment and determining factors associated with people's willingness to pay for HCT services; secondly, to explore the health belief factors that predict HCT service utilisation; thirdly, to investigate the mediating effect of HIV-related stigma barriers to HCT service utilisation in Nigeria. This study used quantitative, cross-sectional, survey-based research approach. A non-probability convenience sampling technique was used to collect data from 768 respondents selected from the three Local Government Areas of Lagos State, Nigeria. Bivariate, multivariate, and Partial Least Square-Structural Equation Modelling (PLS-SEM) data analysis methods using SPSS and WarpPLS software were used in the data analysis. The findings revealed that 75% respondents were willing to pay the mean fees of ₦1291 (~$4.22) for

HCT services, while the significant WTP determinants were income, knowledge of someone living with HIV or died of AIDS, worry about HIV infection, and fear of HIV-related stigma. Also, the health belief factors that significantly correlated with and predicted HCT service were, perceived susceptibility to HIV infection (positively predicted HCT service utilisation), perceived benefits of HCT (positively related to HCT service utilisation and came out as the strongest predictor of HCT), and perceived barriers to HCT (negatively correlated with the HCT service utilisation). Altogether, six sociodemographic variables (Age, Gender, Marital Status, Educational status, Employment status, HIV/AIDS knowledge) of the respondents moderated the relationship between health belief factors and HCT utilisation. HIV-related stigma fully mediated the relationship between HIV transmission misconception and HCT service utilisation, while it partially mediated the relationships between perceived seriousness of HIV/AIDS and HCT service utilisation. The findings offer vital information germane to future implementation of co-payment schemes aimed at financial sustainability of HCT and HIV/AIDS programmes in Nigeria. Also, the findings call for the need to raise awareness among individuals of the HIV infection risks and benefits of HCT, remove barriers to HCT utilisation and to abolish HIV-related stigma to accelerate the uptake of HCT. These efforts will help Nigeria attain the UNAIDS 90-90-90 HIV/AIDS targets.

Keywords: Contingent Valuation, HIV-related stigma, HIV Counselling and Testing, Health Belief Model, Nigeria

PENILAIAN KONTINJEN DAN PENENTU PERKIDHMATAN KAUNSELING DAN PENGUJIAN KEPERCAYAAN HIV DI NEGERI LAGOS NIGERIA

ABSTRAK

HIV/AIDS merupkan antara masalah yang dihadapi oleh penduduk dunia, khasnya Afrika Sub-Sahara. Dengan penduduk berbilang lebih kurang 182 juta pada tahun 2017, Nigeria meduduki tempat kedua dari segi bilangan penduduk yang dihinggap HIV/AIDS (3.2 million) lepas Afrika Selatan (7.1 million). Disebalik rancangan HIV/AIDS yang dilancarkan untuk menahan kesan wabak ini, kauseling dan pengujian HIV (HCT) adalah penting disebabkan peranan strategik sebagai saluran keluar antara pencegahan dan rawatan. Ianya merupakan satu rancangan yang ditujukan untuk mecapai sarasan kerajaan Nigeria UNAID's 90-90-90 HIV/AIDS dan 2030 Matlamat Pembangunan Lestari (SDGs) dalam kesihatan.Namun, perkhidmatan HCT di Nigeria menghadapi berbagai halangan, umpamanya kekurangan pembiayaan, penggunaan yang rendah, aib berkaitan-HIV, dan diskriminasi. Kekurangan kajian terhadap isu ini menimbulkan kekurangan bukti untuk mendukung pembentukan dasar. Dengan itu, tesis ini menmpunyai tiga matlamat luas: pertamanya, untuk menggunakan kaedah penilaian kontingen demi menentukan kauntiti bayaran dan faktor penentu kesudian orang untuk membayar agar memperolehi perkidhmatan HCT; keduanya, untuk menganalisis faktor faedah kepercayaan kesihatan bagi meramalkan penggunaan HCT; ketiga, untuk meninjau kesan perantara halangan aib berkaitan-HIV barriers keatas penggunaan perkhidmatan pengunaan HCT di Nigeria. Kajian ini mengunakan pendekatan kuantitatif berlandaskan data keratan rentas yang dikumpul melalui tinajaun soal-selidik. Satu sampel kemudahan teknik bukan-kebarangkalian dipakai untuk mengumpul data daripada 768 responden daripada tiga kawasan kerajaan tempatan di Negeri Lagos, Nigeria. Kaedah bivariate, multivariate, dan persamaan permodelan Partial Least Square-Structural Modelling (PLS-SEM) digunakan berasaskan SPSS dan software WarpPLS. Penemuan menunjukkan

bahawa 75% responden sudi membayar purata yuran sebanyak ₦1291 (~$4.22) untuk menikmati HCT, sementara penentu WTP yang bererti merupakan pendapatan, pengalaman hidup bersama dengan yang dijangkit HIV ataupun seorang yang meningeal dunia akibat AIDS, kebimbangan terhadap jangkitan HIV, dan stigma ketakutan berkaitan-HIV. Juga, faktor-faktor kepercayaan kesihatan berkorelasi dengan signifikan dengan perkhidmatan HCT yang diramalkan merupakan tangapan penyerahan kepada jangkitan HIV (ramalan positif keatas penggunaan perkhidmatan HCT), tangapan faedah HCT (berkorelasi positif keatas penggunaan perkhidmatan HCT yang merupakan peramal terkuat HCT), dan halangan yang dijanka terhadap HCT (berkorelasi negatif dengan perkhidmatan HCT). Keseluruhannya, enam pembolehubah sosiodemografic (Umur, Jantina, Status perkahwinan, Status pendidikan, status pekerjaan, pengetahuan HIV/AIDS) responden mempengaruhi hubungan antara faktor kepercayaan kesihatan dan penggunaan HCT. Stigma berkaitan-HIV secara penuh dapat menjelaskan hubungan antara kesudian untuk menggunakan HCT dan penggunaan perkhidmatan HCT, sementara ianya mengantara secara separa hubungan antara ancaman HIV/AIDS dan perkidmatan HCT, dan faedah HCT yang dijangka dan perkhidmatan HCT.Dapatan memberi pengetahuan yang kukuh untuk perlaksanaan skema pembayaran bersama pada masa depan terhadap kemampanan pembiayaan rancangan HCT dan HIV/AIDS di Nigeria. Tambahan pula, penemuan membawa kepada keperluan untuk mempertingkatkan kesedaran di kalangan individu yang berisko dijangkit HIV dan faedah HCT, mengatasi kekangan keatas penggunaan HCT dan menangani stigma berkaitan-HIV demi melajukan penerimaan HCT. Usaha ini akan membantu Nigeria untuk mencapai sasaran UNAIDS 90-90-90 HIV.

Kata kunci: Penilaian Kontingen, Stigma HIV/AIDS, Kaunseling dan Pengujian HIV, Model Kepercayaan Kesihatan, Nigeria

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LIST OF SYMBOLS AND ABBREVIATIONS

AARS	:	Average adjusted R-squared
AFVIF	:	Average full collinearity VIF
AIDS	:	Acquired Immune Deficiency Syndrome
ANCOVA	:	Analysis of Covariance
ANOVA	:	Analysis of Variance
APC	:	Average Path Coefficients
ARS	:	Average R-Squared
ART	:	Anti-retroviral Therapy
ARV	:	Anti-retroviral drugs or treatment for HIV/AIDS
AVE	:	Average Variance Extracted
AVIF	:	Average Block Variance Inflation Factor
CBOs	:	Community-Based Organisations
CB-SEM	:	Covariance-Based Structural Equation Modelling
CDC	:	Centers for Disease Control
CFA	:	Confirmatory Factor Analysis
CV	:	Contingent Valuation
CSWs	:	Commercial Sex Workers
DF	:	Degree of Freedom
EFA	:	Exploratory Factor Analysis
ELISA	:	Enzyme-Linked Immuno-absorbent Assay
FBOs	:	Faith-Based Organisations
FCT	:	Federal Capital Territory
FGN	:	Federal Government of Nigeria
FHI	:	Family Health International

FLHE	:	Family Life Health Education
FMOH	:	Federal Ministry of Health
GDP	:	Gross Domestic Product
GLM	:	General Linear Model
HAART	:	Highly Active Anti-Retroviral Therapy
HBM	:	Health Belief Model
HCT	:	HIV Counseling and Testing
HDI	:	Human Development Index
HEAP	:	HIV/AIDS Emergency Action Plan
HIV	:	Human Immunodeficiency Virus
HIVST	:	HIV Self-testing
LACA	:	Local Action Committee on AIDS
LASUTH	:	Lagos State University Teaching Hospital
LCDA	:	Local Council Development Areas
LGA	:	Local Government Area
LSACA	:	Lagos State Agency for the Control of AIDS
LSMOH	:	Lagos State Ministry of Health
MDGs	:	Millennium Development Goals
NACA	:	National Agency for the Control of AIDS
NACP	:	National AIDS Control Programme
NARHS	:	Nigerian HIV & AIDS and Reproductive Health Survey
NBS	:	National Bureau of Statistics
NCH	:	National Council on Health
NDHS	:	Nigeria Demographic and Health Survey
NEACA	:	National Expert Advisory Committee on AIDS
NGOs	:	Non-Governmental Organisations

NHREC	:	National Health Research Ethics Committee
NLBCDR	:	Nonlinear bivariate causality direction ratio
NPC	:	National Population Commission
NWAA	:	National War Against AIDS
PCA	:	Presidential Council on AIDS
PEP	:	Post-exposure Prophylaxis
PEPFAR	:	US President's Emergency Plan for AIDS Relief
PLS	:	Partial Least Square
PLWHA	:	People Living with HIV/AIDS
PLWHIV	:	Persons Living with HIV
PMTCT	:	Prevention of Mother to Child Transmission
PCP	:	Pneumocystis Carinii Pneumonia
PRB	:	Population Reference Bureau
PrEP	:	Pre-exposure Prophylaxis (PrEP)
RSCR	:	R-squared Contribution Ratio
SACA	:	State Action Committee on AIDS
SD	:	Senatorial District
SDGs	:	Sustainable Development Goals
SE	:	Standard Error
SEM	:	Structural Equation Modelling
SPR	:	Sympson's Paradox Ratio
SPSS	:	Statistical Packages for Social Sciences
SSR	:	Statistical Suppression Ratio
STDs	:	Sexually Transmitted Diseases
STIs	:	Sexually Transmitted Infections
TPB	:	Theory of Planned Behaviour

TRA	:	Theory of Reasoned Action
UNAIDS	:	Joint United Nations program on HIV/AIDS
UNDP	:	United Nations Development Programmes
UNFPA	:	United Nations Population Fund
UNICEF	:	United Nations International Children's Fund
VB-SEM	:	Variance-Based Structural Equation Modelling
VIF	:	Variance Inflation Factor
VMMC	:	Voluntary Medical Male Circumcision
WHO	:	World Health Organization
WTA	:	Willingness to Accept
WTP	:	Willingness to Pay

LIST OF APPENDICES

CHAPTER 1: INTRODUCTION

1.1 Background of the Study

One of the major health concerns facing the world today and most especially sub-Saharan Africa (SSA) is Human Immunodeficiency Virus (HIV) infection and Acquired Immunodeficiency Syndrome (AIDS). HIV/AIDS is recognised as a significant cause of death among other infectious diseases globally (Joint United Nations Programme on HIV/AIDS [UNAIDS], 2015). HIV is the virus that causes AIDS. HIV targets its host by weakening the immune system and thus render the individual susceptible to a myriad of opportunistic infections which could be calamitous ultimately. HIV is usually transmitted through contact with contaminated body fluids such as human breast milk, semen, blood, or vaginal secretions (World Health Organisation [WHO], 2013). HIV and AIDS cases were first reported around 1981. About 76.1 million people have been infected, and 35 million people have died from AIDS-related illnesses since the discovery of the virus (UNAIDS, 2017).

Table 1.1: Global and Regional HIV Epidemic Estimates

	People living with HIV (All ages)		**New HIV infections (All ages)**		**AIDS-related death (All ages)**	
	2010	**2016**	**2010**	**2016**	**2010**	**2016**
Global	33.3 million	36.7 million	2.2 million	1.8 million	1.5 million	1 million
Asia and Pacific	4.7 million	5.1 million	310,000	270,000	230,000	170,000
Eastern and Southern Africa	17.2 million	19.4million	1.1million	790,000	760,000	420,000
Eastern Europe and Central Asia	1.0 million	1.6 million	120,000	190,000	38,000	40,000
Latin America and the Caribbean	1.8 million	1.8 million	100,000	97,000	60,000	36,000
Middle East and North Africa	190,000	230,000	20,000	18,000	9,500	11,000
Western and Central Africa	6.3 million	6.1 million	450,000	370,000	370,000	310,000
Western and Central Europe and North America	2.1 million	2.1 million	92,000	73,000	29,000	18,000

Sources: UNAIDS, 2017 estimates

Globally, in 2016, an estimated 36.7 million adults and children were living with HIV/AIDS, which was about a 10% increase from 2010 estimates, 1.8 million new

infections occurred while 1 million AIDS-related deaths were recorded (UNAIDS, 2017). (Table 1.1).

1.1.1 HIV Epidemic: Regional View – Sub-Saharan Africa (SSA)

Since the beginning of the epidemic, developing countries, especially sub-Saharan Africa have been hard hit. The region has the most numbers of people infected with HIV compared to other areas in the world. Sub-Saharan Africa with the population of about one billion which is 13.5% of 7.4 billion world population (Population Reference Bureau [PRB], 2016; World Bank, 2016) is home to two-thirds (70%) of the total number of people living with HIV and AIDS in the world (WHO, 2016).

In response to the destructive impact of the HIV epidemic and the attendant morbidity and mortality rates left in its trail, the government of various countries responded by establishing different programs to curtail the influence of this deadly disease. These programmes range from prevention to treatment and care, such as HIV Counselling and Testing (HCT) service, Prevention from Mother-to-Child Transmission (PMTCT), condom distribution programmes, and Antiretroviral Therapy (ART). HIV Counselling and Testing (HCT) is prominent among the continuum of HIV/AIDS programmes because of its strategic roles as a gateway between prevention and treatment and care (UNAIDS, 2015). However, the statistics available across the globe reveal that the uptake of this service by people is still low. According to UNAIDS (2016), the uptake of HIV testing in Western Africa ranges from 6% to 22% only.

1.1.2 HIV/AIDS AND HIV Counselling and Testing (HCT) in Nigeria -Situational Analysis

1.1.2.1 Country's profile

Nigeria is officially known as the Federal Republic of Nigeria (FGN), and it is located in the western part of sub-Saharan Africa. Nigeria has 36 states and with its Federal Capital

Territory at Abuja, and is politically divided into six geopolitical zones (See table 1.2). The States are further subdivided into 774 local government areas. The population of the country includes more than 500 ethnic groups with each group having its own language. The three major ethnic groups are – Yoruba, Igbo, and Hausa/Fulani (National Population Commission [NPC], 2017). The country gained independence from its colonial master, United Kingdom, on October 1, 1960. Nigeria was under military rule for about 30 years. However, in 1999 the country returned to democratic government. The Nigerian system of government is mainly presidential system with a 3-tier structure, namely: The Federal Government, State Government, and the Local Governments

Table 1.2: Nigeria Geopolitical Zones and States

Zone	States
North-East	Borno, Yobe, Bauchi, Gombe, Taraba, Adamawa
North-West	Sokoto, Kebbi, Zamfara, Katsina, Kano, Jigawa, Kaduna
North-Central	Plateau, Nassarawa, Niger, Kogi, Benue, Kwara, FCT
South-East	Anambra, Enugu, Ebonyi, Abia, Imo
South-West	Ogun, Osun, Ekiti, Ondo, Oyo, Lagos
South-South	Edo, Delta, Bayelsa, Rivers, Akwa-Ibom, Cross River

Source: Nigeria National Bureau of Statistics (2016)

Nigeria is the most populous black nation in the world and is richly blessed with abundant human and natural resources such as natural gas, petroleum, tin, iron ore, coal, limestone, lead, zinc, arable land (National Bureau of Statistics [NBS], 2016). In 2014, the Gross National Income (GNI) per capita was $5,710 (2011 PPP $) and average annual growth rate 2009 – 2014 Gross Domestic Product was 5.5% (World Bank, 2016). Despite the abundant wealth of resources, the majority of the populace live in abject poverty. According to the Human Development Report 2015, Nigeria was ranked 152nd position out of 187 countries with a Human Development Index (HDI) score of only 0.5. Life expectancy at birth was 52.8 years which is one of the lowest in West Africa (UNDP, 2015), under-five mortality rate was 109 per 1,000 live births, and maternal mortality

ratio was 814 per 100,000 live births in 2015. HIV/AIDS has contributed significantly to lowering life expectancy as well as the high child and maternal mortality rates in Nigeria (World Bank, 2016). HIV/AIDS mortality wields tremendous influence on households, private sectors, and national economies by increasing mortality and morbidity among the productive age group (Mahal, 2007; Mahal et al., 2008; Canning et al., 2006). In a 2006 study of 352 households which have at least a member living with HIV/AIDS in two Nigeria States – Oyo and Plateau, it was found that HIV/AIDS imposed both economic and psychological challenges on the households. The problems imposed on households were manifested in form of massive burden on out-of-pocket health spending, income loss within family and increased psychological and financial burden on the caregivers (Canning, Mahal, Odumosu & Okonkwo, 2006).

1.1.2.2 Nigeria HIV/AIDS Situation

Nigeria, the most populous country in Africa, and seventh in the world with the population of about 187 million (NPC, 2017; NBS, 2016; PRB, 2016), has the second largest burden of people living with HIV/AIDS globally after South Africa (UNAIDS, 2017). AIDS was first reported in 1986 and the prevalence of the disease has consistently and steadily increased to date. UNAIDS (2017) data showed that in 2016, HIV prevalence rate was 2.9%; about 3,200,000 were living with HIV; 220,000 new infections were recorded (number of infected males is 87,000 and females 91,000); 160,000 people died of AIDS-related illnesses. HIV infections is primarily concentrated in the age group 15-55 years which falls within the economically active group (15 – 59 years) (UNAIDS, 2016). The number of infections and AIDS-related deaths increased progressively since 1990 till 2003 and then declined. Although, the HIV prevalence rate has since decline in the country, the current number is still unacceptably high (National Agency for the Control of AIDS [NACA], 2015).

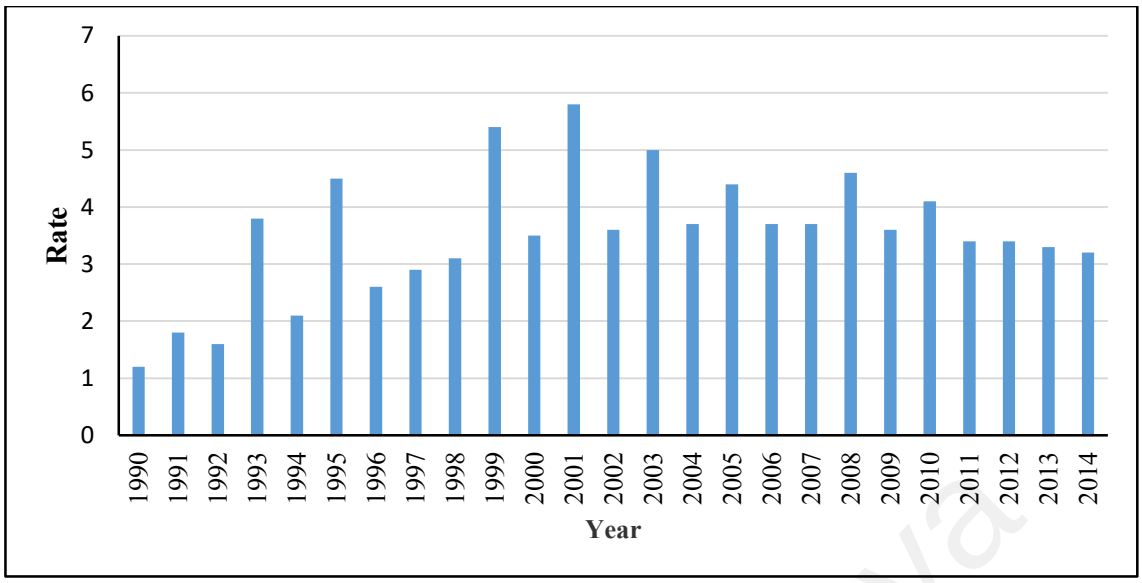

Figure 1.1: Nigeria HIV Prevalence Rate from 1990 – 2014.

Source: NACA (2015)

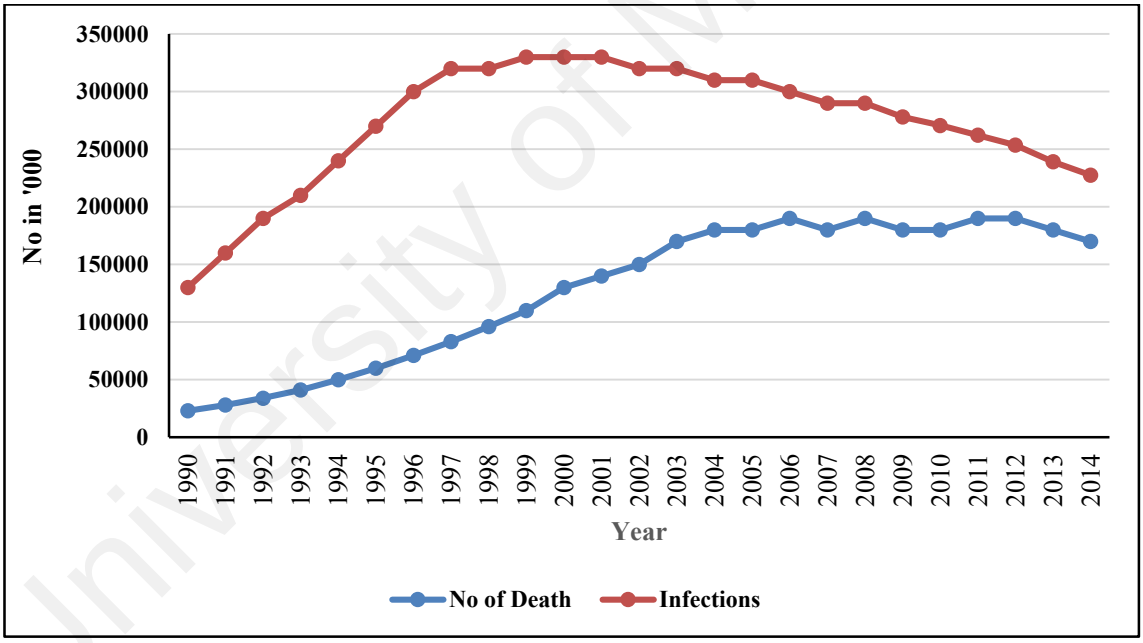

Figure 1.2: Nigeria HIV Infections and AIDS-related Deaths, 1990 – 2014.

Source: NACA (2015), Nigeria GARPR Report 2015

1.1.2.3 HIV prevalence by geopolitical zones and state

In 2007, North Central has the highest prevalence rate of 5.7% while South East has lowest prevalence rate of 2.6%. But in 2012, South-South overtook the North-Central

with a prevalence rate of 5.5%. South East has the lowest prevalence rate through the years, dropping from 2.6% to 1.8% (NACA, 2015).

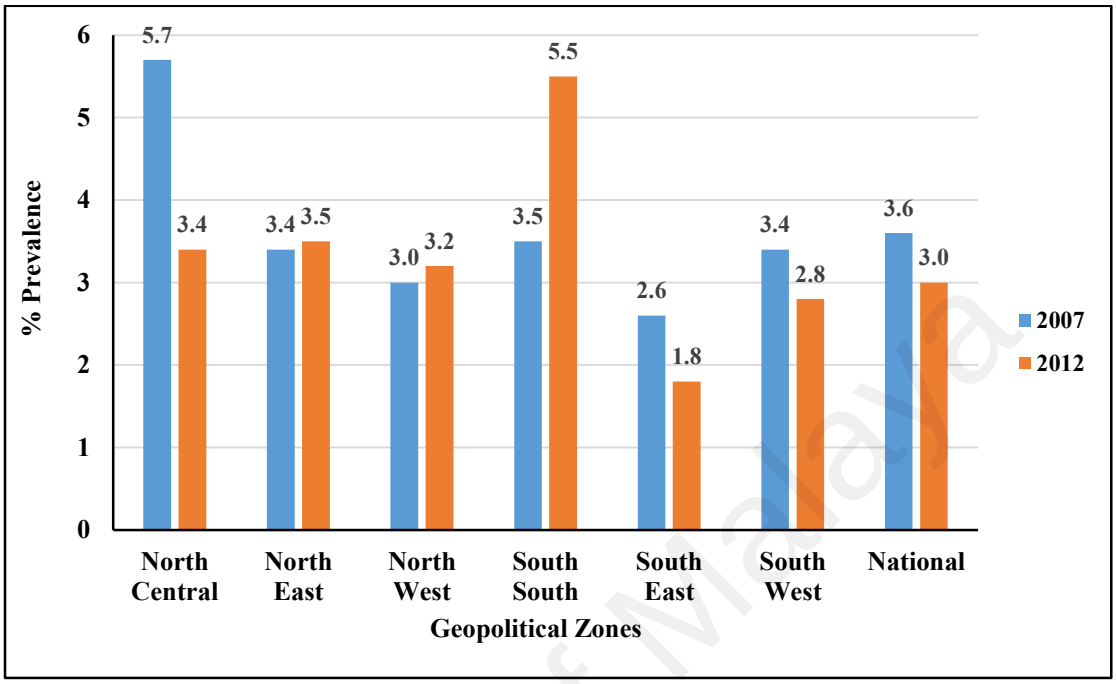

Figure 1.3: HIV Prevalence by Geopolitical Zones and National

Source: NACA (2015), Nigeria GARPR Report 2015

The prevalence rate varies across the 36 States of the Federation (Figure 1.4). The prevalence rates in the first 14 states are higher than the national prevalence rate which was 3.0%. The State with the highest rate is Rivers state, 15.2% while Ekiti state has the lowest rate 0.2%. Lagos state, which is our study area, is ranked 20th with the prevalence rate of 2.2%. Although the prevalence rate in Lagos state seems lower than others yet it has largest number of People Living with HIV/AIDS owing to its large population in the country (about 17 million) (NBS, 2015). In Nigeria, the leading HIV transmission mode is high-risk heterosexual sex which resulted in about 80% of the infections. In the same vein, mother-to-child transmission, and infusion of infected blood also notably contribute to the spread of the epidemic. NACA (2015), identified the key drivers of the epidemic to include these: peoples' low perception of personal risk of contracting the disease,

multiple sexual partners, lack of quality health care and inefficient and ineffective services for STIs.

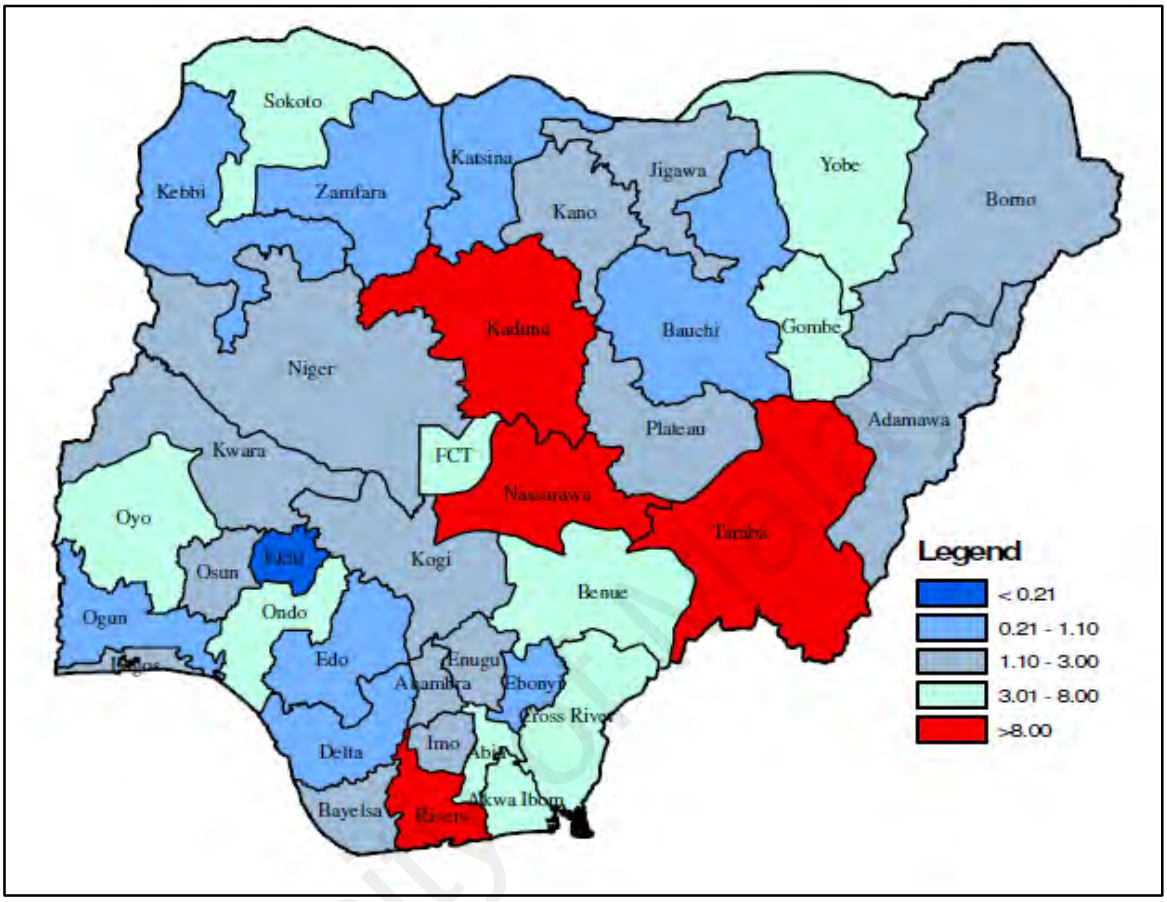

Figure 1.4: Nigeria HIV Prevalence Rate by State.

Source: NACA (2015), Nigeria GARPR Report 2015

1.1.2.4 Nigeria Government's response to HIV/AIDS epidemic.

Initially, response to the emerging epidemic by the government of Nigeria especially during the military era was somewhat slow but the onset of democratic rule in Nigeria in 1999 ushered in a multisectoral response to the ongoing epidemic. The Federal Government of Nigeria in 2000, established National Agency for the Control of AIDS [NACA] (formerly National Action Committee on AIDS). The mandate of the NACA includes: to coordinate various HIV/AIDS activities, develop the framework for collaboration among the stakeholders, develop and articulate a strategic plan, to coordinate and facilitate the mobilisation of resources to effectively respond and sustain

the fight against the epidemic (NACA, 2009). In 2010, NACA launched its comprehensive National Strategic Framework to cover 2010 to 2015, which requires an estimated ₦756 billion[1] ($2.4 billion) to implement (NACA, 2015). Some of the main aims included in the framework are to reach 80 percent of sexually active adults and 80 percent of most-at-risk populations with HIV counselling and testing by 2015; ensure 80 percent of eligible adults and 100 percent of eligible children are receiving ART by 2015; and to improve access to quality care and support services to at least 50 percent of people living with HIV by 2015 (NACA, 2010). In the same vein, coordinating structures were established at both state and local government levels; State Agency for the Control of AIDS (SACA) and Local Government Action Committee on AIDS (LACA) respectively (NACA, 2011). Also, several programmes were established to curtail the epidemic. They range from prevention to treatment and care for the infected individuals. Some of the programmes are HIV Counselling and Testing (HCT) services, Prevention of mother to child transmission (PMTCT), ART, encourage use of condom campaign and promotion programme, and Family Life HIV education.

1.1.2.5 HIV Counselling and Testing in Nigeria

HIV counselling and Testing (HCT) is one of the HIV/AIDS programmes established to contain the spread of the epidemic. HCT is regarded as a critical entry point to other key prevention and intervention programmes such as Prevention-of-Mother-To-Child (PMTCT), treatment services (ART programmes) and care (UNAIDS, 2016; Osterman et al., 2015; Bwambale et al., 2008). It serves as an indicator of the proportion of population who are aware of their HIV status (UNAIDS, 2015). HCT contributes to reduction in probability of HIV transmission (WHO, 2015; Denison et al., 2008), cut in denial, stigma and discrimination and thereby leads to collective responsibility and action (Sweat et al.,

[1] The exchange rate as at June 2018 is ₦305=$1 (CBN, 2018)

2000; WHO, 2005; Alemayehu, 2015). HCT enables individuals to know their serostatus thereby improve their motivation for self-care (Okawa et al., 2017). HCT is regarded as one of the leading HIV/AIDS programmes and aims to contribute significantly to achieve 90-90-90[2] targets by 2020 and Sustainable Development Goals (SDGs) 2030 (UNAIDS, 2017). Despite the pivotal and strategic roles played by HCT in the continuum of HIV/AIDS programmes, utilisation rates are still low (NACA, 2015). Staveteig et al., (2013) reported that over 50% of people living with HIV (PLWHIV) in the SSA were unaware of their HIV status. In Nigeria, the National Reproductive Health Survey (NARHS) 2012 report showed that only 23 % males and 29% females had been tested for HIV (NACA, 2015).

Data from NACA showed that the number of HCT centres significantly increased from 1074 in 2009 to 8114 in 2014 (Figure 1.5), while the number tested also showed increment from 1,749,521 in 2009 to 6,716,482 in 2014 (Figure 1.6). Despite the increase in the number of HIV sites the proportion of those tested is still very low when compared with Nigeria population. HCT programme in Nigeria face some challenges which includes the following: shortage of HIV testing kits, uncertain financial sustainability, weak supply chain management, wrong public perception, low HIV risk perception, and stigma and discrimination associated with HIV infection (NACA, 2015).

[2] 90-90-90 targets is a United Nation HIV/AIDS strategy adopted in 2014 which aimed at achieving 90% diagnosis of people infected with HIV, 90% of those who are diagnosed positive to HIV receiving antiretroviral treatment, and 90% of those who are on antiretroviral therapy having viral suppression by 2020

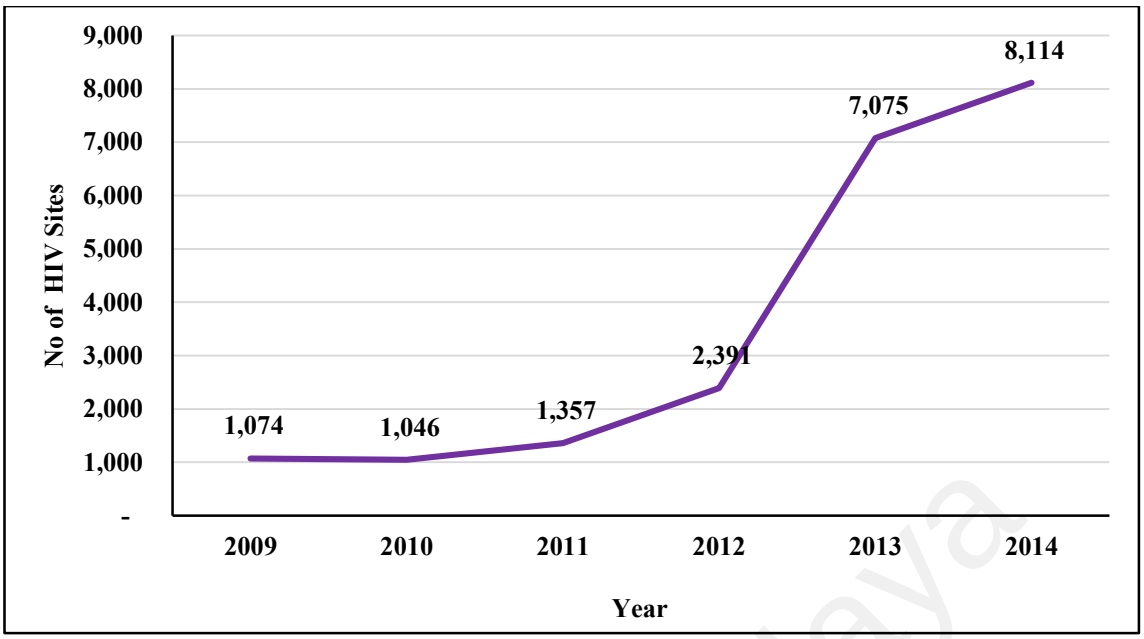

Figure 1.5: Number of HCT centres in Nigeria 2009-2014.

Source: NACA (2015), Nigeria GARPR Report 2015

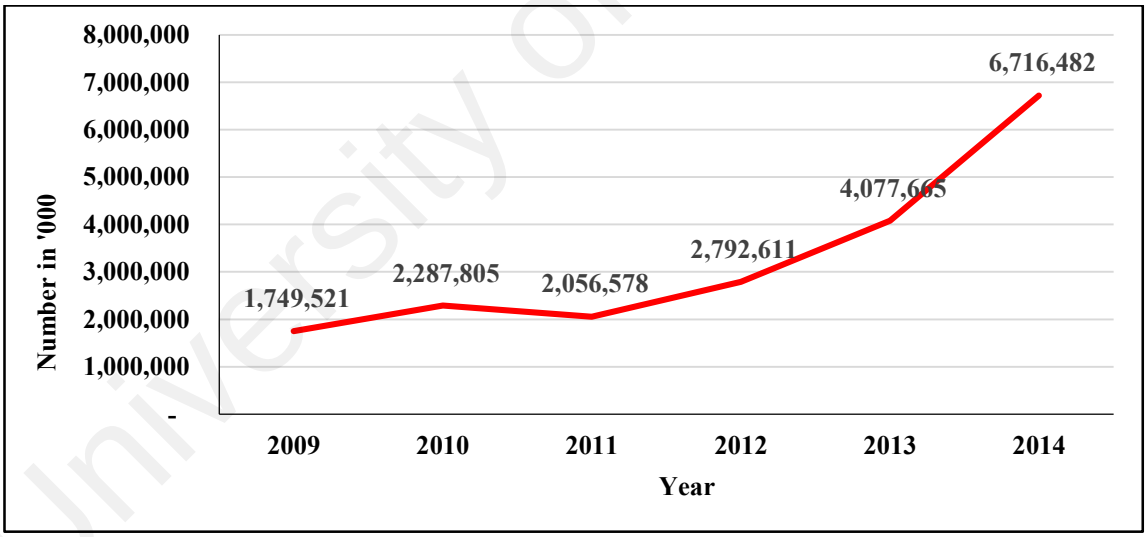

Figure 1.6: Total number of individuals counselled, tested, and received results 2009-2014.

Source: NACA (2015), Nigeria GARPR Report 2015

1.5 Financing of HIV/AIDS programmes in Nigeria.

Financing of HIV/AIDS programmes in the country comes from both internal and external sources. The government and private sectors constitute an internal source while external source is made up of international donors and agencies. The main donors that

have significantly contributed to the national multi-sectoral HIV/AIDS response by providing financial resources for the expansion of antiretroviral treatment and other programmes are the US President's Emergency Plan for AIDS Relief (PEPFAR), the Global Fund to Fight AIDS, Tuberculosis and Malaria, Bill and Melinda Gates Foundation, and the World Bank (NACA, 2013). The total funds from PEPFAR between 2004 and 2011 was $2,488.5million (PEPFAR, 2012).

1.2 Problem Statement

Till date, there is no cure nor vaccine for HIV infection or AIDS. Every year, more people are infected which continue to add to the pool of People Living with HIV and AIDS (PLWHA). According to NACA (2015), about 1000 people are being infected daily in Nigeria. The increasing rate of HIV infection will add more burden to the Nigerian health care system weakened by on-going conflict which will require more spending on HIV/AIDS-related programmes.

HCT service is very germane to national HIV/AIDS programmes because it enables people to know their HIV status and thus, helps in preventing HIV transmission and enhances timely care for those who are tested positive. Moreover, for HIV/AIDS intervention programmes like HCT to run efficiently and be successful, it requires an enormous amount of financial resources. But these resources like any other health care resources, are limited and scarce; and often time, the supply falls short of demand for the services.

With the dwindling or outright withdrawal of financial support by some big international donors and the current economic condition of the country, expansion of HIV/AIDS programmes and sustainability of the current ones have been challenging. This situation may have contributed to the increase in rates of both HIV infection and mortality. For instance, in the ₦6. 08 trillion ($30.5 billion) Federal Government of Nigeria (FGN) 2016

budget, only ₦250 billion ($840 million) (4.13% of the total National budget) were allocated to Ministry of Health; of which only ₦18. 9 billion ($61 million) (less than 1% of Health Budget) was budgeted for the National Agency for Control of AIDS but only ₦1. 5 billion ($4.9 million) was approved by the National Assembly (Federal Ministry of Health [FMOH], 2016). If the total amount were to be spent on 3.5 million PLWHA, it then means only ₦428. 57 ($1.4) would be spent on one person for a year. This amount is not even enough to purchase a dose of ART for one AIDS patient. It then means some of the HIV/AIDS programmes, like HCT, being currently offered almost free mostly by the government-owned health facilities may not be sustainable in the near future. Therefore, there may be a need to look for alternative means of supporting the programmes which may necessitate encouraging user co-payments. Co-payment policies that rely on information relating to individuals' behaviour and preferences as contained in a formal economic evaluation need to be made (Drummond et al., 2005). Contingent Valuation (CV) method of economic valuation in health will play a big role in this aspect. Contingent valuation which is a survey-based technique is used in estimating monetary values for health intervention programmes. CV seeks to ask how much users or potential users of health services are willing to pay to obtain the service. CV rests on neoclassical welfare economics, which believes that individuals are rational, they could make a choice among various alternative goods, they are the best judges of their welfare, and that the outcomes of their decision matters, and the value of their decision should be judged solely on the basis of the utility they were able to attain (O'Brien & Gafni, 1996; Diener, O'Brien & Gafni, 1998). The individual as an economic agent will be willing to participate in HCT if he believes that the potential benefits of HIV testing is greater than the cost attributed to the testing (Ostermann et al., 2015; Rice, 2013; Rice & Unruh, 2009). In the body of literature, CV method of health economic evaluation study targeted at informing co-payment policies HCT sustainability policy is very scarce in Nigeria. The few studies that

employed CV method as a health economic evaluation tool in the study of HCT in Nigeria were restricted in scope and rigorous evaluation, and thus their results cannot be generalised (Uzochukwu et al., 2010; Uzochukwu et al., 2011). There is a lack of data on how much people value HCT. Therefore, one of the major goals of this study is to use the method of CV techniques to provide evidence of people's willingness to pay (WTP) for HCT to inform policies that could encourage co-payment for the sustainability of HCT in Nigeria.

Furthermore, it is generally believed that the potential benefits of HIV testing (MacPhail et al., 2008) and access to HIV/AIDS services such as antiretroviral therapy would encourage people to take up the HCT service (Day et al., 2003; UNAIDS, 2015); despite the expansion of HCT services at both national level and Lagos state, the reported utilization level of the people is still very low. For instance, in Lagos state, the number of HCT sites increased significantly from 94 in 2012 to 650 in 2014, but the total number of people tested for the HIV in 2014 is small (211,890) in comparison to the large population of Lagos state (Lagos State Ministry of Health [LSMOH], 2015). This low number would suggest that other factors predict the utilisation of HCT service apart from the knowledge of the benefits of HIV test. Aside from other factors such as economic, social, cultural, and psychological which might impact on HCT service utilisation; individual health beliefs factors are very germane in motivating a person to seek HIV testing (Champion & Skinner, 2008). Therefore, there is a need to examine the factors that predict the utilisation of HCT service in the context of the Health Belief Model (HBM) theory. These determinants of health service utilisation together with variables that modify their relationship with targeted health service which in this case, HCT, need to be identified. Identification and manipulation of these determining factors can enhance more uptake of the HCT service in Lagos state and Nigeria in general. In the body of literature, studies that employed mainstay HBM constructs to predict HCT utilisation and also examine the

moderating impacts of moderator variables, sociodemographic variables, on the relationship of HBM constructs and HCT utilisation in Nigeria are not common (Mberu, 2013; Edem & Harvey, 1994).

Lastly, HIV testing in Nigeria like other SSA countries, is mostly offered free in government health facilities, but substantial number of people have not been tested, which suggest that financial costs might not be the only barrier and that, other factors such as time needed to travel to HIV testing centres, transportation costs, fears and anxiety associated with knowing the HIV result, and HIV-related stigma and discrimination might be responsible for low HCT utilisation. In consonance with behavioural economic theory, if the individual places greater value than the potential benefits expected from HIV testing, then such individual may not want to take up the test even though it is offered for free (Ostermann et al., 2015; Njau et al., 2014; Thielman et al., 2006). Furthermore, HIV-related stigma is one of the non-financial factors which pose significant barriers to the successful implementation of HCT in high HIV burdened countries in Sub-Saharan Africa. HIV-related stigma is often manifested in the form of prejudice, discrimination, discrediting, ostracism, gossip, mockery, scapegoating, violence, refusal of treatment for individuals living with HIV/AIDS (Niang et al., 2003; Kalichman & Simbayi, 2003; Nyblade et al., 2005; Steward et al., 2008; Bos et al., 2013). HIV-related stigma also manifests at different settings such as an educational institution, workplace, health care system, religious institutions (Feyissa et al., 2012; Sekoni, Obidike & Balogun, 2012; Parker & Aggleton, 2003; Ulasi et al., 2009). Fear of knowing one's HIV status owing to the stigmatisation of HIV positive individuals has been documented in the literature as the primary source of barrier to utilisation of HCT among youth/students (Buldeo & Gilbert, 2015; Ndabarora & Mchunu, 2014; Nothling & Kagee, 2013); pregnant women attending antenatal health care facilities (Workagegn, Kiros & Abebe, 2015; Sarker et al., 2007), HIV care among PLWHA (Earnshaw et al., 2014; Earnshaw et al., 2016), and

general population (DeJesus et al., 2016; Bova et al., 2016; Bwambale et al., 2008; Ma et al., 2007). Although studies that demonstrated bivariate relationships between HIV serostatus with knowledge of HIV and stigma have been reported in the body of literature (Yang et al., 2006); however, little is known about the HIV-related stigma mediation effects on the relationship of HIV-related knowledge, HIV transmission misconception, perceived seriousness of HIV/AIDS and HCT service utilisation. Therefore, there is a need to investigate the mediating effects of HIV-related stigma within the conceptual framework of these relationships with the usage of HCT service in Nigeria.

1.3 Research Questions

Arising from the statement of the problem in the previous section of this chapter, the following fundamental research questions of which this thesis seeks to provide answers guide this study. The research questions are:

(1) What is the amount people are willing to pay (WTP) for HCT service in Nigeria? What are the determinants of WTP for HCT service?

(2) What are the health belief factors that predict HCT service utilisation in Nigeria? Are the relationships between the health belief factors and HCT utilisation moderated by sociodemographic factors?

(3) Does HIV-related stigma mediate the effect of relationship of HIV-related knowledge, HIV transmission misconception, and perceived seriousness of HIV/AIDS on HCT utilisation in Nigeria?

1.4 Research Objectives

Following the statement of the research problem surrounding the HCT service in Nigeria and research questions to provide answers for in this study, the following objectives are set to be achieved. They are:

(1) To assess the amount people are willing to pay (WTP) for HCT service and also to evaluate the determining factors of WTP for HCT service in Nigeria.

(2) To explore the health belief factors that predict HCT service utilisation in Nigeria and analyse the moderating effects of moderator variables on the relationships between health belief factors and HCT service utilisation.

(3) To investigate the mediating effect of HIV-related stigma barriers on the relationship of HIV-related knowledge, HIV transmission misconception, perceived seriousness of HIV/AIDS, and HCT service utilisation in Nigeria.

1.5 Significance of the Study

The strategic roles of HCT in the continuum of other HIV/AIDS programmes and in achieving UNAIDS 90-90-90 HIV treatment targets by 2020 and ultimately SDGs goals by 2030 cannot be overemphasised. Therefore, this study is very significant in the following ways:

(1) Findings from this study are expected to be useful for policymakers' decision because they show the extent of public support for HCT and can as well provide necessary information to guide them on enacting policies such as co-payments which are aimed at financial sustainability of the HCT programme and other HIV/AIDS programmes.

(2) Findings from health belief factors that predict HCT utilisation can assist in designing interventions or programmes that are rooted on people's perception of their vulnerability, severity of the disease, and benefits of taking an HIV test. Such well-designed programmes in which these factors are embedded can immensely contribute to the scaling up of HCT and thereby help in realising the 2030 Sustainable Development Goals (SDGs) in Nigeria.

(3) Unearthing and understanding the barriers to HCT could assist in increasing the participation in HCT thereby reducing HIV transmission rate among the general population in Nigeria.

(4) The findings could be used as a vital tool for assessment of other HIV/AIDS programmes within the Nigerian context.

(5) Findings from this study are expected to be of policy interest to other HIV hard-hit countries, especially in sub-Saharan Africa. Similar strategies can be adopted by other researchers in their settings or geographical areas following the guidelines provided in this study.

(6) The study is expected to significantly contribute to the existing body of literature, especially in the area of CV for HCT, health belief factors as applicable to HCT utilisation, and the role of HIV-related stigma on HCT service.

(7) Findings from CV can provide useful insights for the introduction HIV self-testing in the near future. HIV self-testing method which has been recommended by the World Health Organisation (WHO) to boost the uptake of HIV testing in the world is yet to be implemented in Nigeria.

1.6 Scope of the Study

This study focuses on one of the HIV/AIDS intervention programmes, HIV counselling and Testing (HCT), in Nigeria, and does not delve into other programmes. The study is limited to the general population above twenty years of age in three Local Government Areas (Alimosho, Ikorodu, and Surulere) of Lagos State, Nigeria. The study employed cross-sectional data collected at a point in time between May and July 2015.

1.7 Organization of the Thesis

This thesis is structured into seven chapters as described below:

Chapter 1 introduces the thesis by providing background to the study, problem statement, research questions and objectives, significance of the study. The chapter concludes with the scope and organisation of the thesis.

Chapter 2 presents a thorough literature review of the study. It reviews conceptual, theoretical, and empirical studies in the areas of HIV/AIDS and HIV Counselling and Testing (HCT), Contingent Valuation Method (CV), Health Belief Model (HBM) in the context of researches conducted in Nigeria, Africa and globally. The chapter is guided by the research problem identified in Chapter one and demonstrates research gaps in the study area. The chapter concludes with theoretical/conceptual framework and hypotheses developed for this thesis.

Chapter 3 discusses research methodology adopted for the study. It covers research design, research methods, population and sample, sampling procedure and sample size, variables and measurement scales development, data collection, data analysis methods, software used, and concludes with ethical considerations.

Chapter 4 presents the first analytical chapter, which deals with the analysis of the first objective of the study. The hypotheses pertaining to the first objective which is to assess the value and determinants of willingness to pay for HCT in Nigeria as highlighted in chapter 2 are analysed and results presented and followed by discussion.

Chapter 5 is the second analytical chapter. It answered the second objective of the study by analytically evaluating the health belief factors that predict HCT service utilisation and moderator variables. It concludes with presentation of the findings and discussions.

Chapter 6 centres on the third analytical chapter based on the third objective of the thesis. It deals with the analysis, presentation, and discussion of the mediating effect of HIV-related stigma constructs on the HCT service utilisation.

Chapter 7 is the last chapter that concludes the research. It begins with the summary of the significant findings based on the three primary objectives of this study, contribution to both theory and policy, limitation of the study. The chapter ends with suggestions for further research.

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

This chapter presents the literature review for the study, which focuses on the background information and research problem raised in the previous chapter in order to provide a broad understanding of the research topic and in a systematic way present the knowledge gaps to be filled in this research work. The chapter is divided into several sections: the review of literature concerning HIV/AIDS and HCT in Nigeria and other parts of the world, review of theoretical, methodological, and empirical studies concerning the three major research problems stated in Chapter One. Gaps in the literature were identified. The last section deals with theoretical and conceptual framework and hypotheses development tailored towards the three main objectives of this study.

2.2 HIV/AIDS in Nigeria – History and Government Response

The first HIV/AIDS case was identified in 1985 in Lagos, the former capital city and most populous city in Nigeria (Kanki & Adeyi, 2006). It was diagnosed by Professor Abdusalami Nasidi, former minister of Health, Federal Ministry of Health, and who is currently the Director General/Chief Executive Officer of Nigeria Centre for Disease and Control (NCDC). It was discovered in a thirteen years old girl who was a commercial sex worker from a neighbouring country in West Africa (Nasidi & Harry, 2006). The case was reported in 1986 at International AIDS Conference held in Paris, France (Nasidi, Harry, & Ajose-Coker, 1986). There was trepidation in the government circles when the case was reported to Nigeria Federal Ministry of Health (Nasidi & Harry, 2006).

The development of AIDS has gone through many stages/phases. Balogun (2010) identified three major phases of AIDS development in Nigeria:

Phase One - (the period between 1981 and 1986) - During this period, there was absolute denial in both government circles and the public, about the possibility of

discovery and the presence of the disease in the country. Nigerians held the belief that the disease was alien and also confined to distant lands which could never come to Nigeria (Balogun, 2010).

Phase Two – (the period between 1986 and 1997) – This period is described as the era of AIDS indifference, misconception, and scepticism. Nigerian public received the news about the presence of AIDS in the country with doubt and disbelief. Many took it as a mere hoax and also a ploy to discourage sex among the people, most especially youths (Eze, 2009). AIDS was derisively coined with different acronyms, such as '***A**merican **I**nventions/**I**deas for **D**iscouraging **S**ex*", just to express their scepticism because of their belief that the disease belongs to the foreign land (Balogun, 2010, p. 168). The poor reaction of the Nigerian public to the emerging disease was also entrenched in their religious and cultural beliefs which held that death is predetermined and something, somehow must kill a man/woman someday (Orubuloye & Oguntimehin, 1999; Adeokun, 2006). As a result, there were not much behavioural changes towards sex and sexual practices among sexually active people.

Phase Three- (1997 – Date) – during this era awareness about the presence and discovery of AIDS in Nigeria began to increase. In fact, the public declaration of the cause of death of foremost Nigerian musician Fela Anikulapo Kuti in 1997 contributed immensely to the acknowledgement of the presence of AIDS in the country.

2.2.1 Federal Government Response to HIV/AIDS

Just like other nations in the world, the Nigerian government initial response to the epidemic was rather slow with few actions taken at the early stage of the discovery of the disease. Government, people, religious leaders, and so on, regarded AIDS as foreign disease and God-sent punitive retribution for evildoing and waywardness of people (Caldwell, Orubuloye, & Caldwell, 1992; Caldwell, 2000). The interest of the

government then was the debate about the origin of the disease rather than considering it as a threat to the nation. Consequently, the HIV began to surreptitiously, mutely, and unnoticeably spread to different age groups, genders, all six geopolitical zones, 36 states, cities, towns and villages in Nigeria. The epidemic spread to every nook and cranny of Nigeria and became a generalized epidemic with substantial social and financial burdens on the individuals, households and governments (Mahal, 2007; Mahal et al., 2008; Canning, et al., 2006; Barnett & Whiteside, 2002; Caldwell, 2000; Kanki & Adeyi, 2006; Eze, 2009).

As the rate of infection kept increasing and more detections uncovered, the Federal Ministry of Health (FMOH) in 1986 set up a National Expert Advisory Committee on AIDS (NEACA) with the mandate to chart prevention and control strategies for the epidemic (Nasidi & Harry, 2006). In 1987, the comprehensive Medium-Term Plan to combat the HIV / AIDS battle in the country was implemented by FMOH under the guidance of NEACA and with the support of WHO. And the same year the first of nine HIV testing centres was established with the help of WHO. But in 1988, FMOH formally replaced NEACA with National AIDS Control Programme (NACP). In 1992, the former military ruler President Ibrahim Babangida-led Federal Military Government launched the National War Against AIDS (NWAA) (Balogun, 2010). It is noteworthy that the initial Government response was focused on health sector interventions, but in 1997 a multi-sectoral approach which cut across all sectors of national life was endorsed by the National Council on Health (NCH) (Apena, 2012).

An earnest effort to combat HIV/AIDS epidemic commenced when the country returned to democratic government in 1999. Former President Olusegun Obasanjo established the Presidential Council on AIDS (PCA) in 2000 and by 2001 National Action Committee on AIDS (NACA) was also created with a full mandate to oversee and coordinate overall

HIV/AIDS programmes involving all sectors of the nation. This initiative was also replicated at the state level by formation of State Action Committees on AIDS (SACAs) and Local Government level by the Local Action Committees on AIDS (LACAs). NACA was changed to a full-fledged Agency in 2007. It was charged with the responsibility of developing multisectoral strategies and policies aimed at prevention and control of HIV/AIDS in Nigeria. NACA collaborates with all other government ministries, parastatals, agencies, Faith-Based Organisation (FBO), Local Non-governmental Organisations (NGOs), International NGOs, etc. The first multisectoral response strategy which cut across all segments of the society and all organisations named, HIV/AIDS Emergency Action Plan (HEAP), was established in 2000. It highlighted more than two hundred short-term activities that were pursued by the FGN between 2001 and 2004. The goals of HEAP were to raise HIV/AIDS awareness, promote behavioural change, empowerment, and provision of care and support thereby mitigating the effects of AIDS (Nasidi & Harry, 2006; Eze, 2009; Balogun, 2010). Several programmes such as HIV Counselling and Testing (HCT), Prevention of Mother to Child (PMCTC), Antiretroviral Therapy (ART), Condom Programming and Family Life Health Education (FLHE) and so on were established to combat the epidemic (NACA, 2015). HCT was adjudged to be very strategic to other programmes because of its dual roles. It enables people to know their status and those who are tested positive can be treated by enrolling them on ART programme.

2.3 Lagos State: HIV/AIDS and HCT Situation

Lagos state is one of the oldest state created on May 27, 1967, by the then military government and is located in the south-west Nigeria. According to the 2006 national census, the population of Lagos state was 9,013,534 (NPC, 2006). The state is bordered in the north and east by Ogun state, in the west by the Republic of Benin, and in the south by the Atlantic Ocean. Regarding landmass, Lagos state is the smallest state in Nigeria

with an area of about 3,577km^2 inclusive of lagoons and creeks, but economically, with a GDP estimated at US$136 billion in 2017, it is regarded as the richest state in Nigeria (Ambode, 2017). The state is politically divided into three senatorial districts: Lagos West, Lagos East and Lagos Central. There are 20 Local Government Areas (LGAs) in the state and 57 Local Council Development Areas (LCDAs). The capital of Lagos State is located in Ikeja which also houses the seat of Government. The state is popular for its industrial, commercial, and investment activities, thus, serves as the economic hub of the nation.

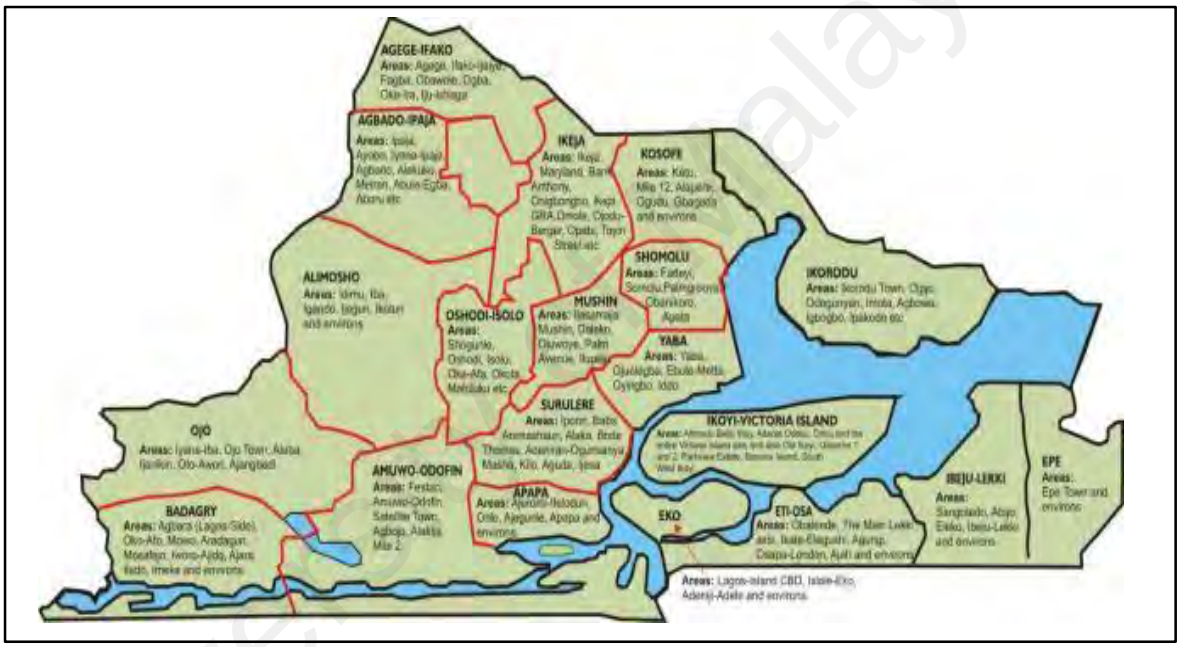

Figure 2.1: Map of Lagos State with the 20 Local Government Areas

Source:https://www.theinfostride.com/wp-content/uploads/2017/07/Lagos-State-Map-with-Local-Government-Areas.jpg

Lagos state, which is the area of this study, incidentally, happens to be the first place where HIV was discovered and holds the twentieth positions amongst states in the league table of HIV burden in Nigeria. The HIV prevalence rate was 2.2% (NACA, 2015). In Lagos state, the number of HCT centres increased significantly from 94 in 2012 to 650 in 2014 (Figure 2.2) (LSMOH, 2015) but the number of people tested for the HIV infection is still low when compare with the large population of Lagos state, which is presently above 20 million according to the report by the Lagos state government. In 2013, about

158,337 people were tested for HIV infection, but the number increased to 211,890 in 2014 showing about 34% increased (Figure 2.3). This amount is small when compares to the large population of Lagos State.

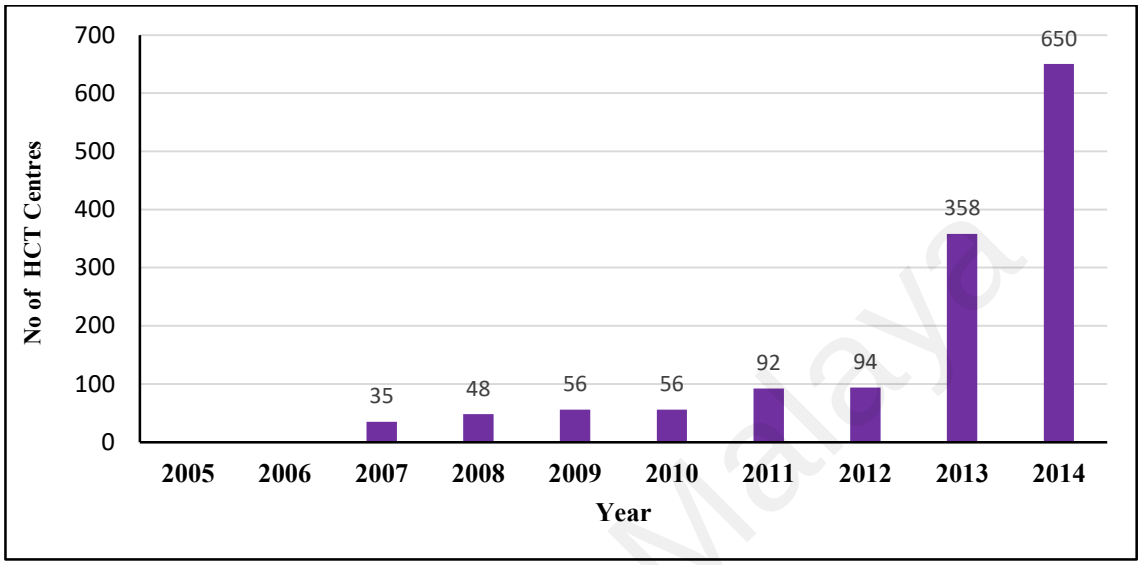

Figure 2.2: Total number of HCT centres established Lagos state between 2005 - 2014

Source: Lagos State Ministry of Health

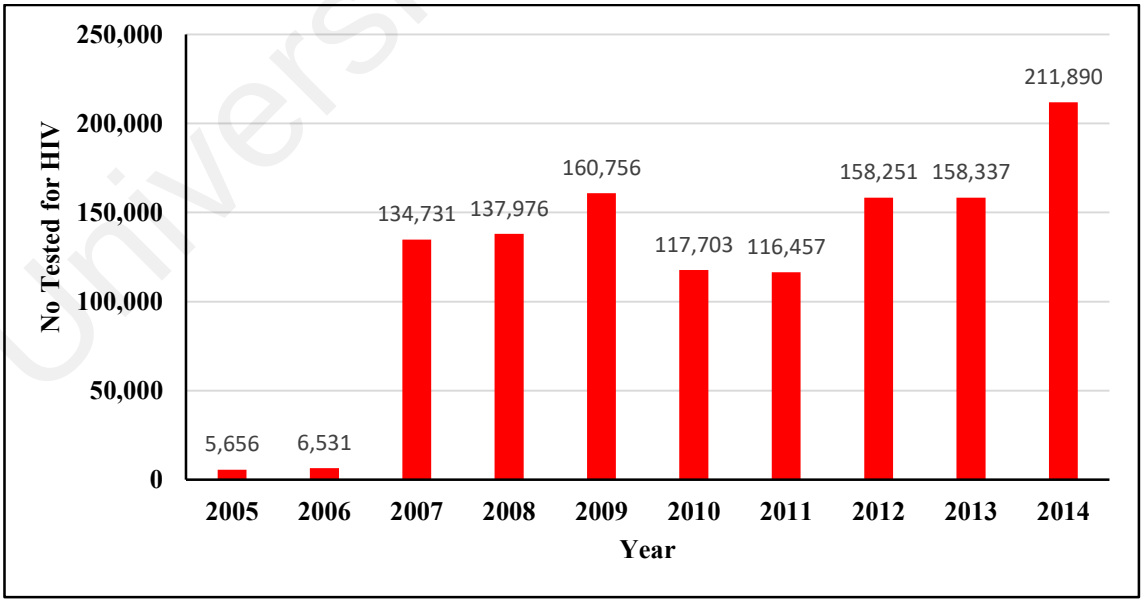

Figure 2.3: Total number of people tested for HIV in Lagos State – 2005-2014

Source: Lagos State Ministry of Health

Lagos State AIDS Control Agency (LSACA) is the operational agent tasked with monitoring HIV/AIDS activities in the state. Its operations are overseen by both NACA and Lagos State Ministry of Health. The Federal Government-owned NACA provides operational support and materials while the State government provides the necessary infrastructures and human resources needed for the smooth running of LSACA activities. LSACA primary function is to supervise and evaluate all HIV/AIDS activities in the state and also report to NACA. It works hand in hand with other stakeholders in the state such as non-governmental organisations (NGOs), faith-based organisations (FBOs) community-based organisations (CBOs), Local government AIDS control agency (LACAs), line ministries under state government, and development partners (NACA, 2010).

2.4 HIV Counselling and Testing (HCT) Services

Shortly after the discovery of the HIV that causes AIDS, the first HIV test became available in the mid-1980s. Before the discovery of effective HIV treatment, the benefits of HIV testing were severely questioned. Many people exhibited their ethical concerns and potential harms arising from HIV tests. However, with the discovery of antiretroviral therapy (ART) which potentially prolong and improve the productive lives of persons living with HIV (PLWHIV) in the mid-1990s, there have been dramatic and tremendous changes in strategies, technology, funding, and access to HIV testing (Staveteig et al., 2013).

HIV counselling and testing is regarded as a process by which an individual is made to pass through proper counselling to enable him, or her make an informed decision about being tested for HIV (Gatta & Thupayagale-Tshweneagae, 2011). HIV counselling "is a confidential dialogue between a person and a caregiver aimed at enabling the person to cope with stress and make informed personal decisions relating to HIV and AIDS"

(FMOH, 2011, p. 15). It involves pre-test counselling, post-test counselling, referral, and adherence counselling. In a pre-test counselling, the candidates are informed about the consequences of the HIV test results to prepare them mentally. In Nigeria, HIV testing is carried out in both public and private health facilities which include NGOs and FBOs. Several versions of HIV testing have evolved over the years. In the 1980s, conventional blood tests such as Enzyme-linked Immunosorbent Assay (ELISA) and Western Blot were in vogue. The scope and impact of this version were limited, because the materials and personnel required to run these centres were too expensive for developing countries. Also, the burden of returning to the test centres few days later to get the result, and coupled with the stigma associated with the HIV infection made many people abandoned the results after being tested. The second type, rapid test, was developed to take care of the encumbrances associated with the first type. (Staveteig et al., 2013; Greenwald et al., 2006).

2.4.1 HCT Service Delivery Approaches and Models in Nigeria

In a bid to stimulate demand and overcome all encumbrances to HCT, such as misconceptions and low awareness of HIV test, stigma and discrimination associated with HIV testing and AIDS, inadequate coverage and access to HIV treatment and care services; Nigeria adopts the following approaches and models to deliver HCT service to the people in the country.

2.4.1.1 HCT service delivery approaches

- **The Client-initiated approach** – this is the traditional approach whereby an individual voluntarily seeks to be counselled and tested for HIV.
- **The Provider-initiated approach** – This approach entails provider of health care services routinely recommending an HIV test as part of the medical care being offered to the patient in the health facility. This approach utilises two strategies,

opt-out and opt-in. In opt-out strategy, all the patients in the health facility are duly informed either orally or in writing that an HIV test would be conducted on them and that they have option to decline to be tested. This strategy is adopted in Nigeria. On the other hand, in the opt-in strategy, health workers might discuss the potential benefits of having an HIV test and the availability of test in the health facility. Nevertheless, the patients themselves must decisively and specifically request to be tested (FMOH, 2011; Kennedy et al., 2013; Galletly, Pinkerton & Petroll 2008).

2.4.1.2 HCT service models

The service delivery models in Nigeria are as follows:

- **Stand-alone model** – In this model, client-initiated HCT services are located outside health facilities and they also render other HIV support services and care to the general public (FMOH, 2011). Stand-alone HCT centres can be wholly owned by the public or private entity such as NGOs.
- **Integrated health facility model** – HCT services are provided within the health facilities and also integrated into other health services provided within the health facilities such as family planning (FP), tuberculosis (TB), sexually transmitted infections (STIs), out-patients, inpatient, and maternal and child health (MCH), antenatal care (ANC). Both provider-initiated and client-initiated HCT services are provided in this model (FMOH, 2011; WHO, 2015)
- **Mobile/Outreach model** – in this model, provision of both provider-initiated and client-initiated HCT services are available to special populations with peculiar characteristics. These special populations include; hard to reach people, such as people living in the remote areas where there are no hospitals or clinics, nomads, fishermen, housewives or women in purdah; high-risk populations, such as men

who have sex with men (MSM), injection drug users (IDU), long-distance drivers, prisoners. Mobile HCT is provided at workplaces, special events (FMOH, 2011; Staveteig et al., 2013).

- **HIV Self-testing (HIVST)** – To enhance the uptake of HCT service within the general community and among the key population in order to meet the 2030 Agenda for Sustainable Development Goals (SDGs) and 90-90-90 HIV treatment targets for 2020, World Health Organisation recommended HIV self-testing (HIVST). HIV self-testing is "a process in which a person collects his or her specimen (oral fluid or blood) and then performs an HIV test and interprets the result, often in a private setting, either alone or with someone he or she trusts" (WHO, 2016, p.1). It is a complementary approach to reach those who are yet to be diagnosed with HIV owing to fear of stigma and discrimination associated with being HIV positive, long distance to clinics, and lack of confidentiality. Since the introduction of HIVST, 40 countries already had supportive HIVST policies while 48 countries are still developing the policies for the full implementation of HIVST. Nigeria is yet to fully develop and implement HIVST policy. The only currently approved HIVST in Nigeria is Amethyst HIV 1 & 2 test Kit with a recommended retail price of $16 (N5, 840) (UNITAID, 2017). It is hoped that as many countries implement policies to enhance uptake of HIVST the world will make progress toward realisation of the 2030 goal of eradicating HIV/AIDS.

2.4.2 Benefits of HCT in the Continuum of HIV/AIDS Programmes

HCT service is a very important HIV/AIDS programme in this era of devastating epidemics. It enables individuals to know their HIV status and individual's knowledge of his/her status is very germane to HIV response to discourage risky behaviour, thus reduce the chance of transmission (WHO, 2015). It facilitates access to care, treatment and support services, prevents transmission of HIV from mother to child (UNAIDS, 2016). A

negative HIV result provides motivation for individuals to adopt appropriate HIV prevention behavioural change (MacPhail et al., 2008); while a positive result could lead to an individual having an early access to ART treatment and care with assured better outcomes (Sweat et al., 2000; UNAIDS, 2015).

HCT is beneficial to the community by helping to minimize denial, stigma and discrimination and thereby leads to collective responsibility and action (Sweat et al., 2000; WHO 2005; Alemayehu, 2015). And to the entire population, HCT is beneficial because it creates awareness which can influence policy environment, normalise HIV/AIDS and reduce stigma and discrimination in the general population (Fonner et al., 2012; Denison et al., 2008).

Review of past studies by Higgins et al. (1991), Wolitski et al. (1997), Fonner et al. (2012), found that HCT can lead to reduction in risky sexual behaviour which culminate in a decrease in probability of transmission of HIV to others. Also, Weinhardt et al. (1999) asserted that HCT can be a proven behavioural change strategy, especially for PLWHIV. Denison et al. (2008), using meta-analytic method of systematic review of seven studies conducted in developing countries, assessed the effectiveness of HCT in reducing risky sexual behaviour. The results of the studies showed that those who have been tested for HIV were significantly less likely to engage in unprotected sexual practices than those who have not been tested. Also, HCT is affirmed to be a highly cost-effective intervention to reduce high-risk behaviour and transmission of HIV infections in many resource-limited Africa settings (Sweat et al., 2000; Forsythe et al., 2002; Thielman et al., 2006). Other programmes such as Antiretroviral Therapy (ART), Voluntary medical male circumcision (VMMC), Prevention of mother-to-child transmission (PMTCT), pre-exposure prophylaxis (PrEP), post-exposure prophylaxis (PEP) also contribute immensely to reducing transmission of HIV and morbidity and mortality relating to HIV

(UNITAID, 2017). However, HCT plays a unique role amidst other HIV/AIDS programmes.

The more people are aware of the HIV status, the less the transmission of the epidemic. The general reports all over the world show that individuals HIV status awareness is still low. For instance, Dailey et al., (2017), reported that about 15% of the 1.1 million people living with HIV (PLWHIV) in the United States were unaware of their status. And among these PLWHIV who were not aware of their serostatus, 44% of them were young people aged between 13-24 years (CDC, 2017). Also, Staveteig et al. (2013) reported that over 50% of PLWHIV in the SSA did not know that they have been infected with the virus. In Nigeria, NARHS 2012 reports showed that only 23 % males and 29% females have been tested for HIV (NACA 2015). When a person is not aware of his/her HIV status, he/she may inadvertently transmit the virus to others. Mark, Crepaz & Janssen (2006) estimated that the rate of HIV transmission through sexual intercourse was 3.5 times higher among those who are unaware of their HIV serostatus than those who knew their status in the US.

Despite the benefits of HCT, the utilisation rate of the services is still low. In Nigeria, available statistics show that testing rate is lower among men than women (Table 2:1) (NACA, 2015). The rate is higher for females who were older than fifteen years in comparison with males above fifteen years. This may be attributed to the fact that HIV testing has been made an integral part of antenatal care for the pregnant women (UNAIDS, 2015). The total number of individuals tested for HIV is extremely low when compared with the estimated NDHS 2013 population estimates (Table 2.1). According to UNAIDS (2017) global HIV/AIDS reports, only 34% of people living with HIV in Nigeria knew their status.

Table 2.1: Number of People Counselled and Tested in 2012, 2013, 2014

Indicators	Achievement						NDHS 2013 Population Estimates
	2012	%	2013	%	2014	%	
Males <15	80,268	3	203,427	5	397,851	6	39,127,615
Males 15+	1,199,533	43	1,698,672	42	2,795,116	42	48,451,084
Females <15	83,536	3	191,262	5	375,138	6	37,334,281
Females 15+	1,429,274	51	1,923,840	48	3,148,377	46	49,594,559
Total	**2,792,611**		**4,017,201**		**6,716,482**		**174,507,539**

Source: FMOH 2014, Annual report on HIV/AIDS health sector response in Nigeria

2.4.3 The Role of HCT in 90-90-90 Targets by 2020 and SDGs 2030 Goals

The place of HCT in achieving HIV/AIDS 90-90-90 treatment targets for the year 2020 and the sustainable development goals 2030 cannot be overemphasised. As the world inched towards the end of the Millennium Development Goals (MDGs) in 2015, with the apparent failure to reach the targets and commitments of the 2011 Political Declaration on HIV and AIDS, another target known as 90-90-90 treatment targets was set up to be accomplished in 2020 to ensure HIV/AIDS is wholly eradicated by 2030 based on the Sustainable Development Goals (SDGs) set up by the United Nations (UNAIDS, 2014). There are 17 goals to be achieved in the SDGs. The third goal which is "good health and well-being", seeks, among other things to end epidemics such as AIDS, malaria, tuberculosis, waterborne diseases. The 90-90-90 targets focus on three issues, the first 90 refers to ensuring 90% of people living with HIV know their status, the second is to ensure that at least 90% of those diagnosed of HIV receive adequate and sustained antiretroviral therapy (ART), and lastly, to ascertain 90% of those receiving ART have viral suppression in their body. It is believed that if these three goals are realised by 2020, the world may experience eradication of AIDS, which will invariably lead to profound health and economic benefits (UNAIDS, 2017). HCT is very critical to achieving the first target, because if people do not go for HIV testing in order to know their serostatus, it will be challenging to diagnose those who have been infected and enrolling them for ART treatment. Consequently, the second and third targets will be defeated. For Nigeria that

has the second largest HIV prevalence in the world to achieve the 90-90-90 HIV targets by 2020 and SDGs 2030, great efforts must be made to enhance the uptake of HIV testing in the country.

2.4.4 The Impact of HIV-related Stigma on HCT Uptake

The importance and usefulness of HCT to the entire spectrum of HIV/AIDS intervention programmes cannot be overemphasised. HCT is significant because it serves as an entry point to both prevention and treatment care. Provision of HCT in Lagos State and Nigeria, in general, has expanded over the years. However, utilisation of the service is still a major concern to all stakeholders. HIV testing in Nigeria is facing a lot problem. These include, amongst other things, inadequate financial support for the smooth running and provision to all and sundry due to dwindling support from the international donors, wrong perception of the people that the HCT is meant for those infected with HIV, HIV stigma and discrimination against PLWHA, inadequate supply and logistic problems associated with HIV test kits (NACA, 2014). Identification and addressing these barriers may eventually lead to the uptake of the service and hence made UNAIDS and WHO 2030 HIV/AIDS goals and targets realisable.

Prominent among the barriers to HCT is HIV-related stigma. According to Goffman (1963, p. 13), stigma is defined as 'an attribute that is deeply discrediting'. It is an attribute that diminishes an individual to a smirched and abated one in the eyes of the society. The presence of such stigma in an individual makes him a potential object of discrimination, in which negative or unsavoury actions are taken against him. Stigma is regarded as a negative judgement cast by the society which is often generated by fear, ignorance and false belief; discrimination, on the other hand, is the result of actions that limit or outrightly deny individuals from enjoying their rights (WHO, 2015). Stigma and discrimination are often manifested in multifarious forms such as; isolation, outright

rejection, job loss, job denial, eviction from rented apartment, denial of admission into school, expulsion from schools, ostracism, gossip, mockery, scapegoating, violence, denial of treatment (Niang et al., 2003; Kalichman & Simbayi, 2003; Nyblade et al., 2005). They also manifest at different settings and contexts such as institutions-education and school, employment and workplace, health care system, religious institutions; community contexts - cultural belief, family contexts and individual. All these take place in diverse settings such as the workplace, hospitals, religious institutions and community; thus violating their fundamental human rights (Parker et al., 2002; Parker & Aggleton, 2003; Feyissa et al., 2012; Ulasi et al., 2009, Sekoni 2012).

Many studies have suggested that stigma might have mediating role in determining whether people will be willing to partake in HCT services or not. In a survey conducted in two northern states of Nigeria – Bauchi and Kano; Babalola (2007) estimated that perceived stigma and social norms were reliable predictors of readiness of the young people for HIV testing. Many of the respondents who expressed their willingness to have an HIV test expressed their worries about the outcome of the results of the test in case it turns out to be positive. Also, in another related study conducted by Daniel & Dolapo (2006), on pregnant women receiving antenatal care at PHC in Ogun state, Nigeria, revealed that self-perception of not being at risk of HIV infection and awareness of the benefits of testing for HIV for pregnant women were independent predictors of HCT. Also, among those who declined to be tested stated stigmatisation and discrimination as major barriers to their decisions. Odimegwu, Adedini, & Ononokpono (2013), examined the community attitudes, perceptions and feeling towards PLWHA and their association with uptake of HCT in Osun state, western part of Nigeria and Imo state, eastern part of Nigeria. They concluded that HIV-related stigma is a significant predictor of HCT utilisation in the country. Musheke et al., (2013) in their meta-analytic reviews identified failing health, death of child or partner of the respondents as significant factors that are

encouraging uptake of HCT. On the other hand, perceived low risk of HIV infections, perceived lack of confidentiality among the health workers involving in the testing services, financial costs, gender inequality, perceived difficulty in living and coping with HIV infection, and fear of HIV-related stigma are substantial barriers to uptake of HCT services in Sub-Saharan Africa.

Furthermore, Merten, Ntalasha, & Musheke (2016) investigated the reasons why children caregivers in urban and rural settings in Zambia did not seek for HIV test for the HIV-risk children. Using a mixed-method approach their results indicated that negative reactions from the family, stigmatising attitudes from neighbour and social norms prevalent in the communities are responsible for non-uptake of the services in the area. Angotti et al., (2009) in their study using qualitative approach, identified three factors that enhanced the uptake of door to door rapid HIV testing in rural Malawi as convenience, confidentiality, and credibility. The participants were more willing to accept HIV testing being offered because it was convenient for them as it was brought to their doorsteps instead of travelling to the HIV testing centres situated in distant health facilities. The rapid door-to-door HIV testing helped them overcame the prohibitive factors such as distant location of HIV testing centres, direct and opportunity cost of travelling to the testing centres and waiting time to be attended to by the service providers as identified in the extant studies (Thornton, 2008; Morin et al., 2006). Also, the participants were willing to participate in the HIV testing because of the reassuring confidentiality it offered. The preference of the participants in having HIV testing in their houses rather than in the health facilities relates to the lack of trust in the health personnel in keeping their positive serostatus secret which may invariably expose them to stigmatisation among the villagers (Adebajo, Bamgbola, & Oyediran, 2003). Furthermore, the participants favourably responded to the rapid HIV testing because of their perceived credibility of the results of the test as result of the improved technology of the rapid blood test which guaranteed

instant results as opposed to the HIV test results in the health facility which could take days. The rapid HIV testing ensured that the results were not tampered with nor swap for another clients, eliminated waiting time anxiety, and provided accurate results (Hutchinson et al., 2004; Marum et al.,2006; Sangiwa et al., 2000). These three factors, convenience, confidentiality, and credibility, helped to overcome the fear of stigma attached to being tested positive for HIV. Ayenew et al., (2010) in their study on acceptance of HIV testing among TB patients in Ethiopia, showed that patients who refused to be tested attributed their non-acceptance of HIV testing due to public stigmatising attitudes towards People living with HIV in the community. Bwambale et al. (2008) in a population-based cross-sectional survey in the rural Uganda explored potential barriers to the utilisation of HCT, highlighted poor access, HIV-related stigma, and confidentiality of the services as major barriers to the usage of the of HCT. Kalichman & Simbayi, (2003), in their study in a black township in Cape Town, showed that AIDS-related stigma was higher among those who have not been tested than those already tested. Stigma and discriminating attitudes were confirmed as substantial barriers to the treatment of PLWHA in a study carried out among the medical and dental students in Malaysia. The study unveiled that women exhibited higher discrimination than their male counterparts (Earnshaw et al., 2016; Earnshaw et al., 2014). A survey among healthcare workers in Laos affirmed that lower level of knowledge about HIV/AIDS were associated with higher levels of stigmatisation against PLWHA (Vorasane et al., 2017). Golub & Gamarel (2013), in their study on the sample of men who have sex with men (MSM) and transgender women in the New York city examined their anticipated stigma in relation with HIV testing behaviour. They discovered that anticipated stigma played a significant role as a predictor of HIV testing behaviour amongst the MSM and transgender women. In a mediational analysis of the role of HIV-related stigma on the relationship between misconception about the transmission of HIV and willingness to disclose HIV positive

status, Yang et al., (2006), found stigma to play a major role in mediating between the two variables. The study concluded that a reduction in the stigma associated with HIV should be accorded higher priority for HIV prevention programmes such as HIV testing and counselling, ART, and so on to succeed. Concisely, fear of stigma and discrimination associated with HIV/AIDS seems to be the significant and most common barriers to utilisation of HCT in Nigeria and elsewhere.

2.5 HCT and Contingent Valuation (Willingness-to-Pay) - Theoretical and Empirical Considerations

CV as a method of economic evaluation has been used for over six decades in the developed countries, but its application in the developing countries was more recent. CV has been widely used in various fields such as environmental economics, transport economics, water supply services, air quality, forest protection, natural resource. In the field of health economics and health intervention by the government or donor agencies, there has been upsurge growth in its application in developing countries few decades ago. (O'Brien 1995, 1996). However, its use in HCT studies is very scarce.

2.5.1 A Brief History of Contingent Valuation (CV)

The idea of using CV as a public policy tool was first suggested by French Engineer and Economist Jules Dupuit in 1844, but the application of CV as a method of assigning values to benefits for goods was dated back in the 1940s (Hanemann, 1994). Hoyos & Mariel (2010), asserted that the history of CV can be grouped into three periods. The first period, (1943-1989), covered the origin of the CV method till the time of Exxon Valdez accident. Bowen (1943) and Ciriacy-Wantrup (1947) were regarded as the first researchers to propose the use of public opinion survey CV to value public goods. These authors believed that asking individuals to vote for a good is akin to or a close substitute for the consumers' choice. Ciriacy-Wantrup (1947) whose article focused on the

evaluation of the economic effects of prevention of soil-erosion, suggested that in order to obtain useful information on the demand for these effects, individuals should be asked how much they will be willing to pay for successive increment in the soil-erosion prevention. Nevertheless, the study did not provide rigorous empirical evaluation. However, it was not until about twenty years later the first empirical study on the CV was conducted by Davis (1963a). Davis in his research, simulated market behaviour scenarios in which interviewers posed as sellers to obtain information on how much the users would be willing to pay for alternative outdoor recreation facilities if the cost of using the recreation areas should increase by a certain amount (Davis, 1963b). It is noteworthy that the main force behind the increased empirical development in CV at that period was outdoor recreations (Hoyos & Mariel, 2010).

The second period spanned between 1989 and 1992. This period covered the Exxon Valdez oil spill which was the largest in the US history, which led to severe degradation of the environment (about 1,300 kilometres coastlines) and destruction of animals (23,000 birds). A panel of experts and researchers, known as the National Oceanic and Atmospheric Administration (NOAA) which was coordinated by Richard Carson, employed CV to verify non-use values resulting from the oil spill. Nobel Laureates Kenneth Arrow and Robert Solow were appointed as chairpersons of the panel, and the results were published in 1995. This is an essential benchmark in the history of CV.

From 1992 onward, marked the third phase of the development of the CV. Contingent Valuation gained more popularity as a non-market valuation technique in both academic and political arenas (Hoyos & Mariel, 2010). It became the dominant technique for non-market environmental costs and benefit valuation (Frew, Whynes, & Wolstenholme, 2003).

2.5.2 Concept of Contingent Valuation Method in Health Programmes

CV is a survey-based technique that is often used to estimate monetary values for health programmes. It presents a hypothetical market where respondents are asked to state their preferences or how much they are willing to pay or willing to accept under different scenarios (Carson, 1997; 2000). According to Wattage (2001, pg. 4), "The CV method aims to construct a hypothetical market for a good or range of goods (as realistic and structured as possible) in a survey setting". CV approach uses "survey method to present respondents with hypothetical scenarios about the programme or problem under evaluation" (Drummond et al., 2005, p.184). It is used to elicit stated preference in which "respondents are required to think about the contingency of an actual market existing for a programme or health benefit and to reveal the maximum they would be willing to pay for such a programme or benefit" ((Drummond et al., 2005, p.84). The benefits of health programmes could be improvements in the health status of an individual and the value attached to process of care. Benefits of a good or service can be calculated by determining the amount that consumers would give up to obtain that good or service.

2.5.3 Willingness to Pay (WTP) and Subjective Utility

WTP is based on the concept of subjective utility. The subjective utility is assumed to depend on the individuals' disposable income, length, and quality of life. According to Zweifel & Kifmann (2009), the relationship can be expressed in the equation below.

$$U_i = U_i(\theta_i, y_i)$$

Where U_i is the utility for individual i, y_i is the disposable income for the individual, and θ_i is the vector of length and quality of life.

Thus, WTP is formally defined as the amount that must be removed or deducted from the individual's income while keeping his utility constant.

The equation is expressed thus:

(1) $V(y_i - WTP_i, p, q_1; Z) = V(y, p, q_0; Z)$

V = indirect utility function; y = income; p = vector of prices faced by the individual; q_0 and q_1 are alternative levels of the good or quality indexes (with $q_1 > q_0$, indicating that q_1 refers to improved health quality)

Willingness to Accept (WTA) for a good is defined as the amount of money that must be given to an individual experiencing a deterioration in environmental / health quality to keep his utility constant.

(2) $V(y_i + WTA, p, q_0; Z) = V(y, p, q_1; Z)$ (Alberini & Cooper, 2000, p.2)

In both equations, utility depends on vector of individual characteristics that are influencing the trade-off between income and health service. Alberini & Cooper (2000), suggested that WTP should be regressed on income and other variables to verify the internal validity of the WTP responses in order to ensure that WTP correlates predictably with these variables based on the theory.

2.5.4 Contingent Valuation and Consumer Surplus

The French Engineer and Economist Jules Dupuit who first mooted the idea of CV argued that the benefits of public projects should be based on consumer surplus (Dupuit, 1844; Houghton, 1958). The theory of consumer surplus has several assumptions. They are: the market is assumed to be perfectly competitive which implies that there are many firms in the market which are smaller in comparison to the industry and thus have no power to influence prices; the price is determined by the interaction of demand and supply in the entire market. There is a freedom of entry and exit, and products of the firms are homogenous. It also assumes both consumers and producers have perfect knowledge of the market. Producers are aware of prices, costs and market opportunities while

consumers are aware of the price, quality and availability of the product. Demand curve shows the amount of good or service individuals are willing to pay for at a specific price. The shape of the curve is downward sloping indicating that for each additional unit purchased the marginal utility, which is the satisfaction that consumers derived from consuming a good or service, tends less and less until the individuals are unwilling to pay for the good in question. This is illustrated in the Figure 2.4 below. From the figure, ABD represents the demand curve for a particular good or service and the total private benefit regarding utility that the consumer derives from consuming at quantity Q_1 at price P_1 is the area $OABQ_1$. The amount spent by the consumer is determined by market price they pay, which is P, and the quantity they purchase, Q. The total amount spent is then P x Q or area OP_1BQ_1. It then follows that consumer surplus is the area, $ABP_1 = OABQ_1 - OP_1BQ_1$. Consumer surplus is essentially the difference between what the individual consumer is willing to pay and what he/she has to pay. Producer surplus is P_1BE. The area under the demand curve is akin to willingness to pay for the good of all individuals in the society and is the sum of all the rectangles under the demand curve.

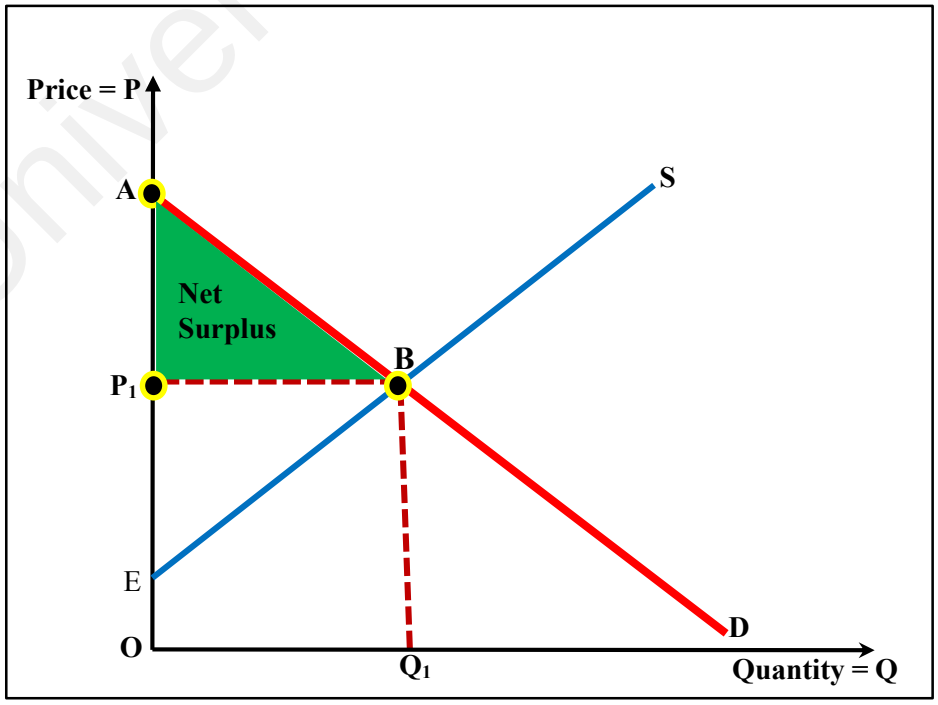

Figure 2.4: Consumer and Producer surplus

2.5.5 Goals of Contingent Valuation Application

There are three primary objectives of conducting CV studies according to Forsythe (2001).

(1) **Cost Recovery and Price Setting** – in the field of health, CV study can be used when cost recovery is the priority. It is usually conducted to assess the amount consumer of a good or service can pay in order to have an idea of how much can they can be charged. CV studies are performed to set prices for socially marketed products such as condoms, family planning services, and STI treatment. It is used when cost recovery is the priority. Few studies have been conducted in line with this CV goal. For instance, Nguyen et al. (2016) used CV to estimate the willingness of the people to pay for Voluntary Counselling and Testing in the two HIV epicentres in Vietnam to inform co-payment VCT scheme for financial sustainability. In the same vein, Nguyen et al. (2017) employed CV to estimate the willingness to pay for viral load testing and CD4 count among the people living with HIV in Vietnam to inform a co-payment policy.

(2) **For Litigation Purposes** – CV was used to estimate the societal impact of the Exxon Valdez oil spill in the USA and the liability incurred by the oil company. The panel that was set up and chaired by Arrow and Solow, conducted a survey using CV to ask those within and outside the affected areas how much they would be willing to pay to avert such similar spill in the future (Arrow et al., 1993; Carson, 1997).

(3) **As a Measure of Benefits in Cost-benefit Analysis (CBA**) – in this case, CV is usually performed to determine the value an individual or community placed on a particular service or good being offered. The primary consideration when this type of CV is performed for CBA is that all potential gainers or beneficiaries, that is, both users and non-users of the good or service needed to be considered. Forsythe (2001) used CV method to estimate benefits in the Cost-benefit analysis of three HIV services: Voluntary Counselling and Testing (VCT), AIDS care, and AIDS vaccine in Kenya.

2.5.6 Contingent Valuation - Survey techniques

There has been a great debate in the CV literature regarding the most appropriate instrumentation techniques to employ in the CV survey. WTP data can be elicited from individuals by directly querying them, using different survey methods such as; telephone survey, mail survey, and in-person interviews. Telephone and in-person interviews afford the respondent's opportunity to ask questions, whereas it is impossible in the mail survey (Alberini & Cooper, 2000). Also, mail survey does not give room to conduct follow-up questions based on the previous answers given by the respondents about their willingness to pay. Telephone and mail surveys are considered cheap to perform but they produce low-quality WTP data. In-person or person-to-person or face-to-face interviews produce the highest quality WTP data, although it is costly and labour intensive to implement. With face-to-face instrumentation technique, any WTP question design can be applied unlike the mail survey which has limited elicitation format (Carson et al., 1998). Nonetheless, there are concerns that this method could create interviewer bias, that is, some factors might influence the respondent's answers to the WTP questions being asked. Most developing countries are characterised by low literacy rate and high level of poverty which make it difficult for many to own telephone; thereby limiting the practicality of using telephone and mail surveys in carrying out the CV study in such places. Consequently, person-to-person interview will be more appropriate in such circumstances. From the foregoing, there is no consensus in the health literature as to which elicitation format is the best for the WTP survey study. Several researchers have used different methods in estimating WTP in their studies. Onwujekwe et al. (2010), Uzochukwu et al. (2011), Asenso-Okyere et al. (1997) and Shafie & Hassali (2013) employed bidding game approach; while Dror, Radermacher, & Koren (2007) used unidirectional bidding game approach. While some studies used only one elicitation format, other studies used combination of two formats for comparison purposes. For

instance, Dong et al. (2003a) and Dong et al. (2003b), compared Take-It-Or-Leave-It (TIOLI) and Bidding Game (BG) methods in their willingness to pay studies of community-based health insurance (CBI). They found that both TIOLI and BG yielded same pattern of elicited WTP for CBI but BG produced higher and more reliable elicited value than TIOLI. A survey for the screening of the colorectal cancer by Whynes, Frew, & Wolstenholme (2003) compared an open-ended questions and payment scale elicitation formats. They found that the higher completion rate was associated with payment scale and the elicitation format generated higher value than open-ended questions. Ryan et al. (2004) in their CV survey on the three alternative health care interventions, compared the payment card (bidding approach) with the dichotomous choice ('take it or leave it' approach). They found that the higher estimates of WTP was consistently associated with dichotomous choice and there was no evidence of range bias in this format. Meanwhile, this study adopted Forsythe (2001) which combines payment scale questions with the iterative bidding game to avoid start-up bias and improve the quality of WTP data.

2.5.7 Bias issues in Contingent Valuation

In administering CV survey using any methods enumerated above, some biases might crop up right from the design to implementation of the survey (Frew, 2010). These biases together with their sources are described below.

Values cues – All CV elicitation formats except an open-ended format potentially provide cues which can influence the respondent stating their maximum WTP. Values cues are divided into two parts namely: (i) **Anchoring effects**: This problem is peculiar to the iterative bidding game technique of CV. Starting point bias can occur when the starting bid influences the respondent. Also in close-ended format, extreme starting point can happen when the respondent answer yes to all questions being asked regardless the amount stated. To help eliminate this bias problem, it has been suggested that the starting

bid administer in the CV survey should be randomly generated (Frew, 2010). **(ii) Range Bias** – This is another value cues common to payment scale method of elicitation. It a situation where the respondent is influenced by the range of values in the payment scale format.

Strategic bias – This occurs when respondents advertently overstate or understate his/her true WTP value. Protest responses from respondent can also arise whereby he/she protest against the programme by stating the zero response or any amount that is exceptionally high or low. They can indicate zero value because they believe the cost should be borne by someone else.

Question ordering bias – the way and manner the WTP questions were ordered could influence respondents' answer to the questions.

2.5.8 Validity of Contingent Valuation

CV validity focuses on whether the estimated value really measure the theoretical construct being investigated. Mitchel & Carson (1989) proposed three criteria for assessing the validity of measure of CV which are content, construct, and context validity.

(i) Content validity – This is concern about the quality of the CV survey instrument used to realise the measure. Content validity focuses on whether the items to be valued are clearly described to the respondents, payment vehicle is acceptably reasonable, right questions are asked, and respondents provide answers to the questions being asked (Brown, 2003). Content validity will reduce if the questions in the survey instrument create a kind of incentive for respondents to answer. Failure of CV survey instrument to describe how the payment will be made (payment vehicle) can create a bias in answering CV questions. (Mitchell & Carson, 1989).

(ii) Criterion validity – According to Brown (2003), this "refers to the comparison of the stated-preference measure with some other measure (the criterion) that is closer to the theoretical construct under investigation" (p.99).

(iii) Construct validity – "Construct validity deals with whether the measure under investigation relates to other measures as predicted by theory" (Brown, 2003, p.99). In other words, the scenario being portrayed in the survey must comply with economic theory. For example, WTP in CV must be examined to see how it varies with income in which theory suggested that there is positive correlation between the two variables (WTP and Income) (Mitchel &Carson, 1989).

2.5.9 Contingent Valuation and HIV/AIDS and HCT programmes – Empirical issues

CV method of economic evaluation of HCT, in particular, has received less attention since the start of the epidemic. There are few studies in the area HIV/AIDS programmes, but studies that dealt with HCT, especially in the Nigeria context, are very scarce. The literature search in the web of science database for contingent valuation (WTP) for HCT in the Nigeria context yielded very few results. There were few WTP studies on HIV vaccines, viral load and CD4 count tests, condom usage et cetera. A WTP study of private demand for hypothetical HIV/AIDS vaccine that could provide a lifetime protection against HIV was carried out by Whittington et al. (2002), in the Mexican Guadalajara city. The CV survey was administered to 234 adults aged 18-60 years. The results of the research showed that individuals were willing to pay for the vaccine and thus ready to allocate a substantial proportional part of their income to be protected from HIV infection which suggested a potential market for sale of the vaccines. Also, individuals with higher incomes, those whose spouses are deceased, and those who perceived themselves to have higher HIV risk were willing to pay higher. In the same vein, another study among Thailand respondents' private demand for HIV vaccine produced similar results, which

revealed that determinants of demand for HIV vaccines are income, risk of infection, vaccine efficacy, price of the vaccine, and age of the respondents (Suraratdecha et al., 2005). Another CV study utilised WTP approach among the households in Thailand revealed spouses were willing to purchase the same number of HIV vaccines, but wives prefer allocations of the vaccines to the daughter in the family rather than sons (Whittington et al., 2008). A study in two rural areas in Kenya by Forsythe et al. (2002), employed CV in a cost-benefit analysis study, which aimed at examining the cost and WTP for VCT. The study found out that lower cost and minimal user fee could make HIV counselling and testing financially sustainable, and further suggested that VCT services should be integrated into the existing health centres using the current staff that can be hired to perform the counselling to reduce the cost.

In Nigeria, Uzochukwu et al. (2011) examined the level of HIV/AIDS awareness among University students in Enugu State in the eastern part of the country and their WTP for HCT. Their report indicated that many of the respondents (about 64%) had heard of HCT, but surprisingly, majority of the respondents (81%), had not utilised the service. In their study, WTP for VCT among the tertiary institutions' students in south-eastern part of Nigeria was assessed using the bidding game format of CV elicitation; it was found out that 64% of the respondent were willing to pay for the service, and the mean WTP is ₦300 ($0.83). In the study, income of the respondents was not considered in the analysis. Thus the construct validity of WTP could not be established.

Studies that employed CV techniques to inform co-payment policy for the sustainability of the HCT programme are very scarce. Two studies related to this phenomenon are Nguyen et al., (2016) and Nguyen et al., (2017). Both studies were conducted in two HIV/AIDS epicentres in Vietnam and utilised double-bounded dichotomous-choice questions in combination with open-ended questions to elicit WTP among the clients.

Nguyen et al., (2016) concentrated on WTP for HCT and the findings revealed that majority of the clients were willing to pay for the service with the mean WTP at $7.75. Respondents with higher education were willing to pay higher while female, middle-income earners, and opioid drug users were willing to pay less. On the other hand, Nguyen et al. (2017) study focused on WTP for viral load and CD4 count tests among individuals living with HIV/AIDS who were receiving ART. Their findings show that higher income, higher educational level, rates of hospitalisation were positively determined WTP; while psychiatric comorbidities treatments were negatively associated with WTP. In both studies, the WTP values were lower than the cost of services ($28.7 for HCT and $95 for viral load test and $15 for CD4 count). The findings from these studies suggested a possibility of introduction of co-payment as a means of sustainability of the HIV/AIDS services in Vietnam.

Meanwhile, the methodological and empirical issues pertaining to contingent valuation of other health care programmes especially in sub-Saharan Africa and other developing countries in the world are summarised in the Table 2.2 below.

Table 2.2: Some selected CV and WTP Studies in Health programmes

Author	Year	Country	Disease/ Programme	CV Method & Format Used
Donfouet et al.	2011	Cameroon	Community-based Health Insurance (CBHI)	Double bounded Contingent Valuation Method(DBDC)
Shafie & Hassali	2013	Malaysia	(CBHI)	Bidding Game (BG)
Onwujekwe et al.	2010	Nigeria	(CBHI)	Bidding Game (BG)
Oriakhi and E. A. Onemolease	2012	Nigeria	(CBHI)	Dichotomous Choice
Dong et al	2003	Burkina Faso	(CBHI)	Bidding Game (BG) & Take-It-Or-Leave-It (TIOLI) TIOLI
Gustafsson-Wright, Asfaw, & van der Gaag	2009	Namibia	(CBHI)	Double bounded Contingent Valuation Method(DBDC)
Dror et al	2007	India	(CBHI)	Unidirectional bidding game approach
Asenso-Okyere et al	1997	Ghana	(CBHI)	Bidding Game

Table 2.2: Continued

Author	Year	Country	Disease/ Programme	CV Method & Format Used
Onwujekwe, O.	2004	Nigeria	Insecticide-treated nets (ITN)	Structured haggling, Bidding Game & Binary with follow Up questions
Onwujekwe, O.	2001	Nigeria	ITN	Dichotomous Choice & Bidding Game
Onwujekwe et al	2000	Nigeria	ITN retreatment	Bidding Game, close-ended with follow-up question
Onyejekwe and Uzochukwu	2004	Nigeria	ITN	Binary with follow up(BWFU) & Open-ended
Onyejekwe, Fox-Rushby, & Hanson	2008	Nigeria	ITN	Bidding Game, Binary with follow up, and structured haggling technique
Onyejekwe Hanson, & Fox-Rushby	2003	Nigeria	ITN	Bidding Game, Binary with follow up, and structured haggling technique
Onyejekwe Hanson, & Fox-Rushby	2005	Nigeria	ITN	Bidding Game, Binary with follow up, and structured haggling technique
Onwujekwe et al	2005	Sudan	ITN	Bidding Game
Onwujekwe & Nwagbo	2002	Nigeria	ITN	Bidding Game
Onyejekwe, Fox-Rushby, & Hanson	2005	Nigeria	ITN	Bidding Game and Binary with Follow Up (BWFU)
Chase et al	2009	Mozambique	ITN	Binary with follow up question
Hansen, et al	2013	Uganda	Rapid Malaria tests & ACTS	Bidding game
Onwujekwe et al	2000	Nigeria	Malaria	
Onwujekwe et al	2006	Nigeria	Malaria	Bidding game
Onwujekwe et al	2010	Nigeria	Malaria	
Onwujekwe et al	2007	Nigeria	Malaria	Bidding Game
Uzochukwu et al	2010	Nigeria	Malaria	Bidding Game
Onwujekwe et al	1999	Nigeria	Malaria	
Onwujekwe et al	2000	Nigeria	Malaria	
Udezi, Usifoh, & Ihimekpen	2010	Nigeria	Malaria vaccine	Payment Card
Wiseman et al	2005	Tanzania	Malaria	Bidding Game
Asafu-Adjaye, & Dzator	2003	Ghana	Malaria insurance	Bidding Game
Onwujekwe et al	2006	Nigeria	Malaria	
Onwujekwe et al	2004	Nigeria	Malaria	Bidding Game & Structural Haggling technique
Onwujekwe et al	2006	Nigeria	Malaria	
Onwujekwe et al	2010	Nigeria	Malaria	
Fonta, Ichoku, & Kabubo-Mariara	2012	Cameroun	Community-based Malaria control scheme	Dichotomous choice & open-ended follow-up question
Saulo et al	2008	Tanzania	Malaria-ACT	Take-It-Or-Leave-It (TIOLI)
Author	**Year**	**Country**	**Disease/ Programme**	**CV Method & Format Used**
Jimoh et al	2007	Nigeria	Malaria	Binary-with-follow-up (BWFU)

Table 2.2: Continued

Muko et al	2004	Cameroon	Highly Active Antiretroviral (HAART) Drugs	Bidding method
Whittington et al	2002	Mexico	HIV/AIDS vaccine	Bidding Game
Whittington et al	2008	Thailand	HIV/AIDS Vaccines	Bidding Game
Heinzen & Bridges	2008	Bangladesh	Pneumococcal Vaccine	Open-ended, Dichotomous Choice, Payment Card, Bidding Game
Onwujekwe et al	2012	Nigeria	Modern Contraceptives	Binary with open-ended follow-up question
Onwujekwe et al	1998	Nigeria	Onchocerciasis	Bidding Game
Onwujekwe, Shu & Okonkwo	1999	Nigeria	Onchocerciasis	Open-ended question format
Ughasoro et al	2015	Nigeria	Ebola Virus Vaccine	Bidding Game

2.6 HCT and Health Belief Theory - Conceptual, Theoretical and Empirical issues

Health belief theory plays significant roles in the success of any health intervention programme because it provides a veritable plethora of health behaviour factors that help in explaining why people use or fail to use health services. Glanz, Lewin & Rimer (1997) recommended the use of health belief theory for a successful designing, planning and implementation of any health programme. This thesis partly focuses on health behaviour of individuals relative to HCT for the prevention and detection of HIV rather than illness behaviour or sick role behaviour of those already diagnosed with HIV or AIDS.

Kasl & Cobb (1966) defined health behaviour as "any activity undertaken by a person believing himself to be healthy, to prevent diseases or detecting it in an asymptomatic stage" (p. 246). Health behaviour, in Gochman (1997) definition, is the "behavioural patterns, actions and habits that relate to health maintenance, to health restoration and health improvement" (p. 3). While Conner & Norman (2005), broadly defined health behaviour as "any activity undertaken to prevent or detecting disease or for improving health and well-being" (p. 2). The behaviours that can be categorised under these

definitions include: the use of medical service (for example, testing, such as HIV testing, vaccination, physician, or doctor visits); health behaviour directed towards self (for example, alcohol consumption, exercise, diet, and smoking).

Health behaviour is distinguished from illness behaviour which is defined as "any activity undertaken by a person who feels ill, to define the state of his health and to discover a suitable remedy;" and sick role behaviour, that is, "any activity undertaken by those who consider themselves ill, for the purpose of getting well" (p. 246).

This distinction from illness and sick role behaviours might be appropriate to explain the reason why some people feel reluctant or refuse to be tested for HIV. The individual may feel they do not need the service since they are not sick, whereas they might have been infected with the virus since the infection can remain asymptomatic for years before starting to manifest. Many AIDS patients are often diagnosed late when the immune system might have been damaged and the individual enters the full-blown AIDS stage. Therefore, Health Belief Model (HBM) which focuses on the health behaviour of an individual might be an appropriate theory/model to explain how people behave when in a particular health condition. In this section, we are considering health behaviour theory that explains why people seek health service or what motivate people to utilize for health services or factors that predict health service usage.

Indeed, transmission of HIV often takes place in a social context; that is, mainly through heterosexual sex, mother to child transmission, blood transfusion, drug injected users, and this differentiate it from other unhealthy behaviour that are personal. All these happen in a social interaction. Therefore, any health intervention programme, especially HCT must rely on health behaviour theories. In other word, the intervention of any successful HIV programme must have its foundation solidly laid on health behaviour theories. And

conformity to components of theoretical health models might determine to a large extent whether such programme will succeed or not (Mantell, DiVittis, & Auerbach, 1997).

2.6.1 Health Belief Model (HBM) – Overview of the historical origin

Health Belief Model is described as "a value-expectancy theory" (Rosentock, Strecher, & Becker, 1994, p. 6). The theory rests on the two health-related concepts, value and expectancy. Value is "the desire to avoid illness or to get well," while, the expectation is "the belief that a specific health action available to a person would prevent (or ameliorate) illness" (p. 6). The concept of expectancy is further described regarding the value individual attaches to his/her vulnerability (susceptibility) and seriousness (severity) of an illness or a disease. HBM, according to Fisher & Fisher (2000, p. 5), is "*the grandparent of all health behaviour change models*" which has been popularly used more than any other health models for many decades and has full acceptance among health researchers. According to Champion & Huster (1995) and Becker (1994), public health intervention programmes that were based upon HBM variables have been shown to increase utilisation of such programmes. Thus, the choice of HBM in this study is justified. HBM was developed in the 1950s by a group of Social Psychologists researchers: Irwin M Rosenstock, Godfrey Hochbaum, Stephen Kegeles, Howard Leventhal, who were working with the US Public Health Service (Rosenstock, 1974). At that time, the US health service was primarily focused on prevention of disease rather than curative or treatment measures. However, it was reported that there was failure among the people to accept preventive measures through a screening test to detect some diseases such as, tuberculosis (TB), polio, influenza, cervical cancer, dental disease, rheumatic fever, which may not readily show symptoms on the surface. Despite several testing/screening sites provided free of charge or at low costs for individuals to obtain the screening tests, few people seized the opportunity to get tested. This was a great concern to the government at that time and a stage was set up for a research to be carried in order

to determine reasons for the low participation of people in the health screening programmes. Eventually, the outcome of the research led to the development of the theory which later came to be known as a Health Belief Model (HBM) (Rosenstock, Derryberry, & Carriger 1959; Rosenstock, 1974; Rosenstock, Strecher, & Becker, 1994).

The reaction of the public to the Tuberculosis health crisis in 1950s is akin to what is playing out today. Presently, in Nigeria, like other HIV hard hit sub-Saharan Africa countries, despite HIV testing being provided free of charge or at very low cost in many testing centres, clinics, health centres, stand-alone centres, and hospitals across the country, few people have been tested while the majority are yet to be tested (NACA, 2015).

2.6.2 HBM Model Description

The two major focus/ of HBM are threat perception and behavioural evaluation. Threat perception is illustrated as two fundamental beliefs, perceived susceptibility to a condition (illness such as AIDS) and anticipated severity as a result of the illness. On the other hand, behavioural evaluation consists of two distinct sets of belief, perceived benefit or efficacy related to recommended behaviour and costs or barriers associated with carrying out the behaviour that was recommended (Abraham & Sheeran, 2005). Also, the model proposed that when an individual holds the appropriate belief, cues to action can motivate health behaviour. Conclusively, self-efficacy or individual general health motivation was added to the model to make six notable constructs (Becker, 1974). Socio-demographic variables modify the behaviour of individuals to the other factors (Figure 2.3).

2.6.3 Assumptions of HBM

HBM posited that individuals would like to participate in preventive behaviour, if they feel they are more liable to the health condition, that acquiring the health condition will be severe, and the benefits of getting involved in the preventive behaviour outweigh the

cost. HBM asserts that before an individual can change his/her behaviour, he/she must feel threatened by his/her current behaviour, and must believe that altering his/her behaviour will bring about higher outcome. Furthermore, such individual must believe that he possesses the capability to surmount any impediment or obstacle on his progress path (Janz, & Champion, 2002). In the HIV / AIDS scenario, for an individual who has not been tested for HIV must first feel threatened by the severe impact HIV infection will have on him should he get infected, and must believe that changing his lackadaisical behaviour towards HCT will bring many benefits to him, his family and society at large both now and in the future, and that the action needed would not be difficult to do.

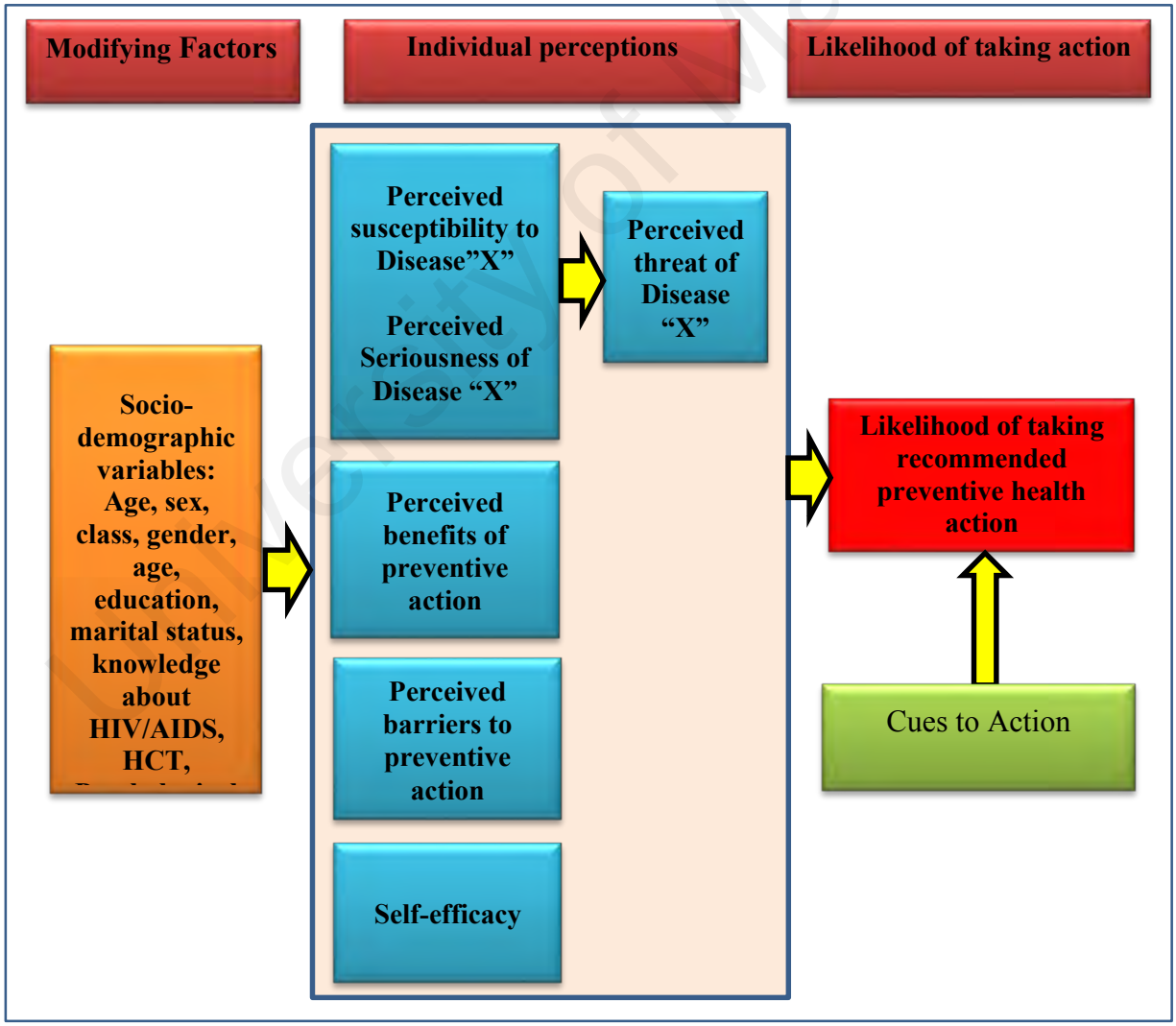

Figure 2.5: The Health Belief Model

Source: Adapted from Rosenstock (1974) – The Health Belief Model as a predictor of preventive health behaviour

2.6.4 HBM- Theoretical Constructs

HBM originally has four main constructs, perceived susceptibility, perceived seriousness, perceived benefits, and perceived barriers in the model. Individual perceptions form the constructs of HBM that are used to explain individual health behaviour. The model was later expanded with other two additional constructs, cues to action and self-efficacy (Janz & Champion, 2002). We consider them in turn.

Perceived Susceptibility – this involves the individual's subjective perception that he/she is at risk of contracting the health condition (Abraham & Sheeran, 2005). This concern the belief of an individual of his/her probability of getting a health condition (Awad et al., 2004). According to Rosenstock (1974), the level of acceptance of personal susceptibility to a condition or disease differs across individuals. Acceptance of personal susceptibility may be low, medium (moderate), and high in individuals. Individual with low acceptance level may deny any possibility of contracting the disease, those in the moderate level may admit to the occurrence of the disease as revealed by statistics, but exhibit possibility that disease is not likely to happen to him/her; while those in higher acceptance level are those who believe that they are in danger of contracting the disease. Personal susceptibility is regarded as one of the potent factors that motivate people to embrace healthier behaviour. The higher the perceived risk, the higher the probability of engaging in the behaviour that will decrease the risk. Logically, on one hand, when individual perceived himself to be at high risk of contracting a disease, he will do everything within his capacity to prevent it. The studies on men who have sex with men revealed that their perceived risk of contracting hepatitis prompted them to be vaccinated against hepatitis (de Wit et al., 2005), while those who perceived that they are susceptible to HIV transmission accepted the use of condoms to prevent the risk (Belcher et al., 2005).

On the other hand, when an individual believes he is not at risk at all or does have very low risk of contracting the disease, he will be engaging in unhealthy behaviour. In Rose (1995) and Maes & Louis (2003) studies on the HIV infection perception of risk by older adults, showed that many did not accept safer sex practice because they considered themselves not susceptible to HIV infection despite their knowledge about its transmission modes and severity of the disease. These logical assertions may not always hold. An individual may have a high perceived risk of disease and yet engage in behaviour that will make him contract the disease. According to Courtenay (1998), there is no link between college students' high perception of susceptibility and healthier behaviour. Also, Lewis, Malow, & Ireland (1997) in a study about college students' HIV risk perception revealed that the students did not practice safer sex despite being admitted to be at high risk of contracting HIV (Hayden, 2014).

Perceived Seriousness – This refers to individual perception of severity of contracting a health condition such as AIDS disease. That is physical consequences, e.g., pain, death; social consequences, for example, impacts on family life, social relation, work, occupation (Abraham & Sheeran, 2005). The degree of severity according to Rosenstock (1974) depends on the level of 'emotional arousal' (p. 330) brought about by the thought of the disease and any accompanying difficulties with disease conditions. An individual may perceive serious consequences of a disease based on medical information or clinical consequences, for example, incurability of a disease such as AIDS.

Furthermore, Strecher & Rosenstock (1997), opined that the combination of perceived susceptibility and perceived severity will result to perceived threat. The strong perception of the threat of a particular disease is assumed to have a very strong impact on individual behaviour to avoid contracting such disease. Health behaviour often changes when there is perceived threat to serious risky disease. In other word, if the perception of threat is

greater, the individual will want to change their behaviour to avert the negative consequences of such disease. Anecdotal evidences from Weitkunat et al. (2003), Mullens et al. (2004), Forsyth & Goetsch (1997) attested to this assertion. In their study of the people's behaviour towards consumption of cow meat after the outbreak of an untreatable and fatal mad cow disease, also known as bovine spongiform encephalitis (BSE), in Germany in 2001. The disease which ordinarily not found in humans, but through eating of infected cow meat, Weitkunat et al. (2003), demonstrated how people's consumption behaviour of beef declined in comparison to the previous year because of their perception of threat of contracting the deadly disease. Also, Mullens et al. (2003) showed how perception of danger of recurrence of the previously treated colorectal cancer patients led to their changed behaviour. The cancer survivors were willing and ready to even make additional changes in their diet, weight loss, and exercise. Corroborating the fact that when there is a high intensity of perceived threat of contracting a disease, people tend to change their behaviour towards that condition that can make them vulnerable to it. In a study by Forsyth & Goetsch (1997), the health protective behaviours of progeny whose parents had the non-insulin dependent diabetes mellitus (NIDDM) and hypertension was compared with another group with no family history of such diseases. The results showed that children with a family history of these diseases were more likely to engage in protective health behaviours such as weight control, more physician check-ups than another group with no parental history of such illnesses.

As evidence from the past studies have shown strong impact of a perceived threat to behavioural change; however, high perception of threat does not always lead to increased behavioural change. This assertion is corroborated by Hanson & Benedict 2002, study of older adults' safe food handling behaviour. Older adults, though highly susceptible to foodborne illness and perceived threat of the illness, did not practice safe food handling

practices in spite of their vulnerability to the disease (Gerba, Rose & Haas, 1996; Hayden, 2014).

Perceived Benefits – These are individual's beliefs concerning effectiveness of taking a particular action to decrease or remove health condition (Awad et al., 2004). In other word, it refers to the individual opinion about the value of embracing a new behaviour to decrease his risk of getting or developing a disease. It refers to what an individual stand to gain from engaging in a particular behaviour that grants him/her an opportunity to avert a health condition. An individual will likely participate in healthier behaviour if he/she believes the new behaviour will reduce his/her chances of developing a disease (Hayden, 2014). In other words, we can say the peoples' attitude to a particular health issue depends on the benefit they can likely get from engaging in such behaviour. (Rosenstock, 1974). For instance, people would likely develop an attitude of drinking 5 litres of water if they believe it highly beneficial for their health. People will stop smoking if they believe that quitting such habit will be beneficial to their health. Likewise, the behaviour of people towards a particular health intervention programme, such as HIV testing, will depend on the benefits they believe they can personally gain, their family, and society will gain by being tested. The outcome of the test, if negative, could enhance individuals quest to continue to protect themselves from infections in the near future by engaging in healthy behaviour and avoiding any risky practices (such as, unprotected sexual intercourse, taking unscreened blood etc.) that can make them vulnerable to the infection. On the other hand, if the test turns positive, such individual can be enrolled into Anti-Retroviral Therapy (ART) programme, which provides them anti-retrovirus drugs that suppress and reduce the multiplicity of HIV antibody in the blood of the HIV infected person and thus hinder the infection from progressing into a fatal full-blown AIDS disease. Perceived benefits play a very crucial role in the individual's prevention behaviour. If the individual's perceived benefit from engaging in a particular health behaviour is very high,

he/she can go to any length in getting it regardless of any inconvenience, unpleasant, or unsavoury or harrowing experiences he/she may have to go through. As to what makes some people wanting to get HIV testing and others not interested depends on their perception of benefits they individually attached or believe to be attached to knowing one's HIV status earlier. Supporting these assertions is the work of Frank, Swedmark, & Grubbs (2004), which dealt with the attitude of people toward colonoscopy screening tests to discover colon cancer in its earliest stage. Among the women surveyed, those who perceived greater benefits of detecting colon cancer earlier are more likely to undergo the test despite the inconvenience, discomfort, and rigorous conditions attached to the test, when compared with those who do not. In a similar scenario, Graham (2002), in his study found out that black women who attached greater benefits to breast self-examination (BSE), which, if done regularly, plays an essential role in early detection of breast cancer, which is common among women; regularly engaged in it than those who did not believe it is beneficial to them.

Perceived Barriers –The fourth main construct of HBM deals with the issue of perceived barriers to change in the health behaviour of an individual. Perceived barriers refer to "tangible and psychological costs associated with an advised action" (Awad et al., 2004, p. 116). These are costs or negative qualities of the preventing health behaviour. According to Rosenstock (1974), an individual may believe that engaging in a specific action of health behaviour may be an effective way of reducing the threat of disease and yet may consider the action as something not convenient, expensive, unpleasant, upsetting or painful. These are referred to as barriers to health behaviour. Perceived barriers are regarded as the most crucial construct among the HBM constructs (Janz & Becker, 1984). Obstacles can stand in the way of people from utilising health service. This was the case of the study of young asymptomatic women in north-western region in England by Umeh & Rogan-Gibson (2001), where perceived barriers to breast self-examination predicted

failure of women to regularly utilise BSE procedures despite the perceived benefits associated with BSE in detecting breast cancer. Amongst the obstacles outlined are, respondents' difficulty in starting a new habit, giving up things to perform BSE, ridicule from members of their family, embarrassment, fear, and pain. To corroborate this, Byrd et al., (2004), in the study of Hispanic women pap tests seeking behaviour to detect breast cancer, found out that perceived barriers which manifested as fear of pain associated with the test and inability to locate testing centres overweigh the benefits of the test or severity of the breast cancer disease. Also, Burak & Meyer (1997) found fear of pain, embarrassment, and anxiety as barriers to Pap smear test among women. For an individual to adopt a new behaviour, such person must believe that the benefits of the new behaviour far overweigh the aftereffect of choosing to continue the old behaviour, and by this, barriers to new behaviour are subdued and overcome, and new behaviour are adopted (Hayden, 2014). If the perceived benefits outweigh the perceived barriers or costs, specific health behaviour might be taken up by individuals, but if perceived benefits are less than the perceived barriers/costs the reverse will be the case (Rosenstock, 1974).

Cues to Action – These are instigators that motivate individual to seek partaking in health programme that will enable him avert an adverse health condition. These are factors that serve as cue, trigger, or prompt to individual's willingness to embark on action to avoid infection or disease. Cues to action might be things, events, people that push or motivate people to change their behaviour in a particular way. For instance, the news about the death of a family member or a notable figure or celebrities (as in the case of Fela Anikulapo Kuti in Nigeria in 1990s, as a result of AIDS) (Balogun 2010), can motivate some people to acknowledge the severity of the disease and thus change their behaviour towards HIV test. Other examples of cues are people' advice, media reports, mass media campaign on radio, television, billboards (HIV/AIDS billboard announcing something

like – '*AIDS no dey show for face'*[3], signposts, flyers, handbills et cetera (Ali, 2002; Graham, 2002). Knowledge about somebody with the disease can prompt an individual to seek to change behaviour. Weinrich et al., (1998), found that knowledge of a church member with prostate cancer served as a cue to action and impetus for African American men's decision to attend programmes designed to educate people about prostate cancers.

Self-efficacy – Rosenstock, Strecher & Becker (1988) added self-efficacy as the last six construct of HBM model. It was adopted from the Bandura (1977) Social Cognitive Theory. Self-efficacy is the belief that individual holds that he is capable of doing something. Before an individual can attempt to do something new, he must believe that he can do it. If an individual believes that changing to a new behaviour is very helpful, but think that he is incapable of doing it, there is likelihood that such individual will not try or attempt it (Hayden, 2014). In the case of breast self-examination, a woman may count the practice very useful, but she must believe that she can perform the exercise by herself (Umeh & Rogan-Gibson, 2001).

2.6.5 HBM in HIV/AIDS Intervention Programmes and HCT Service

The first HBM research was attributed to the study by Hochbaum (1958) on the X-ray screening to detect Tuberculosis (TB) at its asymptomatic stage in about 1200 adults in three cities in the US; in which the researcher assessed people's preparedness to do the test and this include their beliefs that they were vulnerable to TB and that earlier detection of the disease will be beneficial to them (Rosenstock, Strecher, & Becker, 1994). It is noteworthy that since the introduction of the model in the 1950s, over six decades ago, HBM is still popular and has been used in various studies on health issues before the discovery of HIV/AIDS. According to Abraham & Sheeran (2005), there are three broad

[3] Nigeria pidgin English version denoting that AIDS may not be visible. In other words, a physically-looking healthy person may be HIV carrier

areas which include: (1) Preventive health behaviours, such as, screening for hypertension, Cervical cancer, Colorectal cancer, mammography, STI test; Breast self-examination; Contraceptive use (condom inclusive). (2) Risk behaviours – smoking, Alcohol, drug use, etc. (3) Sick role behaviours: Anti-hypertensive regimens; Diabetic regimens; Asthma; Urinary tract infection etc.

Although HBM has been utilised and applied to a variety of health issues, but with the discovery of HIV/AIDS in the 1980s, past research on self-protective behaviour against HIV/AIDS have focused majorly on condom programme and generally on teenagers or young men and women. The past studies have implicitly or explicitly utilised one or more constructs of the HBM to elucidate different behaviours regarding HIV/AIDS such as safe sexual practices and condom use with various results. A study that investigated the sexual abstinence intention and the health belief about AIDS among the male adolescent college students found perceived severity of AIDS as essential factors associated with the intention to abstain from sexual practices as a means of prevention from HIV infections (Iriyama et al., 2007). On the other hand, the young male college students with higher levels of perceived susceptibility did not agree with sexual abstinence intention. Also, Asare & Sharma (2012) and Asare et al, (2013) used components of HBM to assess sexual communication behaviour and to determine the safest sexual behaviour among the African immigrants in Ohio, United States respectively. The results showed that the HBM constructs: cue to action, perceived benefits, and perceived susceptibility to AIDS were the significant predictors of sexual communication behaviour; while perceived barriers, cues to action, self-efficacy and perceived susceptibility to AIDS predicted the practice of safer sex as a veritable protection from HIV infection.

The use of condoms to reduce the risk of HIV infection among young people in the context of the Health Belief Model has attracted much attention in the literature. In their

study to explore the factors that influence the use of condom as HIV risk reduction, Adih & Alexander, (1999) employed constructs of HBM and social learning theory to identify factors that predicted condom usage among young men in Ghana. The logistic regression analysis revealed that young men who perceived themselves at risk of HIV, have a high level of self-efficacy of condom use, and with low level of perceived barriers to condom use were more likely to use a condom in comparison with others. In contrast, Abraham et al. (1996), path analysis findings on the prospective study on teenage condom use, revealed HBM measures and the respondents' demographic characteristics failed to predict reported sexual activity. Thato et al. (2003) tested the ability of HBM components to predict condom use among adolescent vocational students. The researchers found that perceived benefits and intention to use condoms were the main predictors of condom usage. Likewise, Hounton, Carabin & Henderson (2005) tested only one construct of HBM, perceived barriers to condom use and found that perceived barriers expressed were related to the perception of incomplete protective effects of condom and associated problems of condom usage among the people. HBM has also been applied in the study of the use of condom among the high-risk population such as, female sex workers and men who have sex with men (MSM). Zhao et al. (2012) employed HBM to predict condom usage among the female sex workers. The findings from structural equation modelling showed perceived benefits of condom use and perceived barriers to condom use were germane to determine preference for condom use among them. Similarly, a qualitative study among the MSM by Li et al., (2016) revealed that knowledge and prevalence of HIV accounted for their vulnerability to HIV; benefits include prevention against HIV and STI infections; barriers included disquiet using condom and condom availability; and perceived severity was affected by HIV treatment optimism and difficulties in life HIV could bring to them.

The application of HBM to assess or predict attitudes, perception, and behaviour towards HIV testing cut across different settings such as client-initiated HIV testing, provider-initiated HIV testing, in prevention of mother to child HIV transmission, viral loads and CD4 count monitoring with the results varying across studies. A study that examined the factors associated with HIV testing among the migrants who were living in Europe, revealed that the low rate of HIV testing among the heterosexual, gay and bisexual men and women was due to the low-risk perception of HIV among the people (Fakoya et al., 2017). Attitudes of people towards HIV testing will determine how readily they are to utilise the service when provided. Bova et al. (2016), in their study, demonstrated the reasons for low testing rate among the Africa-born men in the US were as a result of fear of stigma attached to HIV and concerns for the privacy in the on-site health screening. They suggested reduction in HIV-related stigma in order to enhance HIV testing. Similar to the Bova et al. (2016), is the mixed method study of community-based outreach HIV testing in which the oral fluid devices and results of the tests were kept in the well-protected website by Loos et al. (2016). The content and univariate analyses revealed that the people showed preference for oral fluid specimen for testing over blood sample, and preferred accessing their HIV results in well secure website. This may not be unconnected with lack of trust for the HIV testing personnel in divulging their serostatus to people and fear of HIV – related stigma. Perceived barriers have been identified as a potential bane to HIV testing. Examining the barriers to HIV testing among migrants in Sweden, Lindkvist, Johansson & Hylander, (2015) found that reasons for people not willing to know their HIV status are fear of denial, social isolation and social exclusion attached to being HIV positive. Similarly, a qualitative study by De Jesus et al. (2015) revealed that the perceived barriers to HIV testing among the surveyed women manifested in their attitudes, perception and behaviour towards HIV testing. It was shown that the women manifested negative assumptions in which they felt that getting an HIV test implies they

were HIV positive; negative emotions expressed in dread of being diagnosed with HIV and the horrible impact on them; negative reactions from their partners and other people around them. In addition, barriers such as fear of disclosure, discrimination, low risk perception, fear of stigma (Ma et al., 2007; Ndabarora & Mchunu, 2014; Manirankunda et al., 2009); inadequate access to HIV services, poor confidentiality (Bwambale et al, 2008); have been identified to impact on HIV testing. HCT is administered as part of antenatal services for pregnant women in the health facilities for the prevention of mother to child transmission (PMTCT) of HIV/AIDS. Studies have utilised HBM to explain acceptability of HCT among pregnant women attending antenatal clinics. de Paoli, Manongi, & Klepp (2004) employed HBM to assess factors that influenced HCT acceptability among pregnant women, the multivariate regression analysis revealed perceived susceptibility to HIV, perceived barriers, and self-efficacy were the significant predictors of HCT usage the pregnant women. In contrast, study by Workagegen, Kiros & Abebe (2015) revealed that the perceived risk of HIV, perceived severity of HIV/AIDS and adequate knowledge of HIV/AIDS are not sufficient to induce PMTCT among the pregnant women. The researchers suggested self-efficacy as the major HCT inducer for HCT in PMTCT. Factors related to HIV test refusal by the women enrolled in ante-natal service in Dahl et al. (2008) are, mistrust in the reliability of the HIV test, lack of access to ART, fear of partner's reaction to the positive test result, and need to discuss with partner before deciding to engage in HIV testing. Abebe & Mitike (2009) and Vermeer et al. (2009) showed perceived barrier, perceived benefits, and perceived susceptibility are associated with willingness to do HCT. Acceptability of routine HCT among the college students revealed all the four mainstays of HBM, perceived barrier, perceived benefits, and perceived susceptibility; perceived severity were significantly predicted HCT (Nothling & Kagee, 2013). Findings from various studies have shown that the HBM application in HCT produced different results.

2.7 Gaps in the Literature

After undertaken a thorough review of theoretical and numerous empirical studies with their methodologies and findings, this section highlights the gaps observed in the literature for further investigation to widen contribution to knowledge. First, empirical studies of contingent valuation on health programmes in sub-Saharan Africa are relatively few. The dearth of studies is most noticeable in the area of HIV/AIDS studies, especially HIV counselling and testing (HCT) in Nigeria. Many of the empirical studies on contingent valuation of HIV/AIDS did not use proper sample size, conduct validity tests necessary to validate the results. Only one study on the WTP for HIV voluntary counselling and Testing in Nigeria was carried out, and this was limited in scope to tertiary institution's students. The surveys failed to capture relationship between the socioeconomic variables and WTP of the respondents. The income of the respondents was not included, and no WTP validity tests were conducted. Only with the exception of Forsythe et al. (2002) and Nguyen et al. (2016), none of the CV studies focused on generating WTP for the purpose of informing co-payment policy for the sustainability of HCT in Nigeria given its prime role in the continuum of HIV/AIDS programmes.

Secondly**,** HIV/AIDS studies in the context of HBM framework have not received significant exploration as in other areas of health. Whereas majority of studies which border on HIV prevention behaviour were concentrated on condom use (Abraham & Sheeran, 1996; Adih & Alexander, 1999; Thato et al., 2003; Asare et al. 2013; Zhao et al., 2012; Li et al., 2016) there is dearth of study on HCT testing in the context of HBM components. The majority of the HIV/AIDS studies conducted in the context of HBM often limit their studies to one or two constructs of the model and not considering all the four traditional mainstay constructs of the model. The results of some of the studies are conflicting. Therefore, it is necessary to employ the four main constructs of HBM to help understand the behaviour of individuals regarding HCT service utilisation. Also, most

noticeable gaps in the HBM literature is that many of the studies neglected the moderating effect of sociodemographic variables as proposed by the proponents of the theory/model. The studies merely reported the sociodemographic characteristics of the study sample without rigorously analysed their moderating effects on HBM constructs.

Thirdly, although many studies have shown that the HIV–related stigma plays a prominent role in the utilisation of the HCT service, but proper modelling and appropriate second generation analytical techniques delineating the mediating effects of HIV-related stigma on the relationships between HIV-related knowledge and HCT service, HIV transmission misconception and HCT service, perceived seriousness of HIV/AIDS and HCT service are quite missing in the empirical literature. Little is known about the mediating effects of HIV-related stigma on the relationship of willingness to participate in HCT, perceived threats of HIV/AIDS, perceived benefits of HCT with HCT service utilisation. For instance, Yang et al. (2006) attempted to demonstrate the mediating effects of HIV-related stigma on the relationship of HIV knowledge with HIV serostatus disclosure among the rural-urban migrants in the two cities of Beijing and Nanjing in China. The study focused on HIV serostatus disclosure rather than HCT utilisation.

2.8 Theoretical/Conceptual Framework and Hypotheses Development

Theoretical framework provides a structure or frame that hold or support the theory of a research study. In other words, it introduces and describes the theory which explains as to the existence of research problem identified in the study. Glanz, Rimer & Viswanath (2008, p. 26) defines theory as "a set of interrelated concepts, definitions, and propositions that present a systematic view of events or situations by specifying relations among variables, to explain and predict the events or situations." In the same vein of context, Leedy & Ormrod, (2015, p. 390) define theory as an "integrated set of concepts and principles developed to explain a particular phenomenon". Following the theoretical

underpinnings and profound review literatures, the theoretical and conceptual frameworks based on the research questions asked in Chapter 1 and hypotheses developed for each of the objectives of the study are presented in this section.

2.8.1 Contingent Valuation (Willingness to pay-WTP) for HCT

Enrooted in the basic economic model of consumer behaviour are assumptions about how individual will behave in the marketplace. The traditional economic theory assumes that individuals are rational, forward-looking, and are aware of what will make them better off (Ostermann et al., 2015); and with the resources/wealth at their disposal, they will wisely choose among the competing available alternatives to maximise their satisfaction (Rice, 2013). In other words, an economic agent, rational individual, will want to test for HIV if his expectation of the benefits of testing is higher than the cost of the test (Ostermann et al., 2015; Ostermann et al., 2011). The potential benefits of HIV testing can be diagnoses of HIV positive result which provides the first step of ART treatment which guaranteed longevity for those tested positive; on the other hand, a negative result gives a peace of mind by removing uncertainty surrounding individual HIV serostatus. Nevertheless, the potential benefits of the test may be counterbalanced by the costs associated with the test such as direct costs – transportation costs, out of the pocket cost, loss of labour productivity; indirect and implicit costs – the costs of living with HIV/AIDS (stress, social exclusion, stigma and discrimination) (Ostermann et al., 2014; Payne, McAllister, & Davies, 2013; Grosse, Wordsworth, & Payne, 2008). As obtained in other diagnostic tests, the behaviour of the individual who choose to be tested for HIV reveal the inherent value of the test to him/her. This intrinsic value or benefit is the implicit WTP which often match with a substantial amount of money (Ostermann et al., 2015; Lin et al., 2013; Forsythe et al., 2002). However, the assumption of rationality in traditional economics was countered by behavioural economics, which holds the view that individual will not always act rationally (Kahneman, 2003; Rice, 2013). A person

can still purchase a good, even though the potential benefits do not exceed the potential costs.

CV unveils a method of estimating the value that people place on a good or service. CV can be applied to both traded and not traded goods in marketplaces. When it is applied to goods not traded in the marketplaces, a kind of hypothetical marketplace scenario is created, and thus respondents are given the privilege to buy the good. By this, respondents can elicit their WTP values which are contingent upon a specific hypothetical market. (Mitchel & Carson, 1989). Theoretically, CV rests on neoclassical welfare economics, which believes that individuals are rational and can make the choice among various alternative goods available to them to maximise their utility. Neoclassical welfare economics tenets also rest on the fact that individual are the best judges of their welfare, and that outcome of their decision matters and the value of their decision should be judged solely on the basis of the utility they were able to attain. (Gafni, 1997). In the meantime, theoretically and conceptually, CV can be express as:

WTP = *f* (socioeconomic status; general health status; knowledge, attitude, and practice about HIV/AIDS and HCT).

The concept of the contingent valuation of HIV counselling and Testing (HCT) can be captured in Figure 2.6 adapted from Nguyen et al. (2016). WTP of an individual is dependent on his/her socioeconomic status, general health status, and knowledge, attitude, behaviour, and practice about HIV/AIDS and HCT.

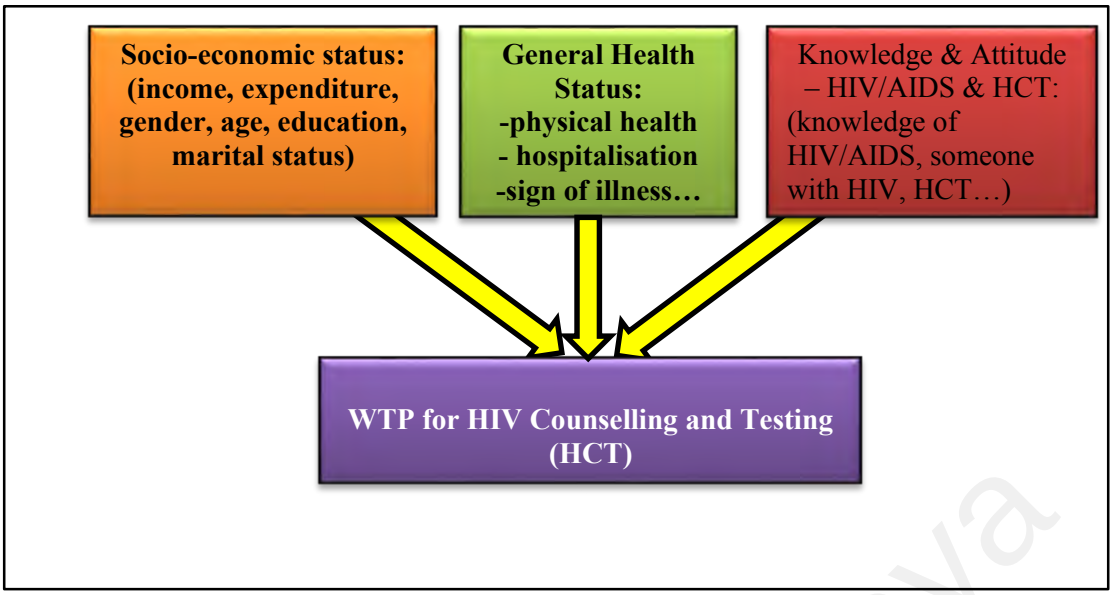

Figure 2.6: Conceptual framework showing factors associated with WTP for HCT

Source: Adapted from Nguyen et al. (2016, p. 850)

Drawing from the theoretical considerations and previous literature reviews on WTP and HCT, this study proposed and tested the following hypotheses:

$H1_a$: There is a relationship between the WTP and sociodemographic variables of the respondents.

$H1_b$: Socioeconomic, sociodemographic, general health status, knowledge variables will be significantly related to WTP for HCT.

2.8.2 HBM and HCT - Conceptual framework and Hypotheses

Since the discovery of HIV and AIDS, several theoretical approaches have been suggested and employed to inform rationale for individuals engaging or not engaging in HIV self-protective behaviours. The most common of such theories include: the Health Belief Model (HBM) (Rosenstock et al., 1994; Becker & Rosenstock, 1984; Becker 1974); Theory of Reasoned Action (TRA) (Fishbein et al., 2001; 2002; Fishbein, 2000; Fishbein & Ajzen, 2010); Theory of Planned Behaviour (TPB) (Ajzen, 1985; 1988; 1991; Ajzen & Fishbein, 1977; 1980; 2005; Ajzen & Madden, 1986; Conner & Sparks, 2005);

Social cognitive theory (Bandura 1985; 1989; 1997; 1998; 2001); AIDS Risk Reduction Model (ARRM) (Catania, Kegeles & Coates, 1990; 1994; Catania et al., 1989; Catania et al., 1990). Some of these theories focus on short-range behavioural change while other assess behaviour change in long-term. However, it is noticeable that the constructs embedded in these theories are somewhat overlapping. Among these theories, Health Belief Model (HBM), is most recognised and has been applied in various area of HIV/AIDS research (Glanz & Bishop, 2010; Glanz, Rimer, & Viswanath, 2008). Health Belief Model (HBM) provides a framework for the relationship between individual health beliefs constructs and health behaviour towards a particular condition. The health beliefs factors motivate or determine how individual will behave or respond towards a condition such as HIV/AIDS infection prevention (Champion & Skinner, 2008; Abraham, 1994; Abraham & Sheeran, 2005; Abraham et al., 1996; 1992; Janz, Champion, & Stretcher, 2002). HBM hypothesises that the decisions of an individual relating to protecting or preventing himself from HIV infection are function of his/her perception of risks of contracting the disease (susceptibility), perceived severity of contracting HIV, perceived benefits and perceived barriers of obtaining HCT services. Rosenstock (1974), postulated that sociodemographic variables, socio-psychological variables, knowledge of the health condition will modify the relationship between the HBM constructs and health condition. Becker (1974), endorsed HBM framework amidst range of different approaches to social-psychological determinant of health behaviour (Abraham & Sheeran, 2005). HBM theoretical framework based on the preceding and its relevance to this study. The conceptual framework for this study in the context of HBM is presented in Figure 2.7. This study employed the four basic HBM factors and excluded self-efficacy and cues to actions factors due to the nature of the study and availability of relevant data.

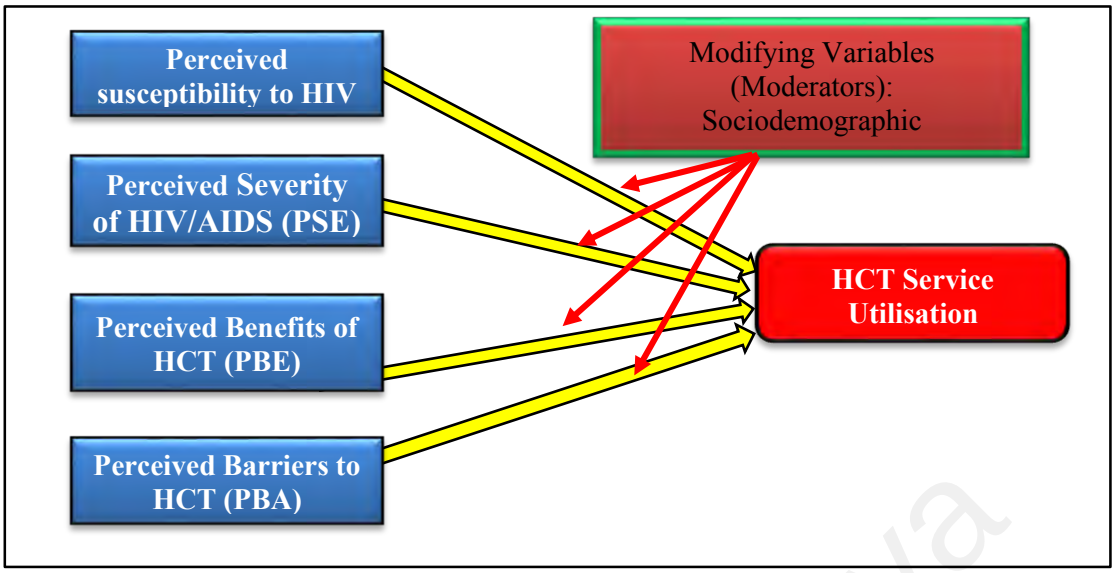

Figure 2.7: Conceptual framework to determine the associated HBM constructs and HCT utilisation

Based on the previous review of the literature and theoretical considerations for HBM on utilisation of HCT, this study proposes the following hypotheses:

$H2_a$: Perceived susceptibility to HIV infection will positively predict HCT service utilisation.

$H2_b$: Perceived severity of AIDS will positively predict HCT service utilisation.

$H2_c$: Perceived benefits of HCT will positively and significantly predict HCT service utilisation.

$H2_d$: Perceived barriers to HCT will have negative effect on HCT service utilisation

$H2_{ei}$: Sociodemographic variables will play modifying roles in the relationship between the four latent HBM constructs and HCT service utilisation.

2.8.3 HIV-related Stigma and HCT Service Utilisation – mediational model framework and hypotheses.

Goffman (1963, p. 13) in his contribution to stigma theory defines stigma as 'an attribute that is deeply discrediting'. In stigma theory, the ideology that explains the inferiority and perceived danger of stigmatised person is contrived. The presence of stigma makes such a person a devalued, discredited, dangerous, evil, weak in the eyes of the public (Goffman,

1963). More specifically, HIV-related stigma is defined according to Steward et al. (2008) as "socially shared knowledge about the devalued status of people living with HIV" (p. 1226). According to Nyablade & MacQuarrie (2006) "HIV stigma refers to the beliefs and attitudes that deeply discredit a person or group because of an association with HIV". HIV-related stigma compromise AIDS responses and act as a potential driver of the spread of HIV in the society. The presence of stigma potentially discourages people from seeking information relating to HIV and AIDS (Bond, Chase & Aggleton, 2002; IIiyasu et al., 2006). It hinders people from coming forward to use HIV testing provided (Meiberg et al., 2008), discourages individuals from disclosing their serostatus (Adeokun, Okonkwo & Ladipo, 2006), hinders people from adopting preventive behaviour and accessing available HIV/AIDS treatments (Chesney & Smith, 1999). According to a study based on the Demographic and Health Survey (DHS, 2013) showed that HIV/AIDS-related stigma and discrimination is very rife among the Nigerian population (about fifty per cent still showed stigmatising and discriminating attitudes towards PLWHA (Dahlui et al., 2015). HIV-related stigma is often evinced in a form of discrimination, prejudice, and discrediting toward not only stigmatized persons, but also toward individuals (such as friends, family members, caregivers), groups, associations, and communities that are associated them (Steward et al., 2008; Bos et al., 2013). HIV-stigma exacted mediating effect on the relationship of HIV knowledge with HIV serostatus disclosure according to Yang et al. (2006). Based on the findings of the various scholars as enunciated in the earlier part of this chapter, which suggested that HIV-related stigma might have a mediating effect on the relationship between HCT and other prominent variables, we want to establish the conceptual framework and hypotheses for this relationship in this section. HIV-related stigma and discrimination against People living with HIV and AIDS (PLWHA) have been identified as a major barrier to the fight against the HIV/AIDS pandemic (Ulasi et al., 2009, Odimegwu, 2003; Odimegwu et al.,

2013, Feyissa et al., 2012, Herek, 2002; 2007; Herek & Capitanio, 1999; 2002; Herek et al., 1998). They are recognized as an essential critical drivers of the epidemic and pose serious threat to the effectiveness of HIV/AIDS prevention, treatment, and care programmes for those living with the disease (UNAIDS, 2012, Herek, 1999, Parker & Aggleton, 2003, Parker et al., 2002; Niang et al., 2003; Piot, 2006). HIV-related stigma was associated with a decreased individual willingness to participate in HIV and sexually transmitted disease prevention intervention activities as reported by Yang et al. (2004). It prevents people living with HIV from disclosing their status (Derlega et al., 2002), and discourage people from assessing available HCT and treatment services for fear of being castigated, ostracised or stigmatised should they test positive (UNAIDS, 2012; Babalola, 2007). The lower level of HIV/AIDS knowledge is associated with discriminating and stigmatising attitudes towards people living with HIV (Vorasane et al., 2017).

Therefore, the conceptual framework and hypothesis for the mediating effect of HIV-related stigma in this study is presented in Figure 2.8.

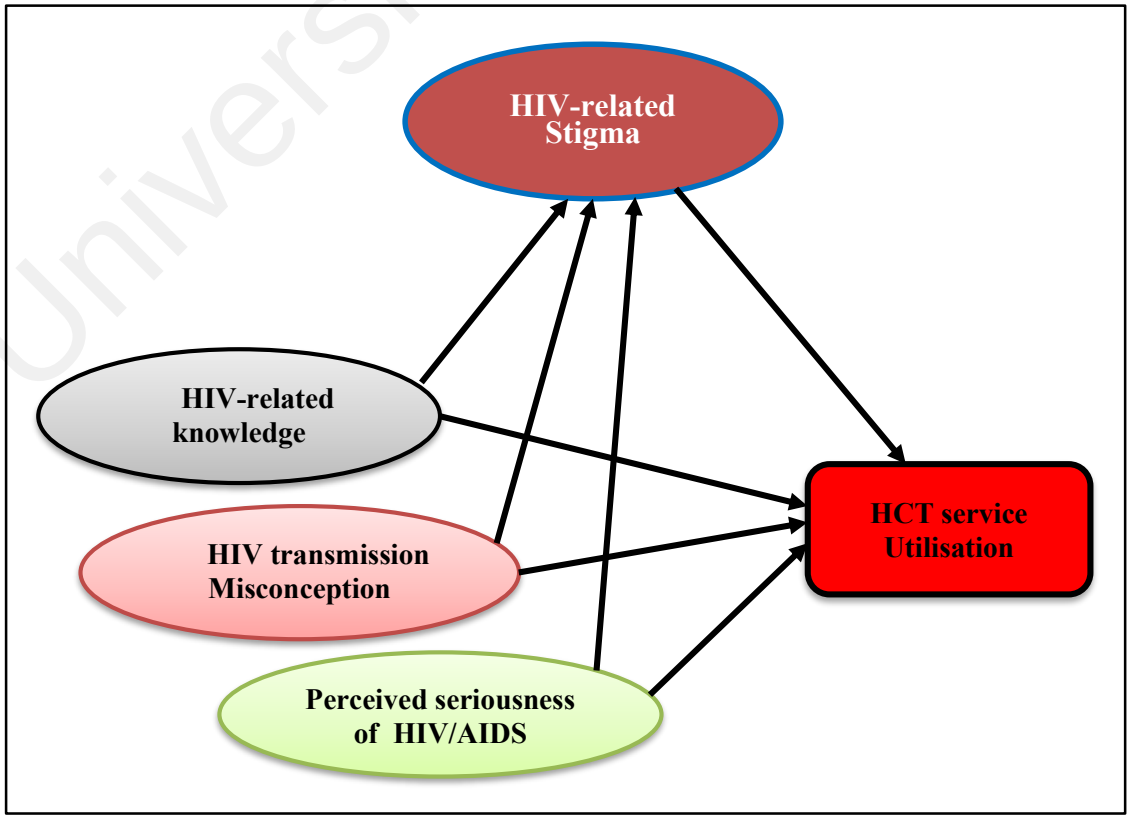

Figure 2.8: Conceptual framework of HIV-related stigma mediator

On the basis of theoretical considerations and the literature, the following hypotheses are proposed are tested in this study:

$H3_a$: HIV-related stigma will have a mediating effect on the relationship between HI-related knowledge and HCT service utilisation.

$H3_b$: HIV-related stigma will have a significant mediating effect on the relationship between HIV transmission misconception and HCT service utilisation.

$H3_c$: HIV-related stigma will have a significant mediating effect in the relationship between the perceived seriousness of HIV/AIDS and HCT services utilisation.

2.9 Conceptual Framework of the Study

The conceptual underpinnings of the entire study are presented in Figure 2.9. The conceptual framework underlies the objectives of this study, and it combines all the three major concepts with their close candidates' variables that defined each of the concepts. The conceptual framework is derived from the combination of the concepts described under the theoretical framework in the previous section. The three main concepts that are the contingent valuation (willingness to pay), health belief model (HBM), and HIV-related stigma.

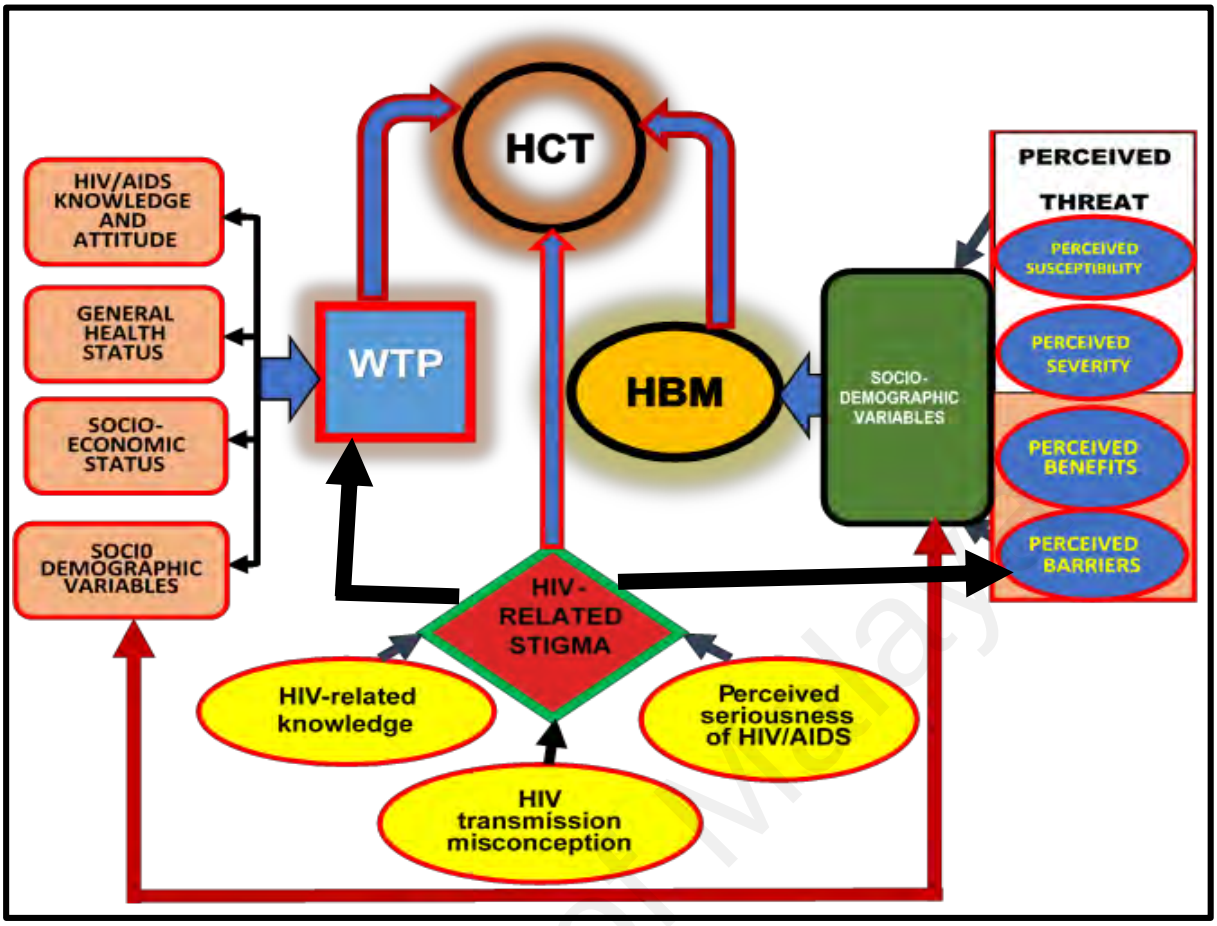

Figure 2.9: The Conceptual Framework for the study

2.10 Summary

In this chapter, we have provided the theoretical, conceptual, methodological and empirical literature reviews for the study. The chapter started with review on issues surrounding HIV/AIDS and HCT services in Nigeria. This was followed by reviews of the concept Contingent Valuation method, willingness to pay, Health Belief Model, and HIV-related stigma. The last section of the chapter dwelt much on the theoretical frameworks and hypothesis formulation to capture the objectives of the study. The next chapter discusses the methodology adopted to achieve the stated objectives in chapter one and hypotheses developed in chapter two of this thesis.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology adopted to address the research objectives and research questions stated in Chapter one of this study. The chapter describes and explains the research method, measurement scale development, instrument development, instrument evaluation, sample and sampling technique, data collection and data analysis procedures used in this study.

3.2 Research Design

In this section, the research design employed to provide answers to research questions in Chapter one and testing of hypotheses as stated in Chapter two are highlighted. According to Polit & Beck (2004, p.162), "the research design of a study spells out the basic strategies that researchers adapt to develop evidence that is accurate and interpretable". It is described as a plan or blueprint which guides researchers to appropriately plan and implement studies to be able to realise set objectives (Burns & Grove, 2001). Research design entails three cardinal concepts, a plan, structure, and strategy, which provide a researcher guidance to write the research questions, execute the project, analyse and evaluate the data and interpret the results (Haber & Lobiondo-Wood, 2006).

This study used a quantitative, cross-sectional, survey-based research approach which enable the collection of statistical data at a point in time for analysis and reporting purposes in order to provide answers to research questions in the study (Polit & Beck, 2004). The survey is one of the quantitative research methodologies that has been extensively used in many fields/disciplines such as economics, social sciences, health sciences and other areas. Survey research possesses great usefulness owing to its wide application and broad coverage in almost any discipline (Barribeau et al., 2012; Babbie, 2008). It allows access to vital information such as respondent's attitudes, opinions,

knowledge and self-reported behaviour. The survey is described as, "a method of collecting information from a sample of the population of interest, usually by personal interviews, postal or other self-completion questionnaire methods… and can be designed to measure certain phenomena (events, behaviour, attitudes) in the population of interest" (Bowling, 2009, p. 214). Quantitative survey research is very suitable in a situation where there is pre-existing knowledge of the phenomenon at hand, and this allows the use of standardised survey instruments such as survey questionnaire which can be used to test the formulated hypotheses (Bowling, 2009). Survey research is relatively inexpensive, especially self-administered surveys, large samples can be collected, and it can be administered even to the farthest distant location (using email or telephone). However, survey research possesses some weaknesses – general questions are often pose to all respondents thereby missing out what is most appropriate for each respondent, the designed research tools are highly inflexible as they do not change during the data collection period, the respondent may find it difficult to recall some information, and some respondents may not be able to tell the truth especially on a controversial subject (Barribeau et al., 2012).

In survey research, the sample of the study can be interviewed in person (face-to-face), or through telephone, or requested to complete a self-completion questionnaire. It can be cross-sectional or retrospective – taking place at a point in time, or it could be longitudinal – taking place more than one point at a time. According to Kaplan and Duchon (1988), quantitative approach is advantageous most especially in a situation where a theory is already established and also when relationship among the variables in the theory needed to be evaluated and validated. Therefore, the choice of quantitative survey research for this study is thus justified since the study aims at using existing models for predictions and validation purposes. A quantitative, descriptive research design was considered an appropriate method and thus employed for this study in order to systematically collect

viable information about the willingness to pay for HCT, general knowledge, attitudes, behaviour, perception, practice towards HIV/AIDS and HCT, and HIV-related stigma among the population of Lagos State, Nigeria. The objectives of this study are to evaluate and validate WTP and its determinants and to determine health belief factors that predict behaviour of people towards the HCT services utilisation as proposed in chapter two. The study specifically employed survey methodology using a structured questionnaire to gather information on WTP and health behaviour from the sample of individuals in three local government areas of Lagos state, Nigeria.

3.3 Research Method

According to Polit & Beck (2004), research methods refer to "the techniques used to structure a study and to gather and analyse information in a systematic fashion" (p.731). This study employed quantitative research method to explore the relationship between the dependent variable and the independent variables as stated in the study hypotheses. A quantitative research method of a study entails a number of processes such as data collection, data analysis, results interpretation, and writings (Creswell, 2013). Cross-sectional survey was employed for this study and data were collected in one-point time in the year 2015.

3.3.1 Study Setting and Sites

The study setting for this study is Lagos State. Three Local Government Areas (LGAs) – Alimosho, Ikorodu, and Surulere – were selected for this study. The selected LGAs were among those with high HIV prevalence rate in the state. Lagos State is cosmopolitan and has a population of about 17 million, it is the largest city in Nigeria and Africa, and possesses a melting pot nature. Lagos state was chosen because it is among the states with highest HIV/AIDS prevalence rate of 4.1% in Nigeria (NACA, 2015). Lagos State has 20 Local Government Areas (LGAs) and 38 Local Council Development Areas (LCDA).

The state is politically divided into three districts: North, Central and South Senatorial Districts.

3.3.2 Study Population

Study population is referred to as "the entire set of individuals (or objects) having some common characteristics" (Polit & Beck, 2004, p. 727). The population provides the basis for making inferences (Cooper & Schindler, 2014). The Nigeria population census 2006 put the three LGAs (Alimosho, Ikorodu, Surulere) under this study at 2,317,308. For the purpose of this study, the target population was made up of adults aged twenty years or older.

3.3.3 Inclusion Criteria

Inclusion criteria or eligibility criteria are a set of conditions individual must fulfil to be classified as a member of the population of the study (Polit & Beck, 2004). Eligibility criteria for the respondents of this research study were the following: adult men and women, must be twenty years old and above. This age category was chosen because they constitute highest number of HIV prevalence rate, incidence rate and also form bulk of working population which could supply some of the crucial information needed in the study (UNAIDS, 2015).

3.4 Sample size, Sampling, and Sampling Procedure

3.4.1 Sample Size

A sample is described as the subset of the elements of the target population and sample size is the total number selected to represent the population (Polit & Beck, 2004). This study employed the accepted and popular Krejcie & Morgan (1970) formula and sample size table to determine the required sample size (see Appendix G). The formula is stated as follows:

Sample size (s) = χ^2NP(1-P)/d^2(N-1)+ χ^2P(1-P). This can be restated as:

Sample size; $s = \frac{\chi^2 NP(1-P)}{d^2(N-1)+\chi^2 P(1-P)}$

Where:

s = required sample size

χ^2 = table value of Chi-Square for one degree of freedom at the desired confidence interval

N = the population size

P = the population proportion (assumed to be 0.50 since this would provide the maximum sample size)

d = the degree of accuracy expressed as a proportion (0.05)

Therefore, based on the formula above, a total number of 768 respondents (for both users and non-users of HCT) were required for this study. The total sample size for this study was proportionately allocated to the three (the three selected LGAs) using Levy & Lemeshow (2008) formula:

Proportionate Strata sample size formula: $n_h = \frac{N_h}{N} \times n$

Where:

n_h = the sample size for stratum h

N_h = the population size for stratum h

N = the total population size

n = the total sample size

h = (no of stratum)

The sample size allocation to each stratum is summarised in Table 3.1. The population for each LGA is based on the 2006 Nigeria population census (NPC, 2006)

Table 3.1: Proportionate sample size allocation for the three LGAs

S/N	Senatorial District	Name of LGA	Population Size	Sample size allocation
1	Lagos West	Alimosho	1,277,714	422
2	Lagos East	Ikorodu	535,619	178
3	Lagos Central	Surulere	503,975	168
		Total Population = 2,317,308		**Total Sample Size = 768**

3.4.2 Sampling and Sampling Procedures

Cooper & Schindler (2014) define sampling as "the process of selecting some elements from a population to represent that population" (p. 665). They offered compelling reasons for sampling, which include, lower cost, higher results accuracy, greater speed of data collection, and availability of population elements. Sampling design can be classified into two: probability and nonprobability sampling. Probability sampling is the sampling type in which each element or unit in the population is randomly selected, and each has a chance of being selected. Examples are simple random sampling, stratified random sampling, systematic sampling, and cluster sampling. On the other hand, nonprobability sampling involves a situation in which the sample unit is nonrandomly, arbitrarily and subjectively selected from a target population to represent the population. Each of the elements in the unit does not have a nonzero chance of being selected. Examples are – Convenience sampling, snowball sampling or chain sampling, quota sampling and purposive sampling (Polit & Beck 2004; Cooper & Schindler, 2014). Probability sampling is adjudged to produce better representative than nonprobability sampling (Bowling, 2009; Cooper & Schindler, 2014). However, in a situation where the criteria for adopting probability sampling, are not met researchers usually resort to nonprobability sampling method.

This study employed nonprobability sampling method in selecting the sample units among the target population. The selection of this method is justified on the ground of that the sampling frame of the users and non-users of HCT (the total list of those who have been tested for HIV and those who have never been tested) for all the study sites are

not available at all or inaccessible (Bowling, 2009; Cooper & Schindler, 2014). To improve the representativeness of the units in the target population and also provide a reasonable results interpretation and generalisation, this study carefully utilised nonprobability sampling by combining both quota and convenience sampling methods in which one LGA was selected from each of the senatorial districts of Lagos state (Lagos East senatorial district – Ikorodu LGA, Lagos, West senatorial district – Alimosho LGA, and Lagos Central senatorial district – Surulere LGA) based on their HIV prevalence rate. Although, nonprobability convenience sampling possesses some advantages, but also has some limitations, such as, vulnerability to selection bias and high level of sampling error. Sampling unit of analysis in this study was the individual in the household in the selected districts.

3.5 Data Collection and Research Instrument

3.5.1 Data Collection

Ross & Matthews (2010, p. 476) describes data as "a collection of facts (or other information, such as opinions or values) which can be analysed and from which conclusions can be drawn". Data collection involves information gathering with the aim of utilising them in order to address a research problem (Polit & Beck, 2004). In cross-sectional survey, data collection is executed at a single point in time from participant (Babbie, 2010). Research data can be collected by means of quantitative method (survey -questionnaire, telephone, email, web, scientific experiment, etc.) or qualitative method (focus group, in-depth interviews, observation, case studies etc.). Based on the quantitative nature of this study, structured questionnaires were administered face-to-face to the study participants in order to collect the required data. All information was totally anonymised such that there was no personal identification of the respondent. Data collection phase commenced in May 2015 and ended in July 2015. Eleven Field Workers and a Research Coordinator were recruited and trained for two days before the

commencement of the exercise. They were distributed to the three study sites (LGAs under the study).

3.5.2 Research Instrument

This study employed a structured survey instrument, questionnaire, to collect data. According to Polit & Beck (2004), data collection instrument is a "formal written document used to collect and record information, such as questionnaire" (p.318). Structured questionnaire inherent advantages include: it is less costly to administer, it guarantees anonymity, and there is absence of interviewer bias. The items of the survey instrument of the study were mostly close-ended questions of which, according to Polit & Beck (2004), are more efficient, easy to administer and analyse and ensure a greater measure of privacy. However, its demerits lie in the fact that some potentially important responses can be overlooked. The items on the questionnaire were adapted from the literature and past validated studies. The questions in the structured research instrument cover the following areas:

- Sociodemographic and socioeconomic factors.
- Knowledge, attitude, behaviour, perception, practices about HIV/AIDS and HCT.
- Four constructs of HBM (perceived susceptibility to HIV infection, perceived severity of AIDS, perceived benefits of HCT, and perceived barriers to HCT).
- Perception of HIV-related stigma
- General health status
- Contingent valuation (willingness to pay for HCT)

The data collection instrument, questionnaire, is presented in Appendix A.

3.5.3 Research Instrument Evaluation (Reliability and Validity)

Before the commencement of the main survey, the research instrument was evaluated in order to achieve the following goals: to ensure that all the questions are well understood,

to make necessary adjustment to an area that seems obfuscating, to evaluate the instrument reliability and validity. Polit & Beck (2004), define instrument reliability as "the consistency with which it measures the target attribute" (p.416) and validity as "the degree to which an instrument measures what it supposed to measure" (p. 422). The reliability and validity of measurement items are important to ensure the instrument is appropriate for the study. The study employed internal consistency reliability approach to ensure items were consistent with the scale of the constructs they were designed for in the study. Items that failed to fit into the scale were removed. In addition, the instrument's validity approaches employed face and content validity. Face validity has to do with physically examining the items to ensure they measure a particular construct and content validity was to ensure that constructs to be measured have appropriate items sample in the instrument (Polit & Beck, 2004). To enhance the face and content validity, the researcher sought the assistance of experts who were vast in the study area. The experts Statistician critical reviewed the questionnaire items to ensure they are consistent with what they are meant to measure.

3.5.4 Research Instrument Pre-testing

Polit & Beck (2004), describe pre-testing as "the trial administration of a newly developed instrument to identify flaws or assess time requirement". The research instrument was pretested among 20 people who were not part of the main survey. The items of the instrument were reviewed and revised based on the results of the pre-test, and the inputs of the research assistants were added to the instrument. The data gathered during the pilot study were only used for that purpose and do not make up the final survey data.

3.6 Data Collection Procedure

Subsequent to the pre-testing of the survey instrument, a few adjustments were made to the original questionnaires, and the main survey commenced in May 2015 and ended in

July 2015. The new questionnaire was labelled according to their Senatorial District (SD) and Local Government (LG). The researcher who doubled as chief investigator handed over the research instruments to the field workers who had been initially trained on how to conduct the survey. The survey combined self-administered questionnaire in a paper-and-pencil format and in-person interview schedule in order to properly administer contingent valuation aspect of the instrument. Eleven field workers were distributed to the three LGAs under the study. Alimosho – four fieldworkers; Ikorodu – four fieldworkers, Surulere – three fieldworkers. The field workers sought the consent of the respondents before their participation. Their confidentiality was assured, and they were informed that they were at liberty to opt out if they feel inconvenient during the course of the interview. All the field workers reported every Saturday to bring reports of their activities and the completed questionnaires. Challenges faced during the period were also addressed.

3.7 Variables and Measurement Scales Development

The level of measurement describes the relationship existing among the values assigned to the attribute to a variable. It helps in the interpretation of the data from the variable and determination of appropriate statistical analysis to be deployed on the assigned value. Four basic levels of measurement are identified in the statistics text: nominal, ordinal, interval and ratio (Bowling, 2009; Cooper & Schindler, 2014; Hair et al., 2009; Trochim, Donnelly, & Arora, 2015). The level of measurement of variables in WTP model comprises of ordinal, nominal, and interval. On the other hand, the independent variables measuring HBM constructs were mostly ordinal.

3.7.1 Willingness to Pay (WTP) Variable and Its Determinants

The CV method adopted as part of the goal of this thesis seeks to assess the individuals' WTP for HCT services. WTP is the dependent variable which was continuous. The

independent variables for WTP analysis were combinations of nominal and ordinal types. They were sourced from published works (Carson, 2012; Forsythe et al., 2002; Frew, Whynes, & Wolstenholme 2003; Nguyen et al., 2016) and presented in the Table 3.2.

Table 3.2: Independent Variables for WTP

Variables	Scales	Data Level	Measurement statement/operational definition
Gender	Sex	Nominal	Sex of the respondents
Age	Age	Ordinal	Age of the respondents
Marital status	Marital status	Nominal	Marital status of the respondents
Educational Status	Hedu	Ordinal	Highest educational qualification obtained
Employment status	Employ	Ordinal	Employment status
Religion	Rel	Nominal	Religious affiliation
Income	Income	Ordinal	Total household income per month
Family Expenditure	Exp	Ordinal	Total household expenditure per month
Family size	Famsize	Ordinal	Total number in the household
Health status	Healthsta	Ordinal	General health status
Personal health insurance	Ins	Nominal	Have personal insurance or not
HCT Knowledge	HCTKno	Nominal	Have the knowledge of HCT as a means of detecting HIV virus
Know PLWHA	HIVInfp	Nominal	Know a person(s) infected with HIV
Know someone killed by AIDS	AIDSdeath	Nominal	Know a person(s) died of AIDS
Likelihood of contracting HIV	HIVch	Nominal	Chance of contracting HIV
Level of HIV worry	HIVwrr	Nominal	Worry much about HIV
HIV stigma fear	HIVstig	Nominal	Have fear about stigma associated with being HIV-positive

3.7.1.1 The Contingent Valuation Elicitation Format Used in the Study

According to Frew (2010, p. 102), "the elicitation format refers to the style of questioning to elicit the WTP/WTA value". Till date, it seems there is no consensus in the health care literature regarding the most superior elicitation format among the available ones. Each of elicitation format or technique possesses its own strength and weakness as well. The Contingent valuation survey instruments use for elicitation of respondent's willingness to pay can take different formats, such as:

Open-ended formats – This is regarded as the simplest method of elicitation method which provides a leeway for respondents to state the price they are willing to pay or accept. In other words, respondents are not given a specific price to either accept or reject. There are no cues or prompts coming from the interviewer or questionnaire to the respondent. Also, a space is created for the respondent to write his maximum WTP. However, it has been argued that respondents often find it challenging to answer WTP questions and most time produce a more significant number of non-response and protests zero responses (Desvousges, Smith, & McGivney, 1983; Arrow et al., 1993; Arrow, 1963).

Close-ended formats – this question format is a Dichotomous Choice (DC) questions and presented respondents with a specific value and gives a "yes"/ "no" answer as to whether they are WTP this amount or not.

Iterative bidding technique or Bidding game– This method is identical to the typical auction market situation in which respondents may be familiar. Davis (1964) introduced the bidding game format of WTP elicitation. It takes the form of haggling or bargaining process that usually takes place in the real-life market. The interviewer keeps changing iteratively, the stated amount of money to be paid until the highest or lowest amount of willingness to pay or accept is attained (Cumming et al., 1986).

Payment Card/ payment scale question – this method is an alternative to bidding game which was developed by Mitchell & Carson (1981; 1984; 1989). The WTP questions are presented to respondents with visual aids. It is a sophisticated questioning technique that specifies the increment or decrement in the good in question.

The discrete choice – this also known as (dichotomous choice, take-it-or-leave-it, and referendum). It was developed by Bishop & Heberlein (1979). It uses close-ended type of questions and a large number of predetermined prices chosen to bracket expected

maximum amount of willingness to pay of respondents. Arrow et al. (1993) recommended this CV elicitation format.

Close-ended with follow-up questions –Carson, Hanemann, & Mitchel (1986) proposed this elicitation method. It is an extension of close-ended format whereby respondents are required to answer yes or no to the first WTP questions pose to them. If respondents answer yes, then another question is randomly raised from a pre-specified list using a higher price. On the other hand, if respondents say no, a lower rate is used as a follow-up questions (Mitchell & Carson, 1987).

The elicitation format adopted by this study is a payment scale with the iterative bidding method of WTP elicitation (Forsythe, 2001). The elicitation method combined features of both payment scale and iterative bidding game method to eliminate biases and problems usually associated with payment scale and iterative bidding game. The reasons for adopting this method are, firstly, was to avoid starting up bias associated with both payment scale/card and iterative bidding game. Secondly, it was to avoid a large number of low or non-responses or protest zeroes responses often recorded by using the open-ended elicitation format in WTP questions (Mitchell & Carson, 1991; Johannesson et al., 1991). Protest votes or responses, according to Frew (2010), occur when respondents protest to the program or service being presented to them by either stating a ridiculous or unreasonably low or high price on the range of WTP values. In CV studies, respondents may deliberately indicate no WTP values or zero values despite the fact that they are aware and care about the service, but feel it is the responsibility of someone else to pay for the service or that government should provide it free of charge for the citizens. Protest votes in CV studies are often classified or grouped with an unwillingness to pay (Frew, 2010; Forsythe, 2001). In fact, Diamond & Hausman (1994) contested that the zero response is regarded invalid and incredible and thus must be systematically eliminated

from the WTP values. In this study, very few respondents expressed zero WTP and were subsequently grouped with those unwilling to pay.

Mitchell & Carson 1981 & 1984 developed the payment scale to provide an alternative for bidding game approach with its associated problems. It usually presents respondents with a list of bids ranging from the lowest to highest in which they can choose. However, this method is susceptible to starting up bias, that is, majority of the respondents could be influenced to choose the first bid on the list on sighting the list. The method used in this study presents the range of bids from zero to highest. The list of price was presented to the participants, and they were asked to pick one. The first selected price represented the first bid. The interviewer asked if they could still afford to pay for the next price in the card/rank, if the answer was in affirmative, the next price was presented until they declined payment. The last price they agreed to pay would be the final bid. The list of bidding prices was adopted from the past studies and were adjusted to fit into the study context (Forsythe, 2001). The bidding price also took cognisance of the existing price of HIV testing in the private hospitals or other providers of HCT in the state.

3.7.2 Health Belief Model (HBM) Variables

Perceived susceptibility, perceived severity, perceived benefits, and perceived barriers, are the four major latent constructs that form the pillars of the Health Belief Model. Based on the nature of this study, we included only the four traditional constructs from the six constructs as highlighted in Chapter 2. The HBM four independent, reflective latent constructs were measured using scales adapted from (Rosenstock, 1974; 1990; 2005; Rosenstock, Strecher, & Becker, 1988; 1994; Chen & Han, 2010). HBM variables included 37 indicators. Items were measured in Likert scale 1-5, where 1 corresponded to 'strongly disagree' and 5 corresponded to 'strongly agree'. Likert scale is arguably adjudged as easy, quick to construct, more reliable (Edwards & Kenney, 1946; Likert,

1932) and also provides higher volume of data than other scales (Cooper & Schindler, 2014; Allen & Seaman, 2007). These variables were used to test hypotheses in Chapter 5 of this thesis. Table 3.3 presents the summary of HBM variables and their respective measurement indicators/items. The level of measurement for all the four latent constructs is ordinal.

Table 3.3: HBM Constructs and Measurement Scale

Constructs	Indicators	Measurement statement
Perceived susceptibility to HIV infection (PSU) (Rosenstock, 1974; Rosenstock, 1994; Rosenstock, 2005; Rosenstock, et al.,1998)	PSU1	It is likely I will get HIV/AIDS in the future
	PSU2	I believe I am more likely than other men/women to contract HIV/AIDS
	PSU3	There is possibility that I will get AIDS because of my physical conditions
	PSU4	I worry a lot about getting HIV/AIDS
	PSU5	With my family history, I am more likely to get HIV/AIDS
	PSU6	I believe my chances of getting HIV/AIDS are great
Perceived severity of AIDS disease (PSE) (Rosenstock,1966; Rosenstock,1974; Rosenstock,1994; Rosenstock, 2005; Rosenstock, et al.,1988; Janz et al 2002)	PSE1	Getting an HIV is uncomfortable
	PSE2	AIDS is a hopeless disease
	PSE3	AIDS would be a serious problem for me
	PSE4	Contracting HIV/AIDS is the worst thing that can happen in my life
	PSE5	My feeling about myself would change if I got HIV/AIDS
	PSE6	Having HIV test would be shameful
	PSE7	HIV/AIDS would cause difficulties in my marriage or future marriage
	PSE8	Having HIV/AIDS would interfere with my roles in the family
	PSE9	I am afraid to think about HIV/AIDS
Perceived benefits of HCT (PBE) (Chen, 1995; Champion 1984; Rosenstock,1966; Rosenstock, 1974; Rosenstock, 1994;	PBE1	I believe getting HIV test would let me feel good about my health
	PBE2	I believe detecting HIV early HIV testing is worth the cost of the test
	PBE3	I believe getting HIV test to prevent developing AIDS is a good idea
	PBE4	I would not be so anxious about AIDS if I had HIV test regularly
	PBE5	Having an HIV test will decrease my chances of dying of AIDS
	PBE6	I believe having a good report from HIV test would give me a sense of relief
	PBE7	I believe AIDS will cause death if not detected and treated early
	PBE8	I believe AIDS will never happen to me if I get HIV test regularly
Perceived barriers to HCT (PBA) (Awad et al., 2004; Goings, et al 2005; Rosenstock,1966; Rosenstock, 1974;	PBA1	I do not receive financial support from any of my family members
	PBA2	I don't have money to do the test
	PBA3	Don't know any HCT location in my community
	PBA4	HCT location in my community is too far from my house
	PBA5	

Table 3.3: Continued

Rosenstock, 1994; Rosenstock, 2005; Rosenstock, et al.,1988)	PBA6	I don't trust HCT personnel to keep secret my HIV test status
	PBA7	I am afraid the HIV test result may be positive
	PBA8	I am scared of the stigma of being tested positive
	PBA9	I will lose my dignity while getting an HIV test
	PBA10	My doctor doesn't tell me I need HIV test
	PBA11	Having HIV test would be embarrassing
	PBA12	I don't like to have an opposite gender for HIV test
	PBA13	The HCT centres hours for getting testing are inconvenient for me
	PBA14	HIV test is not accurate
	PBA15	Having sample of my blood drawn for HIV test makes me uncomfortable
		My religious beliefs do not support HIV test.

3.7.3 Moderating Variables – Sociodemographic Variables

In line with original HBM model, the sociodemographic variables are regarded as modifying factors as established by Rosenstock & Irwin (1997). Sociodemographic variables, age, gender, marital status, employment status, educational status in Table 3.1 were used for moderating effect analysis in Chapter 5 to achieve the second part of the second objective of the study.

3.7.4 Mediating Variable (HIV-related Stigma) And Other Predictors

HIV-related stigma have been identified in the literatures of HIV/AIDS and HCT as a strong determinant of utilisation of HCT and other HIV/AIDS services (UNAIDS, 2001; UNAIDS, 2007; UNAIDS, 2014; WHO, 2011; Lancet, 2014; NDHS, 2014). Stigma is assumed to mediate between willingness to do HIV testing, awareness of the benefits of HIV testing, perceived threat of HIV and HCT services utilisation (Babalola, 2007; Odimegwu, Adedini, & Ononokpono 2013; Earnshaw et al., 2014). HIV-related stigma construct together with their measurement items and sources are presented in Table 3.4. This were used in the analysis of a mediation model in chapter 6. The stigma latent constructs were measured using scales from (NDHS, 2013; Genberg et al., 2008; Nyblade & MacQuarrie, 2006; Nyblade et al., 2005; van Brakel, 2006; Berger, Ferrans, & Lashley, 2001). Stigma construct has 15 indicators measured 3-point categorical nominal scale in

which 1 stands for "Agree", 2 stands for "Disagree", and 3 for "Don't Know/No Opinion" (Cooper & Schindler, 2014; Bowling (2009).

Table 3.4: HIV-related Stigma construct and measurement level

Constructs	Indicators	Measurement Statement
HIV-related Stigma (NDHS,2013; Genberg, et al.2008; Nyblade & MacQuarrie,2006; Nyblade, et al.,2005; Van Brakel, 2006; Berger, et al.,2001)	STGM1	Play with person living with HIV/AIDS (PLWHA)
	STGM2	Eat/share food with PLWHA
	STGM3	Buy things from PLWHA
	STGM4	Stay in the same house with PLWHA
	STGM5	Share same room with PLWHA
	STGM6	Share same office with PLWHA
	STGM7	Share same classroom with PLWHA
	STGM8	Attend the same church/mosque with PLWHA
	STGM9	Enter same vehicle with PLWHA
	STGM10	People with HIV/AIDS should be ashamed of themselves
	STGM11	People with HIV/AIDS should be blamed for bringing the disease into the community
	STGM12	People with HIV/AIDS should be killed so that the disease will not spread any further
	STGM13	People with HIV/AIDS should be avoided at all cost since they can infect others in the community
	STGM14	People with HIV/AIDS should not be offered admission into schools
	STGM15	People with HIV/AIDS should not be given employment in both Government and private companies

Other independent variables used in the mediation model analysis in chapter 6 in order to address the third objective of the study are presented in the Table 3.5 below. They are nominal data measured in 2 levels, yes or no. These variables directly influenced HCT utilisation and indirectly as well through HIV-related stigma.

Table 3.5: Other independent variables in the mediation model

Constructs	Indicators	Measurement statement
HIV-related knowledge (KNHA) (NDHS, 2013; Yang et al 2007)	KNHA1	Have heard about HIV and AIDS
	KNHA2	Know someone infected with HIV virus
	KNHA3	Know someone died of AIDS-related disease
HIV transmission misconception (MSHIV) (NDHS, 2013; Yang et al 2007)	MSHIV1	HIV may be transmitted through mosquito bites
	MSHIV2	Sharing of foods or drinks with an HIV infected person may transmit the virus
	MSHIV3	Shaking of hands or hugging an HIV infected person may transmit the virus
	MSHIV4	Sleeping in the same bed with an HIV person may transmit the virus
	MSHIV5	HIV may be transmitted if an infected person cough or sneeze on you

Table 3.5: Continued

	MSHIV6	Sharing a toilet with an infected person may transmit the virus
	MSHIV7	Witchcraft or other supernatural means may transmit the virus

3.8 Data Analysis Methods

Two major steps were involved in the data analysis. Step one involved preliminary data analysis to get the data ready for the main analyses. Step two dealt with using the appropriate data to analyse the specific objectives as outlined in chapter 2, which include WTP analysis in Chapter 4, full PLS-SEM analysis together with moderation effect analysis in Chapter 5 and mediation analysis in chapter 6.

3.9 Preliminary Data Analysis

3.9.1 Step one: Data Preparation and Screening– Editing, Coding, Data Entry

Before applying an appropriate analysis of the data, data in raw form in the questionnaires needed to be prepared converted into reduced and classified forms and adequately entered into desire software meant for that purpose. According to Leech, Barrett, & Morgan, (2005), preliminary/exploratory data analysis is very imperative before a full analysis of data because it helps in detecting problems in the data, such as outliers, missing values, coding problem, non-normal distribution and errors inputting the data.

Data entering, coding and editing were done using SPSS version 22. In order to examine the data for any problem such as missing data, outliers, and normality distribution, basic descriptive statistics program was run to compute mean, minimum, maximum values for all the participants (Morgan et al., 2011). The total missing values were less than 5%. Nonetheless, missing data replacement was done using imputation method – median value/mean. Outliers detection: descriptive statistics was run (minimum and maximum values) to detect the presence of outliers in the dataset and were corrected manually. Normality test was carried out to determine the distribution pattern of the data which eventually informed the type of analysis suitable for the data to answer the research

questions and test the various hypotheses. Analysis of data not normally distributed followed non-parametric method while those normally distributed were analysed using parametric analysis (Morgan et al., 2011).

3.9.2 Step two: Using the screened and prepared data for appropriate analysis.

As mentioned in step one of the data analysis method, after the raw data were screened for potential problems such as outliers, missing data, and inputting errors or mistakes, the screened data were then uploaded for the appropriate analysis that suit each objective of the study (Allison, 2002).

3.10 The Statistical Analysis of WTP.

For the first objective, WTP data were used in analysis. The following analyses were conducted to achieve the stated objective: descriptive statistics, bivariate analysis bivariate analysis, and General Linear Model (GLM) analysis which embraces ANOVA, ANCOVA and Linear regression.

The statistical analysis of the WTP data for this study was in two folds. The first part dealt with the non-parametric estimations of the WTP, and the second part of the analysis entailed the WTP regression analysis using General Linear Model (GLM).

3.10.1 Non-parametric Analysis

Non-parametric estimations were conducted to compare the effect of socio-demographic and socioeconomic variables on WTP of the respondents. The choice of the tests was informed by the gross violation of normality assumption of WTP data [Skewness (1.181), SE (0.088); Kurtosis (-0.606), SE (0.176)].

Three types of non-parametric tests were carried out in this section. They were: Chi-square analysis; Mann-Whitney U Test; K-Samples Test (Kruskal-Wallis H Test-Median test) (Kruskal & Wallis, 1952; Mann & Whitney, 1947).

3.10.1.1 Chi-square Analysis - Test of Independence

Chi-square Test can be used to test whether one categorical variable is independent of another variable. In other words, it is usually used in testing whether a statistically significant relationship exists between a predictor and criterion variable. The question the Chi-square answered here is: are the sociodemographic variables of those who are willing to pay and those who are unwilling to pay related to WTP?

The following hypotheses were tested:

H_0: sociodemographic, KAPB variables and WTP are independent

H_1: sociodemographic, KAPB variables and WTP are not independent

Decision: Reject H_0 if the *p*-value is less than 0.05; but if the *p*-value is greater than 0.05 accept H_0 that both dependent and independent variables are independent.

3.10.1.2 Mann-Whitney *U*-Test Analysis - WTP and Sociodemographic Variable

WTP data was not normally distributed, thus, violated t-test and ANOVA assumptions. Hence, the resolved to use the most appropriate nonparametric test, Mann-Whitney *U* Test, which does not require the assumptions of parametric distributions (Mann & Whitney, 1947). A Mann-Whitney 2-sample rank sum test was conducted to examine whether there were significant differences in respondents' WTP between groups/levels of the independent variables, that is, socio-demographic variables. Mann-Whitney U Test converts the score on the continuous variable to ranks across the two groups and evaluates whether the ranks of the two groups differ significantly. It does compare medians rather than means as in the case of t-test (Pallant, 2010). The Mann-Whitney 2-sample rank mean the test is a non-parametric alternative to the independent samples t-test and does not share the independent sample t-tests distribution assumptions (Hinton et al., 2004; Field, 2009).

Assumptions of Mann-Whitney U-Test

1. Dependent variable must be measured at the ordinal or continuous level.
2. Independent variable should be of two levels or groups categorical form.
3. Observations must be independent.
4. The variables are not normally distributed. (Pallant, 2009)

Since the dependent variable (WTP) and independent variables of the study model meet all the assumptions, we resolved to employ Mann-Whitney test to compare differences between independent variables with two groups or levels on the WTP (Field, 2009).

It tested the following hypotheses under two-tailed:

H_0: $\mu_i = \mu_j$

H_1: $\mu_i \neq \mu_j$

Where μi represents the median of the first group, *I;* and μj median of the second group, *j*. It tests if the mean of group *i* is statistically significantly different from the mean of group *j*.

3.10.1.3 Kruskal-Wallis Test - WTP by Socio-economic variables

The Kruskal-Wallis test is a non-parametric alternative to the one-way ANOVA and does not share the ANOVA's distributional assumptions (Huck, 2012). Also, it can be regarded as the extension of Mann-Whitney U test just as ANOVA is viewed as an extension of T-test in the parametric analysis. It is also known as Kruskal-Wallis one-way ANOVA on ranks whereby statistically significant differences between two or more groups of an independent variable on a continuous or ordinal dependent variable (Pallant, 2010). The statistics H (rather than F in the ANOVA) gives a measure of the relative strength of the

variability in the ranks between the conditions compared to a standard value for the number of participants (Hinton et al., 2004).

The purpose of conducting a Kruskal-Wallis H Test is to assess if there was an overall effect of family income and family expenditure categories on the WTP. In another word, Kruskal-Wallis tests if at least two groups of income and expenditure are different from each other while controlling for experiment-wise inflation of Type I error.

Assumptions of Kruskal-Wallis H-Test

1. Dependent variable should be measured at the ordinal or continuous level (that is, interval or ratio).
2. Independent variable should have three or more categorical, independent groups.
3. Observations must be independent. There is no relationship between observations in each of the groups or between the groups themselves.
4. The variables are not normally distributed. (Pallant, 2009)

Post-Hoc Investigation for the Kruskal-Wallis Test: Post-hoc test was conducted as a follow-up tests for the group that has significant Kruskal-Wallis test to detect the income groups that were statistically significantly different from another (Pallant, 2009; Field 2009).

3.10.2 WTP Regression Analysis

Regression analysis procedure in GLM univariate was employed to assess the predicting variables that are significantly influenced WTP for HCT.

3.10.2.1 Variables Transformation: Criterion and Predictor Variables

Prior to the regression analysis, criterion and predictor variables in WTP model were transformed for the sake of compatibility with the criteria for the running of valid and reliable results. The other qualitative independent variables used in the GLM regression

analysis were all categorical and nominal with two levels or groups. These qualitative variables were transformed into quantitative before carrying out a regression analysis (Pedace, 2013; Stock & Watson, 2003). The qualitative variables in the model are gender, age, marital status, educational level, occupational level, general health status, knowledge of HIV/AIDS, knowledge of HCT, HIV testing status, knowledge of people infected with HIV, knowledge of persons died of AIDS-related diseases, chance of contracting HIV, worry about HIV/AIDS, and fear of HIV/AIDS-related stigma. Some quantification manipulation of these qualitative variables was performed by re-coding them into binary variables, which are also called zero-one or dummy variables (Wooldridge, 2013). The first group of the categorical variables was assigned zero while the second group was assigned one. The group designated zero is referred to as reference group or base group or benchmark group, which is the "group against which comparisons are made" (Wooldridge, 2013, p. 230).

3.10.2.2 General Linear Model (GLM) Estimation- Regression Procedure

GLM regression procedure was employed for the analysis of respondents' WTP against some predictors. GLM was chosen based on the type and nature of the variables and data used in the analysis of WTP for HCT. While the outcome variable, WTP, is continuous, the explanatory variables are combinations of nominal and continuous variables with different levels. GLM can predict one dependent or response variable from one or more other independent variables or predictor variable. Within the GLM method, an independent variable that is categorical is regarded as a factor and the groups present in this categorical variable as levels of the factor. The continuous independent variable within GLM is considered to be a covariate. GLM embraces ANOVA, ANCOVA and regression analyses within the model. While ANOVA deals with categorical independent variables, ANCOVA, on the other hand, handles one or more continuous independent variable in the GLM model. For the ANOVA and ANCOVA to be properly fit into GLM,

the levels of the factor of an ANOVA must be re-coded into dummy codes and parameters are then solved. But thanks to SPSS as the categorical variables are automatically coded using the highest level as a reference category. In order to perform regression analysis under GLM, the categorical variables must be dummy-recoded (Leech, Barret, Morgan, 2005).

3.10.2.3 General Linear Model Assumptions:

General linear model (GLM) analysis is based on the following assumptions:

1. Linearity

2. Normality of Residuals

3. Equality of residual variances

4. Fixed independent variables measured without error

3.10.2.4 GLM Statistical inference

The logic behind the GLM statistical inference is in two parts. The first part deals with overall model which adequately explains the data irrespective of the individual independent variables that make up the model. The second part has to do with the examination of the impacts or effects of the different independent variables to detect those that substantially and significantly contributed to the prediction from those that contribute little to the model. (Leech, Barret, Morgan, 2005).

The fundamental equation for the General Linear Model is given as:

$Y = \alpha + \beta X$ ……..……..…..3.1

Where Y= a set of outcome variable, X = set of independent variables (categorical) or covariates, α = set of intercepts when each X=0, β = a set of coefficients, one for each X

For several independent variables, the GLM equation is given below: (*U*=Error term)

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + ...\beta_K X_K + U \quad \text{.....3.2}$$

The equation for the predicted value of the dependent variable is

$$\hat{Y} = \alpha + \beta_1 X_1 + \beta_2 X_2 + ...\beta_K X_K . \quad \text{.....3.3}$$

3.10.2.5 GLM Parameters

The GLM parameters are given as α_s, and β_s. α is obtained when all X is set to 0*; while* β_s are the coefficients of all the independent categorical variables (including dummy coded levels of factors) and independent covariates.

3.10.2.6 GLM Model Specification

Our model of interest for the WTP in this study is given as follows:

$$WTP = \alpha + \beta_1 Sex + \beta_2 Age + \beta_3 MarSta + \beta_4 Heduc + \beta_5 Emply + \beta_6 Healthsta + \beta_7 AIDSkno + \beta_8 HCTkno + \beta_9 HIVtested + \beta_{10} HIVInfp + \beta_{11} AIDSdeath + \beta_{12} HIVch + \beta_{13} HIVwry + \beta_{14} HIVstig + \beta_{15} Inc + U \quad \text{.....3.4}$$

Where:

WTP: the value of WTP

Sex: sex of the respondents (dummy coded: male=0, female=1)

Age: age of the respondents (dummy coded: less than 50year=0, above 50years=1)

MarSta: marital status of the respondents; (dummy coded: not married=0, married=1)

Heduc: Highest educational qualification obtained (dummy coded: low education=0, high education=1)

Emply: Employment status (dummy coded: unemployed=0, employed=1)

HealthSta: General health status; (dummy coded: poor health=0, good health=1)

AIDSkno: know of HIV/AIDS; (dummy coded: No=0, Yes=1)

HCTKno: Know about HCT as a means of detecting HIV (dummy coded; No=0, Yes=1)

HIVtested: ever tested for HIV virus; (dummy coded; No=0, Yes=1)

HIVInfp: Know a person(s) infected with HIV; (dummy coded; No=0, Yes=1)

AIDSdeath: Know a person(s) died of AIDS; (dummy coded; No=0, Yes=1)

HIVch: Chance of contracting HIV; (dummy coded; No=0, Yes=1)

HIVwry: Worry much about HIV; (dummy coded; No=0, Yes=1)

HIVstig: Have fear about the stigma associated with being HIV-positive; (dummy coded; No=0, Yes=1)

Inc: Total household income per month. The mean of the range of the selected income for each of the respondents was used. It was log-transformed naturally, since it was not normally distributed (Wooldridge, 2013).

The parameters β_1 - β_{14} represent the proportional differential in WTP between each corresponding categorical variable also called zero-one variable.

3.10.2.7 Assessment of Assumptions of GLM – Normality of Residuals

Before the analysis of GLM regression, the assumptions of normality of residuals was tested by either using residual plot – plotting of residuals (errors) against predicted values or normal plot – plotting of residuals (errors) against expected values given their ranks. The residual output was obtained by checking residuals (unstandardized and standardised) and predicted (unstandardized) values in saving option of GLM: Univariate in SPSS software. The normality of the residuals wass assessed in the histogram or scatterplot or Q-Q plot obtained by plotting residuals against predicted value. (Taylor, 2011).

3.10.2.8 Assessment of GLM Overall Fit: Statistical Significance

GLM statistical significance is usually accessed in the Test of Between-Subjects Effects (also called ANOVA table) and Parameter estimates tables output. Both tables are identical except that the former shows variance accounted for by all the predictors while the later does not (Taylor, 2011). A null hypothesis is often tested to detect if all β_i in the model is 0. *F-statistic* or *omnibus F* as it sometimes called, is normally used to assess the overall statistical significance of the GLM to determine if the data fit the model and predicts better than chance. It tests whether it is significantly larger than expected under the null hypothesis. [H0: $\beta_i = 0$; *H1:* $\beta_i \neq 0$]**.** If the *p*-value for the *F-statistic* less than the predetermined alpha level (0.05), we reject the null hypothesis and conclude that the model predicts better than chance (Field, 2013).

3.10.2.9 Assessment of GLM Overall Fit: Effect size

The effect size in GLM is measured by squared multiple correlations denoted as R^2. It is the square of the correlation between the predicted values and the observed values of the dependent variable. It is the estimate of the proportion of variance in the dependent variable explained by the model. R^2 mathematically has a lower bound of 0 and upper bound of 1.0 (Leech, Barret, Morgan, 2005).

3.10.2.10 Assessment of Individual Independent Variables in GLM equation: Statistical Significance and effect sizes.

GLM regression usually produces a table of output that comprises of all independent variables in the model together with their statistical test of significance. Statistical significance assures us that there is at least a little relationship between the dependent and independent variables (Wooldridge, 2013). The effect size of individual independent variables can be measured by standardised regression coefficient otherwise known as beta weights or the square of the partial correlation coefficient, which measures the proportion

of variance in the dependent variable explained by the independent variable controlling for all the other independent variables in the model.

3.11 Structural Equation Modelling (SEM)

For the second and third objectives of this thesis, the data from the HBM, knowledge attitude and practice of HIV and HCT sections of the datasets were used for the appropriate analysis to achieve the stated objectives. The constructs as specified in the study models were latent in nature, hence, they were not directly measurable but indirectly through measurement items. These measurement items were combination of categorical and ordinal variables which were not normally distributed. Therefore, the study employed Structural Equation Modelling (SEM) to analyse the relationship among these latent constructs and Partial Least Square-Structural Equation Modelling (PLS-SEM) variant of SEM was utilised based on the characteristics of the measurement items data (Hair et al., 2014; Anderson & Gerbing, 1988; 1992; Holmbeck, 1997; Frazer, Tix & Baron, 2004).

SEM is deemed appropriate in an experimental and quasi-experimental designed in which one needs to find causal network among the variables (Chin, 1998a; 1998b). It is regarded as a second-generation technique useful in explaining the set of relationships among multiple variables (Hair et al., 2010). It possesses the capacity to simultaneously assess and evaluate the causal relationship among the predictors and criterion variables (Gefen, Straub, & Boudreau, 2000). With SEM, latent variables (LV) which cannot be observed directly could be constructed and manifest variables which are also known as indicators, could be used to estimate the latent variable (Kock, 2010; Kock, 2014; Kock, 2015; Kock, 2016). Manifest variables or measurement indicators can be reflective or formative (Haenlein & Kaplan, 2004; Hair, Ringle, & Sarstedt, 2012). All the four latent independent HBM constructs in this study are reflective. SEM possess the capacity of handling both confirmatory factor analysis and exploratory factor analysis. SEM

parameters can be estimated using the two approaches – covariance-based approach (CB-SEM) and variance-based approach (VB-SEM) (Chin, 1998b). PLS-SEM analysis was adopted for this study for the following reasons: (1) it places less emphasis on the measurement scale of the variables (Kock, 2014b; Vinzi et al., 2010); (ii) it can handle non-normally distributed data as it makes no distributional assumptions since the data for this study did not satisfy normality assumptions (Hair et al., 2011; Kock, 2010). (iii) It can handle and produce a robust set of results even for the small data sample size (Hair, Ring, & Sarstedt, 2014; Wold et al., 1984).

3.11.1 PLS-SEM Approach

The PLS-SEM analysis adopted for the second and third objectives of this thesis is a variance-based SEM. PLS-SEM can serve both dual purposes of confirmatory factor analysis and exploratory factor analysis. PLS-SEM is gaining more popularity in SEM analysis and has advantages over covariance-based SEM because of the following (Wold, 1984):

(1) It places less emphasis on the measurement scale of the variables (Kock, 2014b; Vinci et al., 2010)
(2) It can handle non-normal data as it makes no distributional assumptions (Hair et al., 2011; Kock, 2010)
(3) It can handle and produce some robust results even for the small data sample size (Hair 2011; Chin, 2010).

These are the reasons this analytic method was adopted in the analysis of the second and the third objectives of this thesis as covered in Chapter 5 and 6 respectively.

3.11.2 Model Validation – 2-stage Approaches

The analytic frameworks for the second and third objectives entailed validation of these models and generating the results. This study adopted Anderson & Gerbing (1988) two-stage approach in reporting the PLS-SEM analyses in both chapter 5 and 6 of this thesis. The first stage involves analysis of the measurement model to establish the reliability and validity of the measurement instruments, while the second stage deals with the analysis of the structural model to test the proposed research hypotheses. In the first stage, the relationship between the manifest variables and the HBM constructs are specified. When the analysis of the first stage satisfied the minimum acceptable standard, the analysis is passed to the second stage, the structural model, which is to test the relationship between the exogenous variables and a criterion variable (Fornell & Yi, 1992).

3.11.2.1 Stage 1: Assessing the Measurement Models

In stage one, the validity and reliability of the model constructs were first established by considering individual item reliability, convergent validity, discriminant validity, and reliability analysis. Measurement indicators reliability was tested to ensure their consistency in measuring the concepts they were designed to measure. On the other hand, measurement items validity was tested to know how well a specific concept was measured by the items intended to measure it.

In measurement model analysis, the intention is to specify the measurement instruments that are related to latent constructs. In other words, it is to ascertain that they truly measured the latent constructs that they were designed to measure in the model (Kline, 2011). An item that fails the reliability and validity are either removed from the construct or move to the other construct of which it cross-loaded better after which the measurement model is re-specified and re-analysed again (Kock, 2014; Hair et al., 2009).

Reliability of the individual items – Each item reliability was assessed by examining its factor loadings and cross-loadings. The first step was to check the loadings of the individual items that measured each construct to ascertain they meet the minimum criteria. In this analysis, we adopted Hair et al., (2010) suggestion that an item is reckoned to be reliable if the loading on parent factor is greater than or equal to 0.50. The items that did not meet the criterion were removed. The item loadings as revealed by WarpPLS, are from structure matrix (unrotated) while the cross-loadings were from a pattern matrix (rotated) (Kock, 2015).

The construct reliability is usually assessed using Cronbach's Alpha (CA) and Composite Reliability (CR). For a construct to be considered reliable, it was recommended that the value of the CA should be equal or greater than 0.60 (Cronbach & Meehl, 1955; Nunnally & Berstein, 1994; Urbach & Ahlemann, 2010). Also, the CR should be 0.60 or higher for exploratory research (Bagozzi & Yi, 1988). On the other hand, value higher than 0.70 was recommended by Hair et al. (2012) and Fornell & Larker (1981).

Validity Assessment – Convergent and Discriminant Validity: In order to affirm the validity of the constructs of the model of the study, two types of validity tests, convergent and discriminant validity were recommended (Gefen & Straub, 2005).

Convergent Validity - As for the convergent validity, items factor loadings and Average Variance Extracted (AVE) were assessed to establish if the constructs are valid. To achieve good convergent validity, items must show high loadings (> 0.50) with the parent construct and a low cross-loading with others factors (Schumacker & Lomax, 2010). Also, the item loadings were validated for their statistical significance by considering their *p*-value which is the confirmatory factor analysis validation parameter (Kline, 2011; Kock, 2013). The second item to examine under convergent validity is the Average Variance Extracted (AVE) which in the actual sense measures the variance captured by

the measurement indicators relative to measurement error. It is recommended that this value should be higher than 0.50 to achieve a good convergent validity (Bagozzi & Yi, 1988; Hair et al., 2009; Urbach & Ahlemann, 2010).

Discriminant Validity – According to Farrell (2010), "discriminant validity is the extent to which latent variable discriminate from other latent variables" (p.1). He restates further, it "means that a latent variable is able to account for more variance in the observed variables associated with it than a measurement error or other constructs within the conceptual framework." In order to confirm whether the results obtained from the hypothesised structural paths in the research model are real or product of statistical discrepancies, researchers must conduct and establish discriminant validity for the latent constructs (Farrell, 2010). To attain acceptable discriminant validity, the square-root of AVE for individual latent construct must be higher in comparison with the correlations between constructs.

The criteria used for both validity and reliability of the measurement models are presented in Table 3.6.

Table 3.6: Measurement Model Assessment Criteria

Assessment	Criterion	Note	Reference
Indicator reliability	Individual item standardised loading on parent factor	0.40 or higher is acceptable Minimum of 0.50	Hulland (1999) (Hair et al., 1987; 2009; 2010)
Convergent Validity	Individual item standardised loading on parent factor Loadings with significant p-value Average Variance Extracted (AVE)	Minimum of 0.50 >0.70 P < 0.05 > 0.50	(Hair et al., 2010; 1987; Hair, 2009; Chin, 1998b); Hair et al., 2010) (Kock, 2015; Gefen & Straub, 2005) (Bagozzi & Yi, 1988; Hair et al., 2010; Urbach & Ahlemann, 2010)
Discriminant Validity	Square-root of AVE of each latent variable	More than the correlations among latent variables	(Fornell & Larker, 1981; Hair et al., 2010)

Table 3.6: Continued

Assessment	Criterion	Note	Reference
Reliability Internal consistency reliability	Composite reliability Cronbach's alpha	0.60 or higher acceptable 0.70 or higher >0.70	Bagozzi & Yi (1988); Nunnally & Berstein (1994) (Hair et al., 2012; Fornell & Larker, 1981;Cronbach, 1951;1987; Cronbach & Meehl, 1955; Nunnally & Berstein, 1994; Urbach & Ahlemann, 2010; Hair et al, 2010)
Collinearity	Variance Inflation Factor (VIF)	< 10 < 5 < 3.3	(Hair et al., 1987; 2009; Kline, 2008; 2011) (Kock & Lynn, 2012) (Kock, 2015)
Nature of construct	Formative/Reflective	Theoretical assessment. Indicator inter-correlation. Weigh loading sign	(Chin, 1998a; Coltman et al., 2008)

3.11.2.2 Stage 2: Assessing the Structural Model

In stage two of the PLS-SEM analysis, the study model or structural model was analysed in order to test hypotheses earlier stated. The explanatory power of the structural model together with the path coefficients were assessed. Some of the properties considered in this section are:

Coefficient of Determination *(R^2)* – this plays a crucial role in the evaluation of structural model in PLS-SEM. R^2 measures the amount of variation of each of the endogenous latent variable accounted for by the exogenous variables (Chin 2010; Roni, 2015). Chin (1998b), suggested that, R^2, 0.67, 0.33, and 0.19 (and lower) are considered as substantial, average and weak respectively.

Predictive Relevance (Q^2) - The predictive relevance or validity (Q^2) is also known as Stone-Geisser Q-squared coefficient (Geisser, 1975; Stone, 1974). It measures the predictive relevance of a block of manifest variables (Mohamadali, 2013). According to Kock (2015), "the Q-squared coefficient is a nonparametric measure traditionally

calculated via blindfolding, is used for the assessment of the predictive validity or relevance associated with each latent variable block in the model, through the endogenous latent variable that is the criterion variable in the block" (p. 67). For criterion construct to have an acceptable predictive validity or relevance, the Q-squared should be higher than zero ($Q^2 > 0$). According to Wong (2013), for the latent criterion variable, Q^2 values of 0.02, 0.15 and 0.35 represent a small, medium and large predictive relevance respectively.

Effect Size (f^2) – Effect size measures the impact of the predictor construct on the criterion construct (Hair et al., 2014). The relationship between two variables in a model may be statistically significant with a *p*-value less than 0.05, nevertheless, the impact of the relationship may be practically weak, according to Kock (2013). Thus, it is advised to always present the effect size in PLS-SEM analysis results (Lowry & Gaskin, 2014). The values of the Effect Size, f^2, could be 0.02, 0.15, and 0.35 and consider to be small, medium, and large respectively (Cohen, 1988).

Model Fit and Quality Indices – Model fit and quality indices are used to assess whether the model fits the data (Kock, 2010). Together with other results, WarpPLS 5.0 generates ten model indices or fits, which are germane to measuring model quality. Four of the fit indices, Average Path Coefficient (APC), Average R-squared (ARS), Average Adjusted R-squared (AARS), and Average Block Variance Inflation Factor (AVIF) are commonly reported in PLS-SEM studies (Kock, 2013). Table 3.7 presents the PLS-SEM common criteria used in Model fit and quality.

Table 3.7: Structural Model Criteria

Criterion	Note	Reference
Coefficient of determination (R^2)	0.67 substantial 0.33 average 0.19 weak	Chin (1998a)
Predictive relevance (Q^2)	> 0 Stone-Geisser test	(Geisser, 1975; Stone, 1974)
Effect size, (f^2)	0.02 small 0.15 medium	(Cohen,1988; Cohen et al, 2003)

Table 3.7: Continued

	0.35 large	
Path coefficient	Magnitude sign p-value	(Hair et al., 2010; Kock, 2016; 2017)

3.12 The Moderational Analysis

The second major goal of chapter 5 is to demonstrate the moderating effects of sociodemographic variables on the relationship between HBM constructs and HCT service utilisation. This forms the second part of the second objective of this thesis. MacKinnon (2011) describes a moderator as "a variable that modifies the form or strength of the relation between an independent and a dependent variable" (p. 6). According to Baron & Kenny (1986, p. 1174), "a moderator is a qualitative (e.g., sex, race, class) or quantitative variable that affects the direction and strength of the relation between an independent or predictor variable and a dependent or criterion variable." In another word, a moderator variable can take the form of either continuous or categorical variable. The moderators used in this thesis are categorical variables with two levels. They are – gender, age, marital status, educational status, employment status, HIV/AIDS knowledge.

3.12.1 The Conceptual Moderating Effects of Sociodemographic Variables

The HBM theory suggested that qualitative sociodemographic variables moderate the relationship between the factors of HBM and the outcome variables (Hochbaum, 1958; Rosenstock, 1974). The moderators, sociodemographic variables, are modelled into the previously hypothesised HBM research model. The conceptual interaction of the moderators with exogenous variables, PSU, PSE, PBE, PBA, and endogenous variable, HCT service utilisation produced twenty-four paths with each path representing a hypothesis. The conceptual and analytical framework capturing correlational analytic procedures of moderator variables using path diagrams is succinctly captured in Figure 3.1 as generated by WarpPLS 5.0. The moderators considered under this analysis are

gender (GEN), age (AGE), marital status (MAR), educational status (EDU), employment status (EMP), and knowledge of the HIV infection, (KNO).

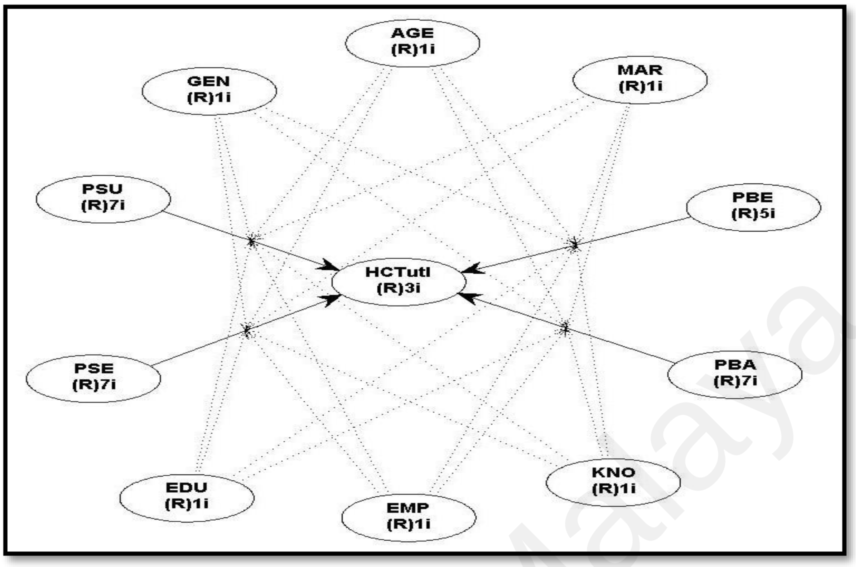

Figure 3.1: A Conceptual and Analytical framework of moderating effect of sociodemographic variables

3.12.2 The Mathematical Model of Moderating Effects

Moderating or interaction effect can be comprehended from the mathematical models specify below:

$$Y = a + bX + cZ \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(3.5)}$$

$$Y = a + bX + cZ + d(XZ) + e \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(3.6)}$$

Where Y is the dependent variable, X is the independent variable, Z is the moderator variable, and XZ is the interaction between moderator and independent variable; a, b, c, and d, are the intercept, path coefficients of the relationship between the dependent variable and independent variable, the moderator variable, and interaction of moderator by the independent variable respectively (Jaccard, 2003).

The first model is a simple additive model without interaction while the second equation has moderator added to it. XZ, the last term in the model, is the multiplicative or product term added to the model which registers the interaction effect and it is estimated through the d coefficient. It is the product of two predictors. There is interaction or moderating

effect if the effect of X on Y varies with the value of Z (Jaccard, 2001; Jaccard & Turrisi, 2003; Jaccard, Wan, & Turrisi, 1990).

To determine whether the first model is statistically significant, Whisman & McClelland (2005), suggested three common methods

1. One can test whether increment in the squared multiple correlations (ΔR^2) is significantly greater than zero.
2. One can test whether the coefficient d differs from zero.
3. Testing whether the partial correlation between the XZ and Y, while controlling for XZ differs from zero.

Multiplicative or Product Approach is employed to estimate the moderating effect of Sociodemographic variables on the relationship between the exogenous latent HBM constructs and HCT utilisation as delineated by Jaccard & Turrisi (2003) and Whisman & McClelland (2005). Therefore, the moderating effect is stated thus:

$$HCT_{utl} = \alpha + \beta_i HBM_{cons} + \gamma_i SocDem_i + \lambda_i (HBM_{cons} * SocDem_i) + \varepsilon \quad \text{.....(3.7)}$$

Where:

HCT_{utl} = HCT utilisation; HBM_{cons} = exogenous latent constructs of HBM (PSU, PSE, PBE, PBA); $SocDem_i$ = sociodemographic variables (Gender, Age, Marital Status, Educational status, Employment Status, Knowledge about HIV/AIDS); α = is the intercept; β_i, γ_i, λ_i are path coefficients; ε is the stochastic term

In order to simply describe the relationship between HCT and HBM constructs, we rearrange and regroup the above equation to yield.

$$HCTutl = [\alpha + \gamma_i SocDem_i] + [\lambda_i + \beta_i (SocDem_i)] HBM_{cons} + \varepsilon \quad \text{.....(3.8)}$$

From the equation above, the line relating HCT_{ut} and HBM constructs for any fixed value of SocDem is described. The equation naturally divided into two parts, the first part in the first parentheses $[\alpha + \gamma_i SocDem_i]$, represents the intercept while the term in the

second parentheses $[\lambda_i + \beta_i(SocDem_i)]$, indicates the regression slope. It was evident from both the intercept and slope that they depend on the level of the moderator, *SocDem*. This implies that as the value of SocDem changes, the values of both the intercept and slope of the relationship between HBM constructs and HCTut change as well.

The specific statistical analysis procedure for measuring and testing a moderation hypothesis depends on the level of measurement of the predictor variable and the moderator variable (Frazier, Tix & Baron, 2004; MacKinnon, 2011). Baron & Kenny (1986) considered four cases of the level of measurement for both predictor and moderator variables and the appropriate or suitable statistically analysis for each case. The first case, where both predictor and moderator are categorical variables, analysis of variance (ANOVA) procedures can be utilised. In the second case, where predictor is continuous variable and moderator is categorical, hierarchical multiple regression is suggested. The third case where predictor is categorical and the moderator is continuous, hierarchical multiple regression also suggested. And the fourth case where both moderator and predictor are continuous variables, regression analysis is recommended. However, these regression methods of analysing moderation hypothesis have been criticised by its inherent limitations which tend to produce biased estimates (Holmbeck, 1997; Frazer, Tix & Baron, 2004). Hence, in testing for moderating effect, several authors have recommended the use structural equation modelling (SEM) analytic procedure above regression analysis based on two reasons. Firstly, SEM tends to produce the less biased assessment. And secondly, it is appropriate and preferred when there is more than one measured variable for each of the constructs (Jaccard & Wan, 1996; Peyrot, 1996; Holmbeck, 2002; Frazer, Tix & Baron, 2004). In the light of the above, PLS-SEM was employed to analyse the moderating effect of sociodemographic variables on the relationship between HBM factors and HCT utilisation.

The analysis followed three steps which were carried out in WarpPLS 5.0. In the first step, code variables were created and dichotomized to represent all the categorical moderator variables. The categorical variables that have more than two levels are recoded into two levels– age (young/old), marital status (not married/married), educational status (low education/higher education), employment status (unemployed/employed) (Henseler & Farrott, 2010). The second step involved creating a product term that represents the interaction between the predictors (PSU, PSE, PBE, PBA) and moderators. And the last step, the structural equations was fully set with all moderating paths and statistical parameters set for running and generating the results for the hypothesised moderating effects. The specification of the moderating effects in the analytic model is made more straightforward in WarpPLS than many other PLS-SEM softwares available (Kock, 2017). The moderating effect hypothesis is supported if the moderator path is significant. In the moderating effect analysis, two issues must be addressed before we can conclude that there is moderating effect in the model. Firstly, a test must be carried out to detect whether the path coefficient of the moderator significantly differs from zero to be able to establish the presence of the moderating effect in the model. Secondly, if the moderator path coefficient is significant, then the strength of the moderating effect must be assessed through the effect size of the moderator (Henseler & Fassort, 2010). We employed PLS regression algorithm for the measurement model estimation and stable-3 method of *p*-value calculation (Kock, 2014).

3.13 The Mediational Analysis

The third objective of the thesis focuses on the mediating effect of HIV-related stigma on HCT service utilisation. Thus, HIV-related stigma was recognised as the mediator variable. According to Baron & Kenny (1986), a "variable may be said to function as a mediator to the extent that it accounts for the relation between the predictor and the criterion" (p. 1176). There are four conditions to be met for a variable to be a mediator:

(i) The predictor must be significantly associated with criterion variable

(ii) The predictor must be significantly associated with the mediator

(iii) The mediator must be significantly associated with the criterion

(iv) The impact of the predictor on criterion variable is significantly less after controlling for the mediator (Holmbeck, 1997; 2006; MacKinnon, 2008; MacKinnon & Fairchild, 2009; Mackinnon, Fairchild, & Fritz, 2007; Preacher & Hayes, 2004).

This is a classical approach to testing mediating effects which do rely on standard errors (Kock, 2014). The Sobel (1982) test is usually conducted to determine the significance of the mediating effects. However, in this thesis, we followed alternative approach to the analysis of mediating effect as suggested by both the Preacher & Hayes (2008) and Kock (2014) by first examined the significance of the direct effect of the endogenous variables on the criterion variable and subsequently assessed the significance of the indirect effect from endogenous variables via mediator to criterion variable. Both the simple models which show the bivariate relationship between the constructs and the complex model which encompasses mediator variable were simultaneously estimated by the WarpPLS (Kock, 2015).

3.13.1 Mathematical Modelling of Mediating Effect of HIV-related Stigma

Since HIV–related stigma is considered as a mediator in the three relationships as described in the previous section, the modelling for each of the relationship is stated below.

For stigma mediation between HIV-related knowledge (KNHA) and HCT utilisation is stated as follows:

$$HCTU = \alpha_1 + \beta_1 KNHA + \varepsilon_1 \quad \text{.....3.9}$$

$$HCTU = \alpha_2 + \beta_2 KNHA + STGM_{(m)+}\varepsilon_2 \quad \text{.....3.10}$$

$$STGM_{(m)} = \alpha_3 + \beta_3 KNHA + \varepsilon_3 \quad \text{.....3.11}$$

For stigma mediation between HIV transmission misconception (MSHIV) and HCT utilisation is stated as follows:

$$HCTU = \alpha_1 + \beta_1 MSHIV + \varepsilon_1 \quad \text{.....3.12}$$

$$HCTU = \alpha_2 + \beta_2 MSHIV + STGM_{(m)} + \varepsilon_2 \quad \text{.....3.13}$$

$$STGM_{(m)} = \alpha_3 + \beta_3 MSHIV + \varepsilon_3 \quad \text{.....3.14}$$

For stigma mediation between the perceived seriousness of HIV/AIDS and HCT service utilisation is stated as follows:

$$HCTU = \alpha_1 + \beta_1 PHSEV + \varepsilon_1 \quad \text{.....3.15}$$

$$HCTU = \alpha_2 + \beta_2 PHSEV + STGM_{(m)} + \varepsilon_2 \quad \text{.....3.16}$$

$$STGM_{(m)} = \alpha_3 + \beta_3 PHSEV + \varepsilon_3 \quad \text{.....3.17}$$

Where:

STGM = HIV – related stigma, mediator latent variable

HCTU = HCT service utilisation, the latent dependent variable

KNHA = HIV-related knowledge, the independent latent variable

MSHIV = HIV transmission misconception, the independent latent variable

PHSEV = Perceived seriousness of HIV/AIDS, the independent latent variable

α_1 - α_3 = the intercepts; $\beta_1 - \beta_3$, represent the path coefficients and $\varepsilon_1 - \varepsilon_3$, represent the error terms of the path regression equations (Preacher & Hayes, 2004; Baron & Kenny 1986).

The mediational analysis of HIV-related stigma followed PLS-SEM analytical procedure. SEM is preferred above standard regression methods in the analysis of mediation effects, most especially when the model contains latent construct which is measured by more than one measurement item (Jaccard & Wan, 1996; Peyrot, 1996; Holmbeck, 1997; Frazier, Tix, & Barron, 2004; Gunzler et al., 2013). In this thesis, the mediator and the independent variables are latent constructs which are measured by multi-items as revealed in early part of this chapter. The study employed WarpPLS 5.0 with Bootstrapping resampling method for the mediation analysis (Kock, 2015).

3.14 Software Used for Analysis

Two main software were employed for the analysis in this study. First, SPSS version 22 was used for the coding of the raw data and preliminary data analysis. It was predominantly used in chapter 4 to conduct descriptive statistics, bivariate analysis-Chi-square, Mann-Whitney test, Kruskal-Wallis test and General Linear Model (GLM). In addition, WarpPLS software was employed for the PLS-SEM analysis in both chapters 5 and 6. WarpPLS software was developed by Professor Ned Kock (Kock, 2009). It is a nonlinear structural modelling, analysis software which possesses certain features that made it to be preferred above other PLS software. WarpPLS handles both linear and nonlinear relationships between latent variables when performing statistical analysis which is uncommon in most other SEM software such as AMOS, LISREL, EQS, SmartPLS etc. WarpPLS produces values for the path coefficients as well as direct *p*-value which made it very easy to interpret. Also, in mediation analysis, it generates direct, indirect and total effect together with their path coefficients, standard errors, and *p*-value thus, calculation of Sobel test may not be necessary (Kock 2011, 2014, 2015). This thesis used the latest version of the software, WarpPLS 5.0 full version, which was provided free for the users for the period of three months. This thesis employed latest WarpPLS

5.0 which helpfully provides all the path coefficients alongside with their *p*-values. This makes WarpPLS unique and advantageous over other PLS-SEM software programs which only offer a path coefficient, t-statistics and associated standard errors while the *p*-values and effect size are left for the researchers to calculate (Kock, 2015).

3.15 Ethical Approval

According to Polite & Beck (2004), research ethics are described as "system of moral values that is concerned with the degree to which research procedures adhere to professional, legal, and social obligations to the study participants" (p. 717). Ethical consideration is very germane to the research project; therefore, it is the responsibility of the researcher to ensure that the design is ethically and morally sound and participants' human rights are well protected. Since this study involves human subjects, ethical approval was obtained from the Health Research and Ethics Committee of Lagos State University Teaching Hospital, (LASUTH) Ikeja, Lagos State, Nigeria (Approval No: LREC/10/06/497) (See Appendix C). Ethical principles were strictly adhered to. These include informed consent of the respondents before admission into the survey and completion of the questionnaire, maintenance of respondents' privacy and anonymity to ensure they were not identifiable (see Appendix B). Prior to the application for the ethical clearance, the researcher undertook online training courses on human subject protection in research based on the collaborative IRB Training (CITI) program of West African Bioethics and University of Miami, Florida, USA, as required by the National Health Research Ethics Committee (NHREC) of the Federal Ministry of Health, Abuja, Nigeria (See Appendix E and F for the certificates issued). In addition, the researcher obtained letter of permission from the Lagos State Primary Health Care Board, Lagos State Ministry of Health, in order to access HCT data at the primary health care centres in the selected Local Government Areas for this study (see Appendix D).

3.16 Summary

In summary, this chapter has dealt in details regarding the research design and research methods used in the study. The justification for the choice of quantitative method and cross-sectional nature of the study was provided. All the constructs together with their validated measurement indicators were enumerated. In the same vein, the statistical techniques employed to examine the three objectives of the study were amply elaborated.

The next three chapters present the detailed analysis, findings, and interpretations of the cross-section data obtained for the study.

CHAPTER 4: ASSESSING THE VALUE AND DETERMINANTS OF WTP FOR HCT SERVICES

4.1 Introduction

This chapter addresses the first objective of this study. The results of the descriptive and multivariate regression analysis of the Contingent Valuation (CV) survey are presented. The chapter comprises of three major parts; the first part deals with descriptive statistics, which include social-demographic and socioeconomic statistics, knowledge, attitude and practice (KAP); while the second part is the quantitative WTP analysis using non-parametric tests and General Linear Model (GLM) regression procedure. The chapter ends with the discussion of the findings and summary.

4.2 Descriptive Data Analysis

The descriptive data analysis is divided into seven sub-sections. The first part deals with the sample respondents' socio-demographic characteristics, followed by their socio-economic characteristics, while the third sub-section captures their knowledge, attitudes and practice and behaviour (KAPB) regarding HIV/AIDS and HIV Counselling and Testing (HCT). The fourth sub-section deals with the respondents' health-related indicators, the fifth section focuses on the respondents' willingness to pay for HCT, sixth section evaluates reasons for willingness to pay for HCT while the last sub-section deals with the reasons reported by those who were unwilling to pay for HCT services in our study.

4.2.1 The Sample Socio-demographic Characteristics

Table 4.1 presents the sociodemographic characteristics of the study sample. Since the sociodemographic characteristics are categorical, thus, they are reported as frequency and percentages (Leech, Barrett, & Morgan, 2005; Field, 2013). The data for the study sample of 768 respondents showed that 413 (54%) were male while 355 (46%) were

female. Majority of the respondents were less than 50 years of age, 675 (88%). The youngest in the sample was 20 years while the oldest was 70 years. Data on marital status revealed that about 435 (57%) of the respondents were married. As for the religious affiliation of the respondents, 575 (75%) identified with Christianity while 182 (24%) were Muslims. The remaining respondents reported that they belong to the traditional religion. Respondents were regrouped into two categories (low education and high education), low education comprises of primary school leavers, secondary school certificate (SSCE) holders, certificate, and diploma holders; while high education category is those with Bachelor degrees and above. From the descriptive analysis, it showed that 400 (52%) of the study sample falls within low education category while those in high education category constitute about 368 (48%) out of which 33% had Bachelor degree certificate. Regarding the employment status of the respondents, out of the 667 (87%) of those employed, only 113 (15%) were civil servants working in Government ministries and parastatals. About 234 (31%) work in private companies while the rest work as daily labourers, owns their business or trading. Also, most of the respondents were from Yoruba ethnic group, 476 (62%), followed by Igbo 197 (26%) and lastly Hausa/Fulani 22 (2%). The broad representation of the Yorubas in the sample may not be unconnected to the fact that the study area, Lagos State, falls within the South-Western part of Nigeria which is predominantly Yoruba ethnic group.

Table 4.1: Respondents Socio-demographic Characteristics

Variable	Number	Percentage
Gender		
- Male	413	54
- Female	355	46
Age		
- 20-29	270	35
- 30-39	288	38
- 40-49	117	15
- 50-59	55	7
- 60-69	28	4
- 70+	10	1
Marital Status		
- Single	305	40
- Married	435	57
- Divorced	9	1
- Separated	7	1
- Widowed	12	1
Religion		
- Christianity	575	75
- Islam	182	24
- Traditional	11	1
Highest educational qualification		
- Primary	20	3
- Secondary	133	17
- Certificate	93	12
- Diploma	154	20
- Bachelor	254	33
- Master	88	12
- PhD	11	1
- No formal education	15	2
Ethnic Origin/Tribe		
- Yoruba	476	62
- Igbo	197	26
- Hausa/Fulani	22	2
- Other	73	10

4.2.2 The Sample Characteristics - Socioeconomic

The socioeconomic variables of the study sample are presented in Table 4. 2. Regarding the household size of the respondents, most of the respondents have a family size between 1-5 family members, 568 (74%); 23% of the respondents have a family size between six and ten while only 3% has family size of above ten persons. The average monthly household income revealed that those earning above ₦50,000 were 274(36%). Also, those earning between ₦20,000-49,999 were 305(39%) while those earning below

₦20000 were 183(24%). This category falls within the national minimum wage ₦18,000 (Table 4.2)

Table 4.2: Socio-economic characteristics of the respondents

Variable	Number	Percentage
No of household members		
1-2	146	19
3-5	422	55
6-10	179	23
above 10	21	3
No of dependants		
1-2	191	25
3-5	288	38
6-10	95	12
above 10	18	2
none	176	23
Occupation		
Civil servant	113	15
Private employee	234	31
Trading	92	12
Own business	156	20
Daily labourer	13	2
Unemployed	78	10
Other	43	6
Student	23	3
Youth Corper	16	2
Household Income		
<₦5000	40	5
₦5000 – ₦9999	66	9
₦10000 – ₦19999	77	10
₦20000 – ₦29999	57	7
₦30000 – ₦39999	122	16
₦40000 – ₦49999	126	16
>₦50000	274	36
Don't know	6	1
Household Expenditure		
<₦5000	44	6
₦5000 – ₦9999	91	12
₦10000 – ₦19999	65	9
₦20000 – ₦29999	49	6
₦30000 – ₦39999	79	10
₦40000 – ₦49999	48	6
>₦50000	93	12
Don't know	299	39
General Health Status		
Excellent	230	30
Very good	300	39
Good	200	26
Fair	34	4
Poor	4	1

4.2.3 Respondents' Knowledge, Attitude, Behaviour and Practice on HIV/AIDS and HCT

Table 4.3 presents the summary of the respondents' knowledge, attitude, behaviour and practice regarding HIV/AIDS and HIV Counselling and Testing (HCT). The study respondents were asked whether they ever heard of HIV/AIDS, HCT, knew someone infected with HIV or died of AIDS before, a cure for HIV/AIDS, a healthy-looking person can be HIV carrier. Awareness of the HIV and AIDS is very high among the study population, 753 (98%) and 747 (97%) respectively. Also, those who knew individuals infected HIV or died as a result of AIDS-related diseases were 138 (18%) and 221 (29%) respectively. The majority of the respondents believed that a physically healthy-looking person can be a potential carrier of HIV/AIDS 694 (90%). Respondents' awareness about the medical test (HIV testing) that can detect the presence of HIV in the body was high, 743 (97%).

Table 4.3: Respondents' Knowledge, Attitude, Practice about HIV/AIDS and HCT

Variable	Yes		No	
	Number	Percentage	Number	Percentage
HIV knowledge – Heard of HIV	753	98	15	2
AIDS knowledge - Heard of AIDS	747	97	21	3
Knowledge of medical test to detect HIV in the body - HCT	743	97	25	3
Know someone infected with HIV	138	18	630	82
Know someone died of AIDS	221	29	547	71
Whether a healthy-looking person can have HIV	694	90	74	10
Whether HIV & AIDS can be cure	389	51	379	49
Ever tested for HIV	384	50	384	50

Also, the majority of the respondents know that a medical test is available to detect whether an individual has been infected with HIV or not. About 697 (91%) of the respondents believed that the only available method to detect HIV in the body is blood testing.

Table 4.4: Respondents' knowledge about how HIV can be detected/confirm in the human body

Variable	Number	Percentage
Health status	53	7
Have a blood test	697	91
Partner's status is known	6	1
Don't know any way	12	1

4.2.4 Health-related Indicators

The questions that ask about the general health status of the respondents were included in section C of the questionnaires. In order to evaluate the respondents' health status, firstly, they were asked to rate their health status by selecting one of the five options provided (excellent, very good, good, fair, poor). Following this, were questions, investigating whether their health condition limits them from engaging in vigorous activities like running or lifting heavy objects, unable to do certain kinds of work, number of times they visited health centres/hospitals, and number of times they were hospitalised in the last two months. The general health status of the respondents was regrouped into two: those who rated from excellent to good, were classified as 'good health'; while those who reported fair and poor, were grouped as 'poor health'. As presented in the Table 4.5, majority of the respondents reported good health 730 (95%). About 78% had a regular source of care they usually used whenever they were sick or wanted medical advice concerning their health.

Table 4.5: Health-related Variables of the Respondents

	Yes		No	
	Number	**Percentage**	**Number**	**Percentage**
Does your health limit the kind of vigorous activities you can do, such as running or lifting heavy objects?	198	26	570	74
Are you unable to do certain kinds or amounts of work (or schoolwork) because of your health?	144	19	624	81
Does your health keep you from working (or going to school)?	75	10	693	90
Is there one place in particular, like a doctor's office or clinic, where you go when you are sick or want advice about your health?[Regular source of care]	599	78	169	22

4.2.5 Respondents Willingness to Pay (WTP) for HCT Services

The preliminary data analysis showed that 75% of the respondents indicated their WTP to pay for HCT service as shown in Table 4.10.

4.2.6 Respondents Reasons for WTP for HCT Services

Respondents reasons for WTP for HCT was sought, the various reasons attributed to their decisions were presented in Figure 4.1 below. The most frequently observed reasons for WTP for HCT was the fear of HIV/AIDS disease and associated stigma, (44%). Another reason specified for willingness to pay was the avoidance of being killed by AIDS disease (22%), while only 7% adduced it to their risky lifestyle. About 27% of the respondents gave other reasons.

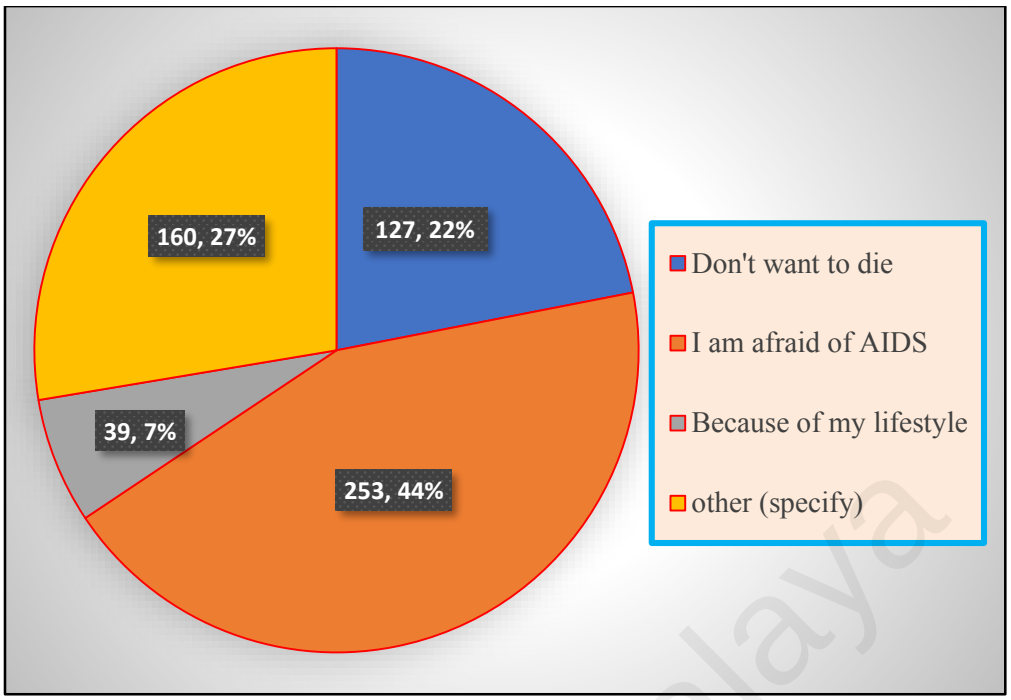

Figure 4.1: Reason for WTP for HCT service

4.2.7 Source of Payment for WTP

In order to confirm the WTP of the respondents, the means of payment, that is, how they would be able to raise money to pay for the service if it were presented to them based on the price selected. Figure 4.2 provides a summary of the WTP payment sources of the respondents; 38% indicated that they would spend less on leisure activities, reduced savings to accommodate the test (10%), asked for assistance from their relatives (6%), or purchased less food (5%).

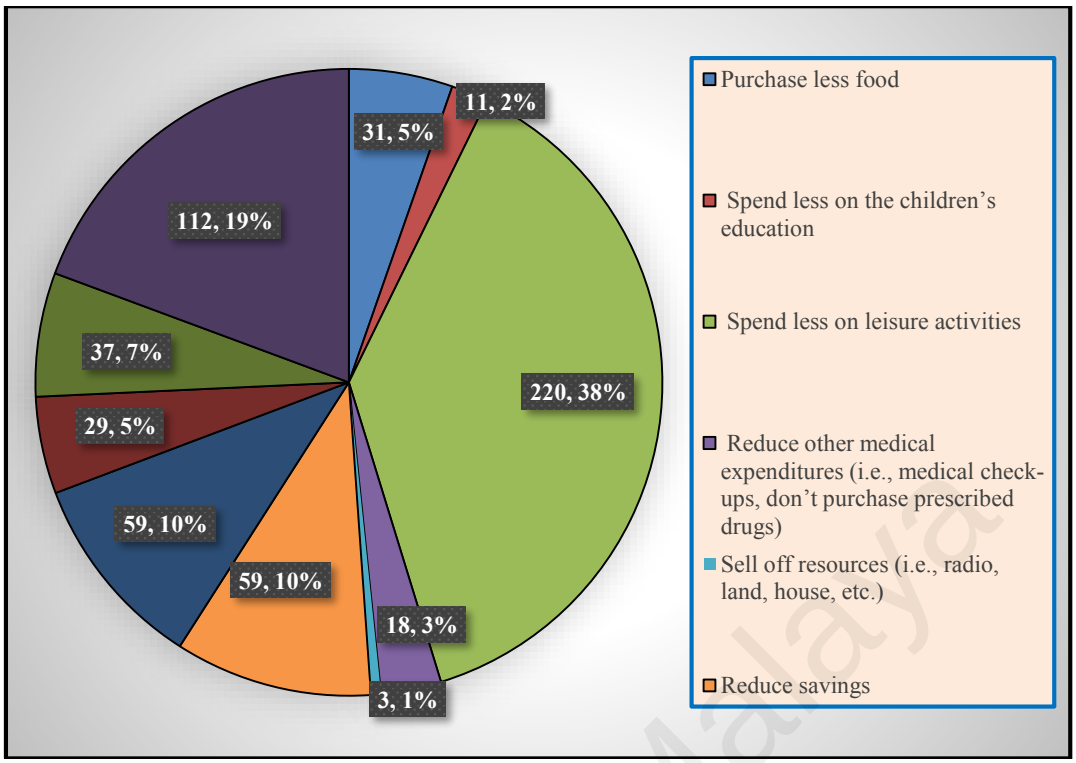

Figure 4.2: Respondents Means of Payment for HCT Services

4.2.8 Economic Status of Respondents indicating WTP for HCT Services

To evaluate the total income accrued to respondents per month, three sources of income were used, which are, monthly earnings by the respondents, family income and transfer income. Transfer income refers to money income transferred or provided to the respondents by relatives, friend, or associations. It is assumed that even if an individual is unemployed, he might still be getting money support from relatives or friends.

The mean income was ₦36, 856.65. Furthermore, out of the total 579 respondents who expressed their WTP for HCT services, 230 (40%) earned monthly income above ₦50, 000. This is followed by 227 (39%) of those with income between ₦20, 000-₦49, 999, and lastly, those earning below ₦20, 000 are 122 (21%). The current national minimum wage is ₦18, 000. The combination of the last two groups show that about 79% of them earned above national minimum wage (Table 4.7).

4.2.9 Respondents Reasons for not willing to pay for HCT

In this section, we examine the rationale behind respondents' unwillingness to pay for HCT despite their knowledge of the importance of HIV testing to detect the virus before developing into a full life-treating AIDS. The respondents were asked why they did not want to pay for the testing. Figure 4.1 below summarises their responses. The main reasons for not willing to pay for HCT is that the service should be provided free of charge to the citizens. Out of the 189 respondents not willing to pay, 154 (82%) were of the opinion that the service should be made available free of charge. Only 22 (12%) complained of not having enough money to pay for the service while 5% believed that HCT worth nothing to them.

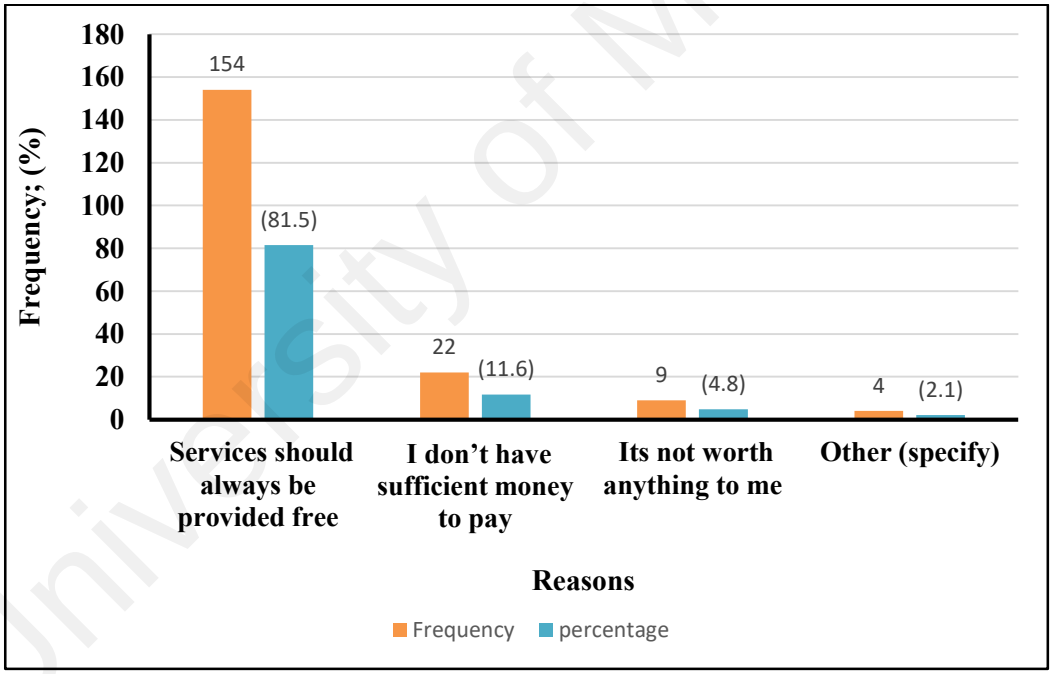

Figure 4.3: Reasons for not WTP

4.3 Mean Vs Median Willingness to Pay (WTP)

The stated minimum and maximum WTP for HCT are ₦125 and ₦5, 000 respectively (Table 4.6). The mean WTP for HCT services in our study was ₦1, 291.15 while the median WTP was ₦800 (Table 4.5). One of the major controversy surrounding the

development of WTP estimates for statistical analysis is whether to use Mean or Median WTP estimates. While some are of the opinion that mean value are better than median because of its better representation of consumer surplus, on the other hand, other researchers prefer median because it is more conservative and less susceptible to the influence of outliers in the data (Forsythe, 2001). For the purpose of this study, mean WTP was adopted in the estimation of WTP model.

Table 4.6: WTP Descriptive Statistics

Statistics	WTP for HCT
Number of respondents	579
Mean	1,291.15
Median	800.00
Mode	1,500.00
Std. Deviation	1,196.55
Variance	1431741.37
Skewness	1.838
Std. Error of Skewness	0.102
Kurtosis	3.170
Std. Error of Kurtosis	0.203
Minimum	125.00
Maximum	5000.00

4.4 WTP Demand Curve for HCT Services

This section presents WTP demand function for HCT services. To construct the demand curve, two sets of data are required; WTP values and the proportion WTP. These data are presented in Tables 4.7 and 4.8.

Table 4.7: The WTP Descriptive Statistics (Frequency and Percentage)

WTP	Frequency	Percentage
125.00	43	7.4
250.00	53	9.2
400.00	47	8.1
600.00	70	12.1
800.00	88	15.2
1000.00	1	0.2
1050.00	2	0.3
1150.00	36	6.2
1500.00	148	25.6
2750.00	55	9.5
5000.00	36	6.2

Table 4.8: WTP Proportions

Value	Proportion WTP HCT (%)
0	100.0
5	100.0
10	100.0
25	100.0
50	100.0
100	100.0
200	92.6
400	75.3
600	63.2
800	48.0
1000	47.8
1500	15.7
2000	15.7
4000	6.2
8000	0.0
12500	0.0
25000	0.0

Figure 4.4 presents the WTP curve. From the graph, the WTP demand curve follows the traditional demand function for normal good which reassures that the WTP demand curve for HCT is not particularly unusual (Frew, 2010). This signifies that as the amount charged for HCT testing increases, the number of people that are willing to pay for the service will decline. At a low price, proportion WTP was high. For instance, at a price ₦5, 000 only 6% of the respondents showed WTP, whereas 48% were willing to pay when the price reduced to ₦1, 000, and at a much lower rate of ₦400, many more people, 75%, were willing to pay at that price.

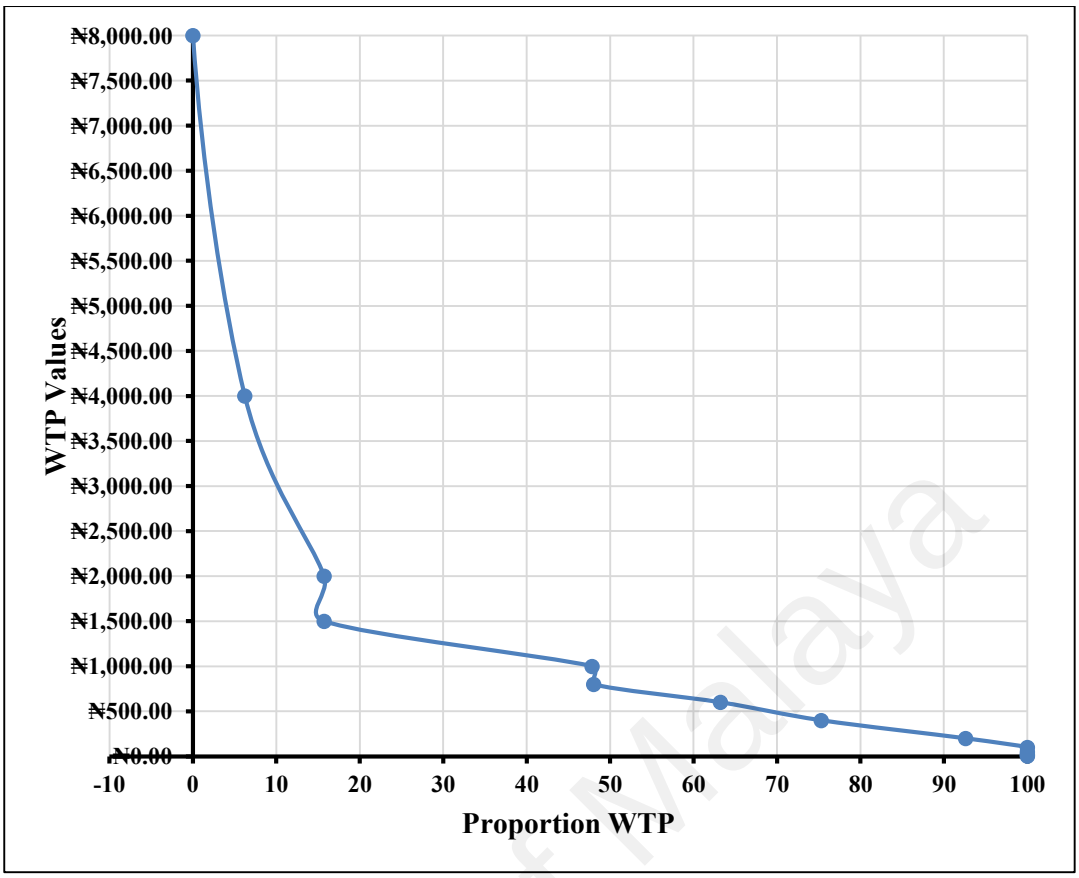

Figure 4.4: WTP Demand Curve for HCT Service

4.5 Validity Tests for Contingent Valuation (WTP)

CV involves interviewing individuals and making public policies based on the responses obtained from interviewees. For the CV to be relevant in contributing to the public or health policies, it is necessary, that such WTP results are valid. There are some tests recommended for this purpose, and they are considered below.

4.5.1 Construct and Scope Tests

The Contingent Valuation (CV) which involves asking individuals how much they would pay for goods that are quasi-public or pure public good in nature, may lead to some uncertainty and bias. The reason is that respondents in providing answers to WTP values may state extremely high figure, especially if they are aware that they would not incur the cost as they are not required to pay in the long run. On the other hand, respondents tend to state very low figures most especially when they perceived that they might be charged in the future based on the amount they reported on WTP values.

In order to play safe or be on the safe side, they would prefer stating a low figure. We try to tackle the technical problems associated with CV in this section. It has been suggested that the validity test should be carried out to ascertain and established the veracity of the CV results (Forsythe, 2001). For this study and as suggested by health economists, we conducted Construct and Scope validity tests. According to Mitchell & Carson (1993), construct test involves testing to determine whether the responses are in tandem with the prediction of the theory. In another words, the findings of the study are assessed to determine the degree of their consistency with theoretical expectation. Forsythe (2001) asserted a correlation between WTP and ability to pay as the most common test, that is, the amount that people are willing to pay must be correlated with their income. In a situation where people thoughtlessly overbidding, the expectation is that there would not be a correlation between income and their WTP.

In order to test the correlation between the two variables, we employed Spearman correlation method instead of the Pearson Correlation since the data for both variables did not satisfy normality assumptions (Field, 2009; Shapiro & Wilk, 1965; Kolmogorov, 1933; Smirnov, 1936).

Table 4.9: Spearman Correlation Analysis for Mean WTP and Income

		Income	WTP
Income	Correlation Coefficient	1.000	0.181**
	Sig. (2-tailed)		0.000
	N	579	579
WTP	Correlation Coefficient	0.181**	1.000
	Sig. (2-tailed)	0.000	
	N	579	579

A Spearman correlation analysis was conducted to examine the relationship between the mean WTP and Income of the respondents. The result of the analysis showed that there was a statistically significant but positively weak relationship between mean WTP and Income, [r (579) = 0.181, $p < 0.05$]. Hence, the construct validity test for the CV is

satisfied. As for the scope validity test, it is usually applied when the contingent valuation survey involves two alternative scenarios, but in this study, it involved only one scenario-WTP for HCT alone. As a result, the scope, validity is not necessary (Frew, 2010).

4.5.2 Biasness Test – a starting point.

Starting point bias is often associated with the payment scale/card and iterative bidding game method of eliciting in the Contingent Valuation survey. To overcome this problem researchers came up with a new approach called payment scale with iterative bidding. This method presents the WTP bids starting from 0 to the highest value, thus eliminating the pressure or temptation of choosing the first bid. The study adopted Forsythe (2001) method to avoid the problem of starting point biases.

4.6 The Statistical Analysis and Results.

The statistical analysis of the WTP data for this study is in two folds. First, we examined the non-parametric estimations of the WTP data. The second part of the analysis involved the WTP regression analysis using General Linear Model (GLM). Table 4.10 presents the WTP descriptive statistics.

Table 4.10: WTP distribution- Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
WTP	579	125.00	5000.00	1291.15	1196.55
Income	579	5000.00	50000.00	36856.65	15547.48

4.6.1 Chi-square Analysis and Results

Chi-square test of independence conducted to determine whether sociodemographic characteristics of the respondents were related to their willingness to pay (WTP) for HCT services or not. The results showed that three of the variables were significantly

related to the WTP. These variables are: HIV knowledge [χ^2 (1, N = 768) = 4.01, p < 0.05]; AIDS knowledge [χ^2 (1, N = 768) = 12.32, p < 0.01]; worry about HIV [χ^2 (1, N = 768) = 10.63, p < 0.01]. This signifies that the willingness to pay for HCT or not depends on respondents' knowledge about the HIV infection, AIDS disease, and their level of worry and anxiety concerning HIV/AIDS. Thus, we can conclude that while WTP and these variables are related and dependent, on the other hand, the remaining variables, respondents' sex, age, marital status, religious affiliation, general health status, personal insurance, knowledge of someone infected with HIV, knowledge of somebody died of AIDS, and their chances of contracting HIV are truly independent of their decisions to either pay for HCT or not as all their p-values greater than 0.05. Table 4.10 presents the Chi-square Test results.

Table 4.11: WTP and sociodemographic variables - Chi-square Test of Independence.

Variable	**Total sample**	**Willingness to pay for HCT**				
						χ^2
Overall	**768**	**Yes (579)**	**% (75)**	**No (189)**	**% (25)**	***p-value****
Gender						0.490
Male	413	312	75	101	25	
Female	355	267	75	88	25	
Age						0.194
20-29	270	201	74	69	26	
30-39	288	207	72	81	28	
40-49	117	94	80	23	20	
50-59	55	46	84	9	16	
60-69	28	24	86	4	14	
70+	10	7	70	3	30	
Marital Status						0.986
Single	305	227	74	78	26	
Married	435	331	76	104	24	
Divorced	9	7	78	2	22	
Separated	7	5	71	2	29	
Widowed	12	9	75	3	25	
Highest education						0.220
Primary school Cert	20	12	60	8	40	
Secondary School Cert	133	88	66	45	34	

Table 4.11: Continued

Variable	Total sample	Willingness to pay for HCT				
						χ^2
Overall	**768**	**Yes (579)**	**% (75)**	**No (189)**	**% (25)**	***p-value****
Certificate	93	70	75	23	25	
Diploma	154	119	77	35	23	
Bachelor Degree	254	199	78	55	22	
Master Degree	88	70	80	18	20	
PhD	11	9	82	2	18	
No formal Education	13	10	77	3	23	
Occupation						0.413
Civil servant	113	90	80	23	20	
Private employee	234	166	71	68	29	
Trading	92	68	74	24	26	
Own business	156	115	74	41	26	
Daily labourer	13	11	85	2	15	
Unemployed	78	62	80	16	20	
Other	43	33	77	10	23	
Student	23	20	87	3	13	
Youth Corper	16	14	88	2	12	
Religion						0.859
Christianity	575	433	75	142	25	
Islam	182	137	75	45	25	
Traditionalists	8	7	88	1	12	
Others	3	2	67	1	33	
Tribe						
Yoruba	476	350	74	126	26	0.406
Igbo	197	156	79	41	21	
Hausa/Fulani	22	18	82	4	18	
Others	73	55	75	18	25	
No in Household						0.172
1-2	146	114	78	32	22	
3-5	422	322	76	100	24	
6-10	179	131	73	48	27	
Above 10	21	12	57	9	43	
HIV knowledge						0.045*
Yes	753	571	76	182	24	
No	15	8	53	7	47	
AIDS knowledge						0.000**
Yes	747	570	76	177	24	
No	21	9	43	12	57	
Worry about HIV						0.001**
Yes	111	70	63	41	37	
No	657	509	78	148	22	

4.6.1.1 Mann-Whitney *U*-Test Analysis and Results

Mann-Whitney analysis was conducted to examine if there were significant differences in the mean WTP between the two groups/levels of the independent variables, that is, socio-demographic variables. The results of Mann-Whitney U Test indicate that only two variables, personal insurance of the respondents and knowledge of somebody infected with HIV were significantly different in their WTP for HCT. A Mann-Whitney U Test showed, on the average, that the amount of WTP of participants with personal insurance (M_d =1325; mean rank = 325.50; n = 118) significantly exceeded those of the participants without personal insurance (M_d = 800; mean rank = 280.91; n = 461); U = 23010.00 (Z = -2.62), $p < 0.05$, two-tailed. The effect size was r = -0.11, which signifies a small effect between the two groups. Also, descriptive statistics showed that respondents who knew somebody infected with the HIV virus (M_d = 1150; mean rank = 320.36; n =109) scored higher than those who did not know (M_d = 800; mean rank = 282.96; n = 470). Mann-Whitney U-value was found to be statistically significant, U = 22305.50 (Z = -2.13), $p < 0.05$, two-tailed, and the difference between those who knew somebody infected with HIV and those who did not know was small (r = -0.09), according to the calculated effect size. In both personal insurance and knowledge of HIV infected individual variables, the p-values are less than 0.05. Therefore, we failed to accept the null hypothesis (H_0), and thus, conclude that the those with personal insurance and those who did not; and those who aware of individuals who are living with HIV infection and those unaware, differ significantly in their WTP for HCT. Furthermore, apart from these two variables which were found to be statistically different in their levels, other variables – gender, marital status, age, educational levels, employment, religion,; general health status groups, HCT knowledge, knowledge of somebody died of AIDS, HIV knowledge, believe that AIDS can be cured, believe that physically looking healthy person can have HIV, chances of contracting HIV, worry

about HIV/AIDS, Afraid of HIV-related stigma, afraid of HIV-related stigma, HIV testing status – did not significantly differ in their levels. Table 4.12 presents and summarises the results of the Mann-Whitney test, where *U* represents Mann-Whitney statistics value, *z* represents z-score, *p*-value is the significant value, while *r* is the effect size which is manually calculated using the following formula $r = \frac{Z}{\sqrt{N}}$. Using Cohen (1988) criteria; 0.1 = small effect, 0.3 = medium effect, 0.5 = large effect.

Table 4.12: Mann-Whitney U Test for WTP by socio-demographic Group

Variable	**Total Sample**	**Willingness To Pay**			**Mann-Whitney**			***p*-value**
		No	**%**	**Mean Rank**	**Median (M_d)**	***U***	***Z***	***P***
Overall	768	579	75					
Gender						40817.00	-0.421	0.673
Male	413	312	54	292.68	1150			
Female	355	267	46	286.87	800			
Age						18272.00	-0.782	0.434
< 50 years	675	502	87	287.90	800			
Above 50years	93	77	13	303.70	1150			
Marital Status						39390.50	-0.841	0.401
Not Married	333	248	43	248	800			
Married	435	331	57	331	1150			
Highest educational qualification						38129.00	-1.868	0.06
Low education	413	301	52	277.67	800			
High education	355	278	48	303.35	1150			
Employment status						22308.50	-0.592	0.554
Unemployed	101	96	17	280.88	800			
Employed	667	483	83	291.81	800			
Religion						28786.50	-1.635	0.102
Christianity	586	433	75	283.48	800			
Islam	182	146	25	309.33	1150			
General Health Status						7322.00	-0.155	0.877
Poor health	38	27	5	285.19	1150			
Good health	730	552	95	290.24	800			
Insurance						23010.00	-2.616	0.009
Yes	149	118	20	325.50	1325			
No	617	461	80	280.91	800			
HCT knowledge						4407.00	-1.289	0.197
Yes	743	560	97	291.63	800			
No	25	19	3	241.95	800			

Table 4.12: Continued

Know someone with HIV								
Yes	138	109	19	320.36	1150	22305.50	-2.130	0.033
No	630	470	81	282.96	800			
Know someone died of AIDS						34404.00	-0.393	0.694
Yes	221	173	30	285.87	800			
No	547	406	70	291.76	800			
HIV knowledge						1861.50	-0.911	0.362
Yes	753	571	99	290.74	800			
No	15	8	1	237.19	700			
AIDS knowledge						2149.50	-0.845	0.398
Yes	747	570	98	290.73	800			
No	21	9	2	243.83	800			
A physically looking person can have AIDS virus						11991.50	-0.898	0.369
Yes	694	530	92	291.87	800			
No	74	9	8	269.72	800			
Curability of AIDS						39536.50	-1.187	0.235
Yes	389	294	51	298.02	1150			
No	379	285	49	281.72	800			
Chances of contracting HIV						18465.50	-0.941	0.346
Yes	108	79	14	306.26	1150			
No	660	500	86	287.43	800			
Worry about HIV						17069.00	-0.576	0.565
Yes	331	70	12	279.34	800			
No	437	509	88	291.47	800			
Afraid of AIDS Stigma						34109.50	-0.680	0.497
Yes	238	175	30	297.09	800			
No	530	404	70	286.93	800			
Ever Tested for HIV						39927.00	0.920	0.358
Yes	384	307	53	295.94	1000			
No	384	272	47	283.29	800			

4.6.1.2 Kruskal-Wallis Test Analysis and Results

The Kruskal-Wallis analysis was conducted on the socioeconomic variables with level more three to find if there were significant differences in their mean WTP. The results of Kruskal-Wallis H Test in Table 4.13 show that the score distribution of WTP data across the family expenditure categories of the respondents did not show any statistically significant difference as the *p*-value was greater than the criterion *p*-value, χ^2 (3, N=579) = 5.180, $p > 0.5$. Whether the expenditure category is high or low does not matter in their WTP. However, the results of the Kruskal-Wallis Test revealed that there was a statistically significant difference in the mean WTP of the participants

among the different income categories, χ^2 (2, N=579) =20.805, p = 0.000, with a mean rank of 260.35 (Median = 800.00, n = 122) for <N20, 000 income category; 266.97 (Median = 800.00, n = 227) for Income category of N20, 000 – N49999; and 328.45 (Median =1500.00, n = 230) for income category >N50, 000.

Table 4.13: Kruskal-Wallis Test for WTP by Socioeconomic Variables

Variable	No	Willingness to Pay			Median	DOF		H statistics	Eta square
	768	No 579	% 75	Mean rank	M_{dn}	*df*	*p*	χ^2	η^2
Family expenditure						3	0.065	7.235	0.012
<20000	200	151	26	301.29	1150.00				
20000-49999	176	135	23	297.08	800.00				
>50000	93	70	12	320.92	975.00				
DK	299	223	39	268.36	800.00				
Family Income						2	0.000	20.805	0.035
<20000	183	122	21	260.35	800.00				
20000-49999	305	227	39	266.97	800.00				
>50000	280	230	40	328.45	1500.00				

4.6.1.3 Kruskal-Wallis Test – a Post-Hoc Investigation for the income category

Since the result of Kruskal-Wallis test conducted to evaluate differences among the three income category conditions (<20000, 20000-49999, and >50000) on the mean WTP scores was significant, a post-hoc test was conducted to detect the income groups were statistically significantly different from another (Pallant, 2009; Field 2009). Mann-Whitney follow-up pairwise comparisons was conducted in order to investigate the groups the K-W showed to be significantly different. Table 4.14 presents the Mann-Whitney test results.

Table 4.14: Post-Hoc Investigation for the Kruskal-Wallis Test- Comparisons for a mean score of Income category using Mann-Whitney Test

Comparison	Mann-Whitney	p-value	Holms Correction, α	Decision
<20000 vs 20000-49999	13465.50	0.67	(0.017)	Not significant
<20000 vs >50000	10794.50	0.01	(0.017)	Significant
20000-49999 vs >50000	20496.50	0.00	(0.017)	Significant

The test was corrected for tied ranks, and was significant, χ^2 (2, N=579) =20.805, p = 0.000. Bonferroni approach was used to control for Type 1 error across tests. Mann-Whitney post hoc analyses revealed that WTP scores were not statistically significantly different (U=13465.50, p = 0.67) between income category <20000 (Mean rank = 171.87, n=122) and income category 20000-49999 (Mean rank = 176.68; n = 227). However, there was a statistically significant difference (U = 10794, p = 0.00); less than Holm's correction α=0.025) between income category <20000 (Mean rank = 149.98, n = 122) and >50000 (Mean rank = 190.57, n = 230). Those in income category, >50000 were more willing to pay than those earning less than 20,000. Likewise, the third group showed the statistically significant difference (U = 20496.50, p = 0.00); less than Holm's correction α=. 050) between income category N20,000-49,999 (Mean rank = 204.29, n=227) and income category >50000 (Mean rank = 253.38, n = 230). The income category of above N50,000 ranks highest among the group. This shows that those earning above N50,000 income demonstrated greater WTP than those in the middle-income category. Therefore, it can be inferred that as income of the respondent increases, the more is his/her WTP for HCT and vice versa.

4.6.2 WTP Regression Analysis and Results

4.6.2.1 Assessment of Assumptions of GLM – Normality of Residuals

Before the analysis of GLM regression, we tested for the assumptions of normality of residuals. The results are presented in Figures 4.5 – 4.7 below. From both Histogram

and Q-Q plot in Figures 4.4 and 4.5, the residuals were normally distributed thus satisfied the assumption of normality of residuals.

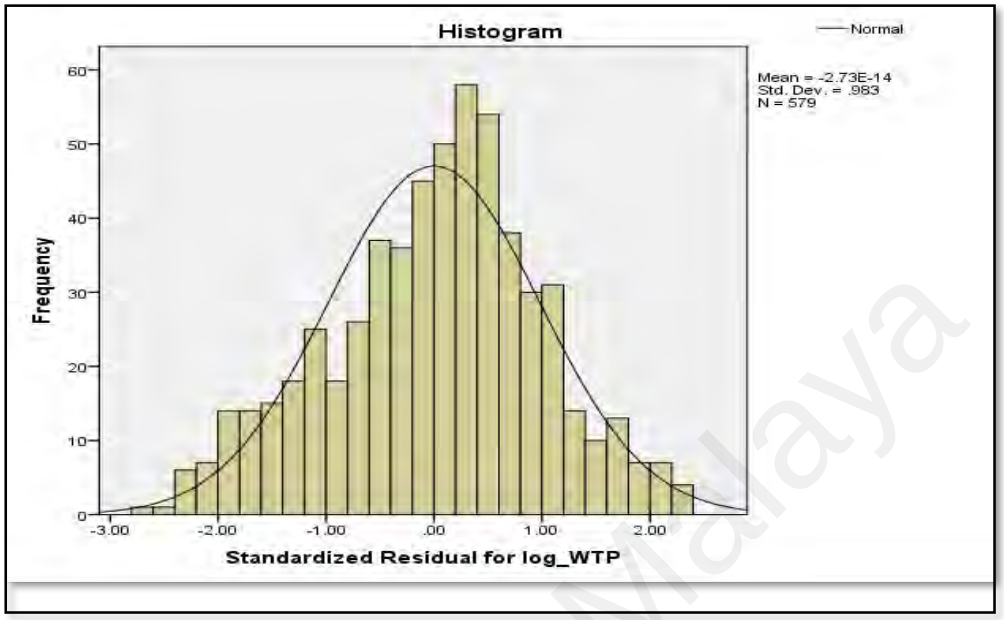

Figure 4.5: Histogram of normality of standardised residuals for WTP

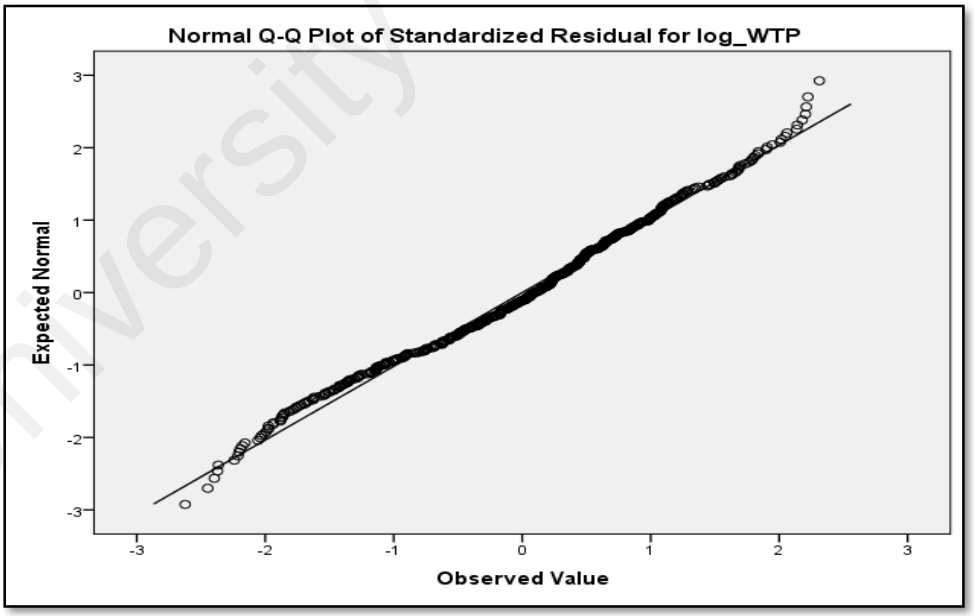

Figure 4.6: Q-Q scatterplot for normality of the residuals

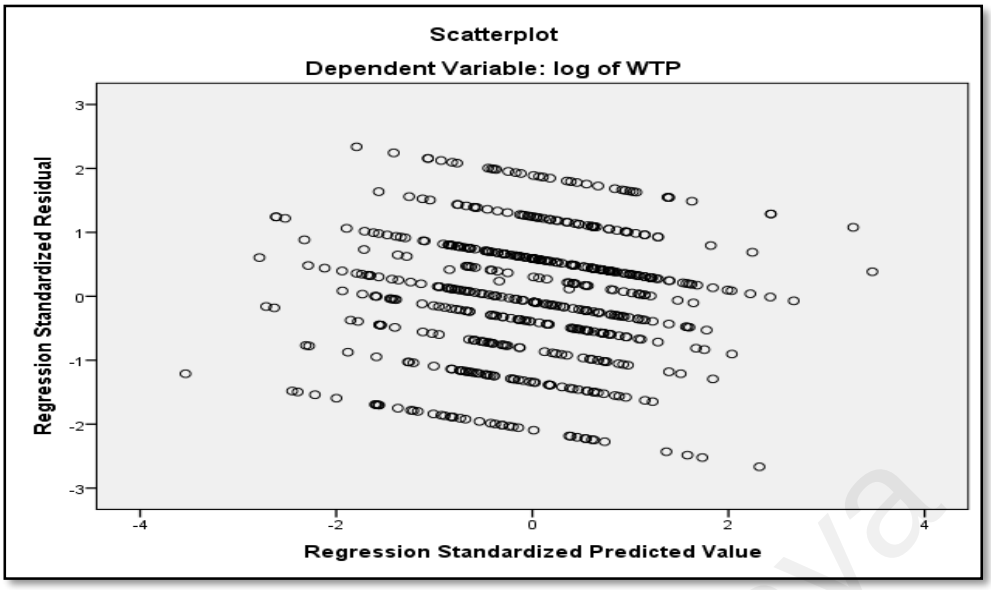

Figure 4.7: Residuals scatterplot for homoscedasticity

4.6.2.2 Assessment of GLM Overall Fit: Statistical Significance

From the ANOVA table (also called Tests of Between-Subjects Effects), Table 4.15, the WTP model showed that it was statistically significantly different from 0, [F (15,579) = 2.39, $p < 0.05$]. Thus, we can confidently assert that the model was reliable in predicting the WTP from all the independent variables in the model.

Table 4.15: GLM ANOVA table (Test of Between-Subjects Effects)

Tests of Between-Subjects Effects							
Dependent Variable: WTP							
Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**	**Partial Eta Squared**	**Observed Power[b]**
Corrected Model	5.785[a]	15	0.386	2.388	0.002	0.060	.987
Intercept	5.653	1	5.653	35.009	0.000	0.059	1.000
Inc	1.797	1	1.797	11.128	0.001*	0.019	0.915
sex	0.005	1	0.005	0.032	0.858	0.000	0.054
Age	0.083	1	0.083	0.515	0.473	0.001	0.111
Marsta	0.033	1	0.033	0.204	0.652	0.000	0.074
Educ	0.040	1	0.040	0.246	0.620	0.000	0.078
Emply	0.025	1	0.025	0.157	0.692	0.000	0.068
Healthsta	0.007	1	0.007	0.044	0.833	0.000	0.055
AIDSkno	0.076	1	0.076	0.469	0.494	0.001	0.105
HCTkno	0.217	1	0.217	1.346	0.246	0.002	0.212

Table 4.15 continued

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observed Power[b]
Testedever	0.313	1	0.313	1.939	0.164	0.003	0.285
HIVinfp	1.236	1	1.236	7.655	0.006*	0.013	0.789
AIDSdeath	0.802	1	0.802	4.965	0.026*	0.009	0.604
HIVwry	1.908	1	1.908	11.817	0.001*	0.021	0.929
HIVstig	1.285	1	1.285	7.958	0.005*	0.014	0.804
HIVch	.443	1	0.443	2.745	0.098	0.005	0.380

a. R Squared = .060 (Adjusted R Squared = .035) b. Computed using alpha = .05

4.6.2.3 Assessment of GLM Overall Fit: Effect size

The R squared value, which shows the percentage of the variance in WTP predictable from all the independent variables in the WTP model was given as 0.06. This can be interpreted as 6% of the variation in WTP was accounted for by the independent variables (Leech, Barret, Morgan, 2005).

4.6.2.4 Assessment of Individual Independent Variables in GLM equation: Statistical Significance and effect sizes.

Table 4.16 presents the statistical significance together with the effect sizes of the individual independent variables in the WTP model. The effect size of individual independent variables were measured by standardised regression coefficient, also known as beta weights or the square of the partial correlation coefficient. This measures the proportion of variance in the dependent variable explained by the independent variable controlling for all the other independent variables in the model.

Table 4.16: Parameter Estimates of the GLM regression

Parameter Estimates								
Dependent Variable: WTP								
					95% Confidence Interval			
Parameter	B	Std. Error	t	Sig.	Lower Bound	Upper Bound	Partial Eta Squared	Observed Power[a]
Intercept	1.862	0.315	5.917	0.000	1.244	2.479	0.059	1.000
Inc	0.198	0.059	3.336	0.001*	0.081	0.315	0.019	0.915
Gender	-0.006	0.034	-0.179	0.858	-0.073	0.060	0.000	0.054
Age	0.037	0.051	0.718	0.473	-0.064	0.137	0.001	0.111
Marsta	-0.017	0.038	-0.451	0.652	-0.092	0.058	0.000	0.074
Educ	0.017	0.035	0.496	0.620	-0.051	0.085	0.000	0.078
Emply	-0.020	0.049	-0.396	0.692	-0.117	0.077	0.000	0.068
Healthsta	-0.017	0.082	-0.211	0.833	-0.178	0.143	0.000	0.055
AIDSkno	0.094	0.137	0.685	0.494	-0.176	0.364	0.001	0.105
HCTkno	0.113	0.097	1.16	0.246	-0.078	0.304	0.002	0.212
Testedever	0.054	0.039	1.39	0.164	-0.022	0.130	0.003	0.285
HIVinfp	0.134	0.048	2.76	0.006*	0.039	0.229	0.013	0.789
AIDSdeath	-0.092	0.041	-2.22	0.026*	-0.172	-0.011	0.009	0.604
HIVwry	-0.137	0.040	-3.44	0.001*	-0.215	-0.059	0.021	0.929
HIVstig	0.121	0.043	2.82	0.005*	0.037	0.206	0.014	0.804
HIVch	0.084	0.051	1.66	0.098	-0.016	0.185	0.005	0.380

a. Computed using alpha = .05 *$p<0.05$

Table 4.16 presents the estimated parameters together with their accompanied means, B, standard errors, t-statistics, significant level, confidence interval, effect size, and power size of the independent variables in the study model. The GLM regression results indicate that five of the independent variables in the model statistically significantly predicted WTP for HCT in this study. These variables are:

Income: Income was statistically significant at the 5 % level [t (563) = 3.336, p = 0.001, effect size = 0.02, power = 0.92] with small effect size Cohen (1988). The estimated coefficient of income variable is 0.20.

HIVinfp – The relationship between WTP and knowledge of somebody infected with the HIV virus (HIVinfp) is positive (0.134) and statistically significant at the 5 % level [t (563) = 2.76, p = 0.006, effect size = 0.013, power = 0.80]. The effect on the significance on WTP is small as unveiled in the reported effect size.

AIDSdeath – knowing someone who died as a result of AIDS-related diseases is statistically significant with WTP at 5% [t (563) = -2.22, p = 0.026, effect size = 0.009, power=0.60]. The reported effect size of the significance level is small. On the average, respondents who know somebody died of AIDS-related diseases scored 9.2% lower than those who did not know someone died of AIDS.

HIVwrry – those who worry about HIV scored less than that those not worry when control for other variables in the model. t (563) = -3.44, p = 0.001, effect size=0.021, power = 0.93. The relationship between the two variables is significant at 5%. The effect size signifies that the effect of the significance is small on WTP.

HIVstig1 – fear of the stigma associated with being HIV-positive is statistically significant with WTP at 5%, t (563) = 2.82, p = 0.005, effect size = 0.014. HIV-related stigma is positively related to WTP. The reported effect size of the significance level is small. From the result, it shows that those who are afraid of the stigma associated with HIV are willing to pay 12.1% more for HCT services than their counterparts.

The remaining variables – gender, age, marital status, educational level, employment status, health status, HIV/AIDS and HCT knowledge, ever tested for HIV, the chance of being infected with HIV – did not show substantial evidence of predicting WTP which signifies that their effects on dependent variables are due to chance. It is noteworthy that although the above variables are not statistically significant in GLM

regression they, however, provide a handy information in the analysis of the determinants of WTP for HCT services.

4.7 Discussion

This section presents and discusses some key findings in the results of the analysis of WTP and the various factors that determine it. From our study, the results of the descriptive statistics of the knowledge, attitude and behaviour of individuals concerning HIV, AIDS and HCT, clearly showed that there was much awareness (over 90%) about HIV infection, AIDS, and acknowledgement of HCT as a means of early detection of HIV in the human body, in Lagos State, Nigeria. The results of this study are similar to earlier studies among tertiary institutions in the south-eastern part of Nigeria by Uzochukwu et al., (2011), which found that 64% of the respondents were aware of Voluntary Counselling and Testing (VCT) and majority obtained HIV information from the mass media. Also, it corroborates Obermeyer et al., (2009), in which the majority of the respondents in their study were well informed about HIV/AIDS and HCT services. It also supports findings of Whittington et al., (2002), Forsythe et al., 2002, Nguyen et al., (2016) and Iliyasu et al., (2006). High awareness of HIV and HCT may not be unconnected with the very fact that Lagos is an urban city with teeming multifarious media houses. It is home to many prominent Nigeria newspapers, television stations, radio stations which regularly disseminate information, advertisements, talks, shows, about HIV/AIDS. Some of them are being sponsored by government agencies, private organisations and NGOs. Media serves as a potential channel of communicating with the population of the benefits of having HCT and other HIV services (Nguyen et al., 2016).

Furthermore, it was observed that majority of the respondents expressed WTP for HCT service, about 75% of the study sample. The results coincided with findings of Nguyen

et al, (2016) in Vietnam, Forsythe et al., (2002) study on Kenya, and Uzochukwu et al., (2011) study on Southeast Nigeria. Amongst those who expressed WTP for HCT, males were more willing to pay (54%) than females. The finding also agrees with Nyuyen et al., (2016) and Uzochukwu et al., (2011) . The reason for higher WTP on the part of males than female might be attributed to the fact that in Nigeria culture, men are assumed to shoulder family responsibility and women may also expect males to pay for them in all things even health care. From the observation, high WTP may suggest that the respondents had already perceived benefits of having HCT and their co-payment responsibility. The findings also revealed that WTP for HCT depend on the knowledge and awareness of the HIV/AIDS and level of worry about the infection. If individuals are worried about the possibility of being infected and the negative impact it would have on them, they will prefer to participate in HCT services.

In this study, differences in the mean WTP value with regards to some sociodemographic, health status, and knowledge/attitude/behaviour were identified. Amongst the respondents who expressed their WTP for HCT, their mean WTP was analysed to see if there were significant differences in the amount they specified. The results indicate that there were no significant differences between the groups of the independent variables except for personal insurance and knowledge of PLHIV. Respondents who have personal insurance were willing to pay more than those who do not, N1, 325 ($4.34). This amount is higher than the mean of WTP in this study. Higher WTP of this group might not be unconnected with the feeling that cost would be covered by their insurance companies. Also, those who knew a person living or infected with HIV (PLHIV) were more willing to pay N1150 ($3.77) than those who did not.

From the analysis of the results, the mean of WTP for HCT in our study showed that on the average, respondents are willing to pay as much as ₦1, 291.15 ($4.22). The mean

WTP was higher than the mean of VCT, ₦370 ($3.2), in Uzochukwu et al., (2011) study on students of two tertiary institutions in Enugu, south-eastern part of Nigeria. The difference between the two could be attributed to the fact that our study sample was based on general population, while Uzochukwu et al., (2011) sample was drawn among students who might not be financially able to pay or were not earning income but somehow depended on their parents. Furthermore, the findings of the study also contrasted with Forsythe et al., (2002), which found the $2 as the mean amount people were willing to pay for voluntary HIV counselling and testing in Kenya. The value of their WTP was lower than the mean of our results. This could be probably explained by the fact that our study area, Lagos State, is an urban, metropolitan and the commercial capital city of Nigeria, where incomes of the residents are much higher than people in the rural areas of Kenya. However, the mean WTP in our study was lower than that of Nguyen et al, (2016), which found $7.75 mean WTP in a survey of two provinces in Vietnam. The difference in WTP could be attributed to various factors. First, the cost of operating HCT in Vietnam was higher than Nigeria. Secondly, their study centred on clients visiting health facility in which some of them had already known their HIV status and thus HCT become much more important to them, our study is a generalised epidemic population-based. And finally, a very sizable number of people hold the belief that it is the responsibility of the government to provide HCT services to them free of charge. This was reflected in the low amount that some stated in the survey.

When comparing the result of the mean WTP to the cost of providing the HCT service per client in Nigeria according to Aliyu et al., (2012), in which the mean cost per client was $7.4, the mean WTP was much lower, about 57% of the cost per client. As at the time of the survey of this study, the HCT cost per client might be higher than that which was by expressed by Aliyu et al., (2012). The cost of HIV Rapid Test Kits in the Primary Health Centres (PHC) as obtained during this suvey indicated that the four prominent

HIV test kits, Determine (100 tests), Uni-Gold (20 tests), Stat-Pak (20 tests), and Double-Check Gold (100 tests) cost US$80, US$16. 65, US$40, US$135 respectively. The first three test kits are commonly used in rapid HIV testing in Lagos State, Nigeria (APIN, 2016). If we take, for instance, one Stat-Pak pack which contains 20 HIV test kits, it then means that each unit of the test kits cost approximately US$2. Adding other costs such as, personnel costs, capital, miscellaneous disposable materials (such as latex gloves, adhesive bandages, sterile wipes, gauze pads, phlebotomy equipment (needles, holders, blood tubes) absorbent workspace covers, biohazard waste disposal bags, lab supplies (pipettes, tubes) as identified by Pinkerton et al., (2010), the cost will be much higher than the cost stated by Aliyu. The mean cost per client in Nigeria seems lower than other countries. For instance, cost per client in the study of Menzies et al. (2009) in Uganda was (stand-alone HCT: US$19. 26; Hospital-based HCT: US$11. 68, Household-member HCT: US$13. 85; Door-to-door HCT: US$8. 29). In Kenya, Forsythe et al (2002) cost per client was US$16 while Marum, Taegtmeyer, & Chebet (2006) was (in stand-alone sites: US$15; community-based: US$10; health care facility-based: US$11-$13). In Vietnam, Minh et al., (2012), it was in (facility-based: US$30. 3; freestanding facility: US$38. 9); and US$ 7.6 in Nguyen et al. (2015).

The mean WTP [(₦1, 291.15 ($4.22)] in this study, accounted for about 0.16% GDP per capita in Nigeria as at 2015. According to the World Bank statistic, Nigeria GDP per capita in 2015 was US$2, 640.29 (World Bank, 2016). In comparison, Nguyen et al., (2016) mean WTP accounted for 0.41% of GDP per capita (US$2111. 14, World Bank Statistic 2015) in Vietnam. Even though Nigeria GDP per capita and HIV incidence and prevalence rate were higher than Vietnam, the WTP was lesser. In addition, the stated WTP in this study was much lower (about 4.1%) than the reported average income of the respondents (₦31,525). Thus, we can infer that the stated WTP

value seemed acceptable and affordable to the participants giving their expressed average income.

Household income played a crucial role in determining the amount that individuals were willing to pay for HCT services. Among other variables, the income is the strongest determinant of WTP for HCT. The estimated coefficient of income variable was 0.20. Since both WTP and Income variables were log-transformed due to their high skewness, it means that a 1% change in income was associated with a 0.20% change in WTP, holding other variables in the regression equation constant. The relationship between them was positive which signifies that as income rises there is a possibility of people willing to pay more for HCT services. Also, the power of the test was high, 0.92, meaning that if the test should be conducted a hundred time, we are ninety-two percent certain that income will significantly predict WTP. The relationship between WTP and income was also corroborated in the non-parametric results which showed that individuals in the higher-income group were willing to pay more than other groups. The findings agreed with Nguyen et al (2016), although their findings indicated middle income earners were willing to pay less than the lowest income group. The finding also agreed with Forsythe 2002, Tran (2013) and Tang (2007). From this result, it shows that for people to be willing to pay more, their level of income is very crucial. In a situation where most people are jobless with little or no means of sustenance, it will be quite challenging for them to pay for HCT. Therefore, the co-payment system must take cognisance of the level of income of the people.

Furthermore, the results of this study suggested that respondents' knowledge of somebody who has been infected with HIV and someone died because of HIV-related diseases influenced their willingness to pay for HCT. The respondents might have realised and convinced about the seriousness of the disease. Hence, their decisions to

pay for the service in order to avert the negative impacts the disease will have in their lives. The results of this study suggested that worry about the possibility of being infected with HIV and fear of the stigma associated with being HIV-positive played important roles in influencing the respondents' decisions to WTP for HCT. The findings agreed with the study by Golub & Gamarel (2013), in which it was found out that anticipated stigma was a significant predictor of HIV testing behaviour among the men who have sex with men (MSM) and transgender women in the New York City.

4.8 Summary

This chapter was set out to evaluate the first objective of this thesis, which is to investigate the determining factors of willingness to pay (WTP) for HCT services in Nigeria in the context of the Contingent Valuation method of economic evaluation. It has been argued out in the earlier chapters the roles of HCT in the soaring HIV/AIDS scenarios in Nigeria. However, it was noted that this service is being threatened by the lack of fund necessary to sustain and increase its coverage. And to ensure the sustainability of the programme there is a need to introduce a type of co-payment system which is affordable for the potential users. This system may be achieved in the context of the Contingent Valuation model which is expressed in the maximum amount that the individual will be willing to pay to get the service.

From the results of the non-parametric estimations and GLM regression analysis, HIV/AIDS knowledge, worry about HIV, knowledge of someone infected by HIV, knowing someone who died as a result of AIDS, ownership of personal insurance, income level, fear of HIV-related stigma are essential determinant factors of willingness to pay for HCT service utilisation in Nigeria.

CV method of economic analysis produces very vital information for price setting for introduction for co-payment in case the free or subsidised provision of HCT is no longer

sustainable. The results from the regression analysis show the variables of interest that were significant if the CV is to be used for introduction of co-payment for HCT service. Prominent among these is the income of the people.

CHAPTER 5: EXPLORING THE HEALTH BELIEF PREDICTORS OF HCT SERVICE UTILISATION AND MODERATING EFFECTS OF SOCIODEMOGRAPHIC VARIABLES

5.1 Introduction

In the previous chapter, it was established that the knowledge of HIV/AIDS and HCT was very high, but this has not translated to higher uptake of HCT service in Nigeria as reported by NACA, (2015) and UNAIDS, (2015). Therefore, this chapter aims to explore the factors that significantly predict HCT service utilisation using the Health Belief Model (HBM) framework. This chapter presents the analysis and results of the hypothesised structural model to determine factors that predict HCT utilisation in Nigeria in the context of the Health Belief Model (HBM) as laid down in the second objective of this thesis. Also, presented in this chapter are the results of the moderating effects of the moderator variables (sociodemographic variables) on the relationship between the HBM factors and HCT service utilisation. The layout of this chapter is as follows: the introduction, the analytic framework, PLS-SEM analysis, moderation analysis, findings and discussion, and chapter summary.

5.2 Analytical Framework

Figure 5.1 displays the analytical framework of the relationship between HBM factors and HCT service utilisation as hypothesised in chapter two. The measurements indicators or manifest variables for each of the latent constructs described in Chapter three, are also displayed in the framework. The four paths represent the four hypotheses stated in chapter 2. They are:

(1) Perceived susceptibility to HIV infection (PSU) will positively and significantly predict HCT utilisation.

(2) Perceived severity of AIDS disease (PSE) will positively and significantly predict HCT utilisation.

(3) Perceived benefits of HCT (PBE) will positively and significantly predict HCT utilisation.

(4) Perceived barriers to HCT (PBA) will negatively and significantly predict HCT utilisation.

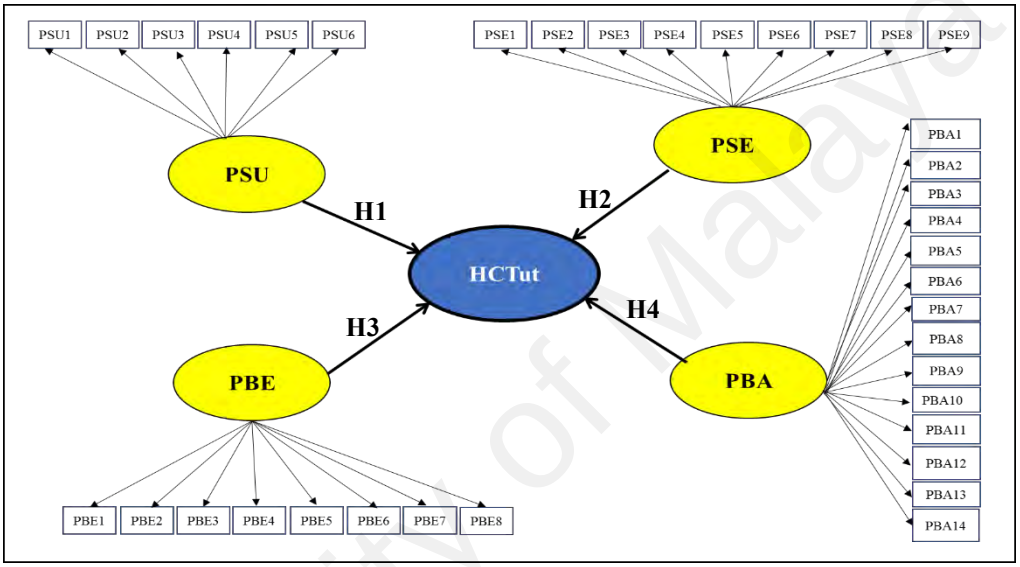

Figure 5.1: Analytical Framework of HBM on HCT

5.3 Data Analysis and Results - PLS-SEM Approach

Partial Least Square structural equation modelling (PLS-SEM) analysis approach was used to analyse the relationships among the constructs as specify in the analytical framework above. The PLS-SEM approach used to analyse the relationships among the variables follows Anderson & Gerbing (1988) recommended two-step approach as mentioned in Chapter 3. The study used the Stable-3 resampling method in WarpPLS because it produces better results than other methods. (Kock, 2015a).

5.3.1 Model Validation Stage 1: Measurement Model Assessment

Under the first stage of the PLS-SEM analysis, four constructs (PSU, PSE, PBE, PBA) of the hypothesised HBM model with their measurement items were first analysed to

establish their reliability and validity. The criteria used for this purpose were outlined in Chapter 3 (Table 3.6).

5.3.1.1 Measurement Items Reliability

Table 5.1 presents the result of reliability test for the measurement items after deleting the items that failed to meet the measurement model criteria. The indicators that were retained have loadings above 0.50.

Table 5.1: Measurement items loadings and cross-loadings (individual item reliability)

	HCTut	PSU	PSE	PBE	PBA	Type	SE	*p*-value
HCTutl	1.000	0.000	0.000	0.000	0.000	Reflective	0.033	<0.001
PSU1	0.274	**0.625**	-0.032	-0.188	-0.035	Reflective	0.034	<0.001
PSU2	0.264	**0.673**	-0.161	-0.047	0.240	Reflective	0.034	<0.001
PSU3	-0.360	**0.702**	0.115	0.099	-0.160	Reflective	0.034	<0.001
PSU4	-0.368	**0.684**	-0.227	0.188	-0.120	Reflective	0.034	<0.001
PSU5	0.316	**0.656**	0.298	-0.144	-0.204	Reflective	0.034	<0.001
PSU6	-0.057	**0.921**	0.008	0.049	0.205	Reflective	0.033	<0.001
PSE4	0.092	0.116	**0.899**	0.163	0.079	Reflective	0.033	<0.001
PSE5	-0.298	0.038	**0.643**	-0.065	0.084	Reflective	0.034	<0.001
PSE6	0.093	0.209	**0.667**	-0.274	-0.02	Reflective	0.034	<0.001
PSE7	-0.039	-0.229	**0.724**	0.045	0.035	Reflective	0.034	<0.001
PSE8	0.119	-0.161	**0.635**	0.073	-0.216	Reflective	0.034	<0.001
PBE2	0.095	0.081	-0.154	**0.711**	0.005	Reflective	0.034	<0.001
PBE3	0.135	0.105	-0.196	**0.802**	0.000	Reflective	0.033	<0.001
PBE6	-0.140	-0.061	0.054	**0.711**	-0.125	Reflective	0.034	<0.001
PBE7	-0.157	-0.003	0.121	**0.920**	0.041	Reflective	0.033	<0.001
PBE8	0.102	-0.145	0.175	**0.666**	0.072	Reflective	0.034	<0.001
PBA4	-0.430	-0.004	0.015	0.031	**0.772**	Reflective	0.033	<0.001
PBA5	0.585	-0.134	0.389	-0.261	**0.582**	Reflective	0.034	<0.001
PBA6	-0.222	0.539	-0.300	0.080	**0.514**	Reflective	0.034	<0.001
PBA7	0.263	-0.202	-0.029	0.013	**0.680**	Reflective	0.034	<0.001
PBA10	0.071	-0.024	0.045	0.000	**0.962**	Reflective	0.033	<0.001
PBA11	-0.182	-0.045	-0.137	0.100	**0.777**	Reflective	0.033	<0.001

As revealed in Figure 5.2, the items loadings were more than the recommended value 0.50. Therefore, all the constructs measurement items show a very satisfactory level of item reliability.

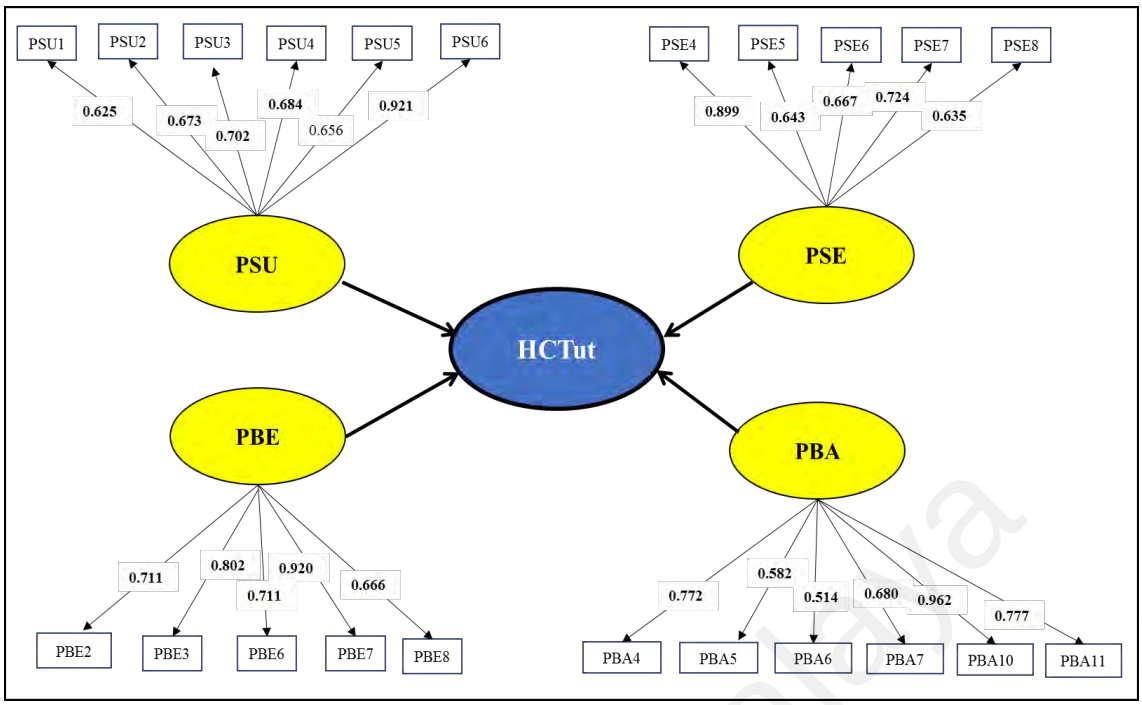

Figure 5.2: Reduced final structural model

5.3.1.2 Validity Assessment – Convergent Validity

Table 5.2 below shows the validity results indicating that the measurement items are significantly loaded on the parent factor as $p < 0.05$ (Kock, 2015). The second item examined under convergent validity is the Average Variance Extracted (AVE). The results revealed that AVEs were higher than the recommended 0.50. Therefore, all the four constructs show good convergent validity (Bagozzi & Yi, 1988; Hair et al., 2009; Urbach & Ahlemann, 2010).

Table 5.2: Convergent Validity Test of the Measurement Model – The standardised item loadings, *p*-value and Average Variance Extracted (AVE)

Latent Constructs	Construct Indicators	Loadings	*p*-value	AVE
Perceived Susceptibility to HIV infection (PSU)	PSU1	0.625	<0.001	0.514
	PSU2	0.673	<0.001	
	PSU3	0.702	<0.001	
	PSU4	0.684	<0.001	
	PSU 5	0.656	<0.001	
	PSU 6	0.921	<0.001	

Table 5.2: Continued

Perceived Severity of AIDS disease (PSE)	**PSE5**	0.643	<0.001	0.519
	PSE6	0.667	<0.001	
	PSE7	0.724	<0.001	
	PSE8	0.635	<0.001	
	PSE4	0.899	<0.001	
Perceived Benefits of HCT (PBE)	**PBE2**	0.711	<0.001	0.589
	PBE3	0.802	<0.001	
	PBE6	0.711	<0.001	
	PBE7	0.920	<0.001	
	PBE8	0.666	<0.001	
Perceived Barriers to HCT (PBA)	**PBA4**	0.772	<0.001	0.532
	PBA5	0.582	<0.001	
	PBA6	0.514	<0.001	
	PBA7	0.680	<0.001	
	PBA10	0.962	<0.001	
	PBA11	0.777	<0.001	
HCT service utilisation (HCTut)	**HCTut**	1.000	<0.001	1.000

5.3.1.3 Validity Assessment - Discriminant Validity

Table 5.3 presents the results of the discriminant validity test. The discriminant validity results revealed that all the bolded values of the square-root of AVE for individual latent in the diagonal were larger than correlation values in both column and row (Wong, 2013; Hair, Ringle, & Sarstedt, 2011). Thus, the constructs attain the acceptable level of discriminant validity.

Table 5.3: Discriminant Validity of the measurement constructs – Fornell-Larcker Criterion Analysis for checking Discriminant Validity

	PSU	**PSE**	**PBE**	**PBA**	**HCTut**
PSU	**(0.717)**	0.293	0.526	0.209	0.386
PSE	0.293	**(0.720)**	0.164	0.560	-0.257
PBE	0.526	0.164	**(0.768)**	-0.152	0.626
PBA	0.209	0.560	-0.152	**(0.729)**	-0.488
HCTut	0.386	-0.257	0.626	-0.488	**(1.000)**

5.3.1.4 Reliability Assessment- Internal Consistency Reliability

The reliability of the latent constructs in the HBM model was assessed by Cronbach's alpha and composite reliability. Table 5.4 presents the results of the constructs reliability test. The results showed that both Cronbach's alpha and composite reliability ranging from 0.760 - 0.823 and 0.841 - 0.879 respectively. These values are higher than 0.60 (Cronbach & Meehl, 1955; Nunnally & Berstein, 1994; Urbach & Ahlemann, 2010; Bagozzi & Yi, 1988) and 0.70 (Hair et al. 2012; Fornell & Larker, 1981). Therefore, the reliability results indicate that the constructs are both suitable and reliable in the HBM model.

Table 5.4: Results of Reliability Test for the Measurement Model - Cronbach's Alpha and Composite Reliability

Latent Construct	Measurement Items	Cronbach's Alpha	Composite Reliability	Loading Range	Number of Items
Perceived Susceptibility to HIV infection (PSU)	PSU1-PSU6	0.804	0.862	0.625 – 0.921	6
Perceived Severity of AIDS Disease (PSE)	PSE4-PSE8	0.760	0.841	0.635 – 0.899	5
Perceived Benefits of HCT (PBE)	PBE2, PBE3, PBE6, PBE7, PBE8	0.820	0.876	0.666 – 0.920	5
Perceived Barriers to HCT (PBA)	PBA4, PBA5, PBA6, PBA7,PBA10, PBA11,	0.811	0.867	0.594 – 0.966	6
HCT utilisation (HCTut)	HCTut	1.000	1.000	1.000	1

5.3.1.5 Multicollinearity Tests – Variance Inflation Factor (VIF)

According to Mohamadali (2012), "Variance Inflation Factor (VIF) measures the degree of multicollinearity among latent variables that are hypothesised to affect other latent variables" (p.161). High multicollinearity is a major concern because it can cause a

reduction in the efficiency of the estimators (Kennett & Salini, 2011). The VIF of the exogenous constructs was assessed in order to establish whether multicollinearity problem was present in the model or not. The results show that the VIF of all the constructs were less than the cut-off points 3.3 as recommended by Kock (2015), cut-off point 5 by Kline (1998), and cut-off point 10 by Hair et al (1987; 2009) (Table 5.6). Both vertical collinearity (predictor–predictor) and lateral (predictor-criterion) collinearity were assessed by Average Variance Inflation Factors (AVIF) and Average Full Inflation Factor (AFVIF) and satisfied the recommended 3.3 value by Kock & Lynn (2012).

Table 5.5: Latent constructs and Variance Inflation Factors

Latent Construct	VIF
PSU	1.785
PSE	1.732
PBE	2.180
PBA	2.050
HCTut	2.670

5.3.2 Model Validation Stage 2: Structural Model Assessment

Having successfully established the reliability and validity of the measurement models by ensuring they fully satisfied all the stipulated criteria in stage one; thus, this stage provided a good foundation and sufficient robustness requires for testing the relationship between exogenous variables and the endogenous variable in stage two of the PLS-SEM analysis. In the second stage of the PLS-SEM analysis, the relationship between the predictors and response construct was established by examining the path analysis, coefficient of determination, effect sizes , predictive relevance, and model fit.

5.3.2.1 Assessment of Coefficient of Determination (R^2)

The value of R^2, 0.63, as shown in Figure 5.3 reveals that the four latent constructs could explain sixty-three per cent of the variation of the criterion construct which in this case

is HCT utilisation. Another thirty-seven per cent was not accounted for in the model. Thus, we can infer that the coefficient of the determination falls within the substantial category.

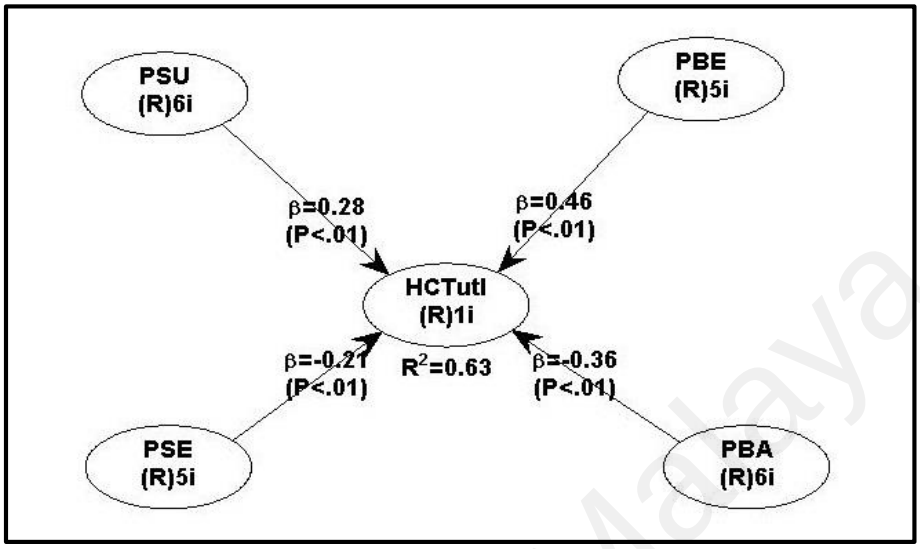

Figure 5.3: The Estimated Structural Model with Path Coefficients

5.3.2.2 Assessment of Path Coefficient, (β)

Path coefficient is also referred to as beta (β) coefficients in PLS-SEM analysis. The weight, size, and direction of the relationships between predictors and criterion constructs are shown in path coefficients. Each path represents a hypothesis in the research model. Table 5.7 presents the results of the path analysis.

Table 5.6: Summary of the Structural model - Path Coefficient, (β) with effect sizes

Latent Construct	Path coefficient	SE	*p*-value	Effect sizes	Hypotheses
PSU	0.281	0.035	<0.001	0.109	H_{2a}: Supported
PSE	-0.214	0.035	<0.001	0.055	H_{2b}: Not Supported
PBE	0.459	0.034	<0.001	0.288	H_{2c}: Supported
PBA	-0.358	0.035	<0.001	0.175	H_{2d}: Supported

Hypothesis 1: Path analysis results supported the first hypothesis. The relationship between PSU and HCT utilisation was positive. PLS-SEM results indicate that perceived susceptibility to HIV was a significant predictor of HCT utilisation (PSU: β

= 0.281, $p < 0.001$, $f^2 = 0.109$). There is a positive and linear relationship between the two constructs as generated by WarpPLS 5.0 and depicted in Figure 5.4.

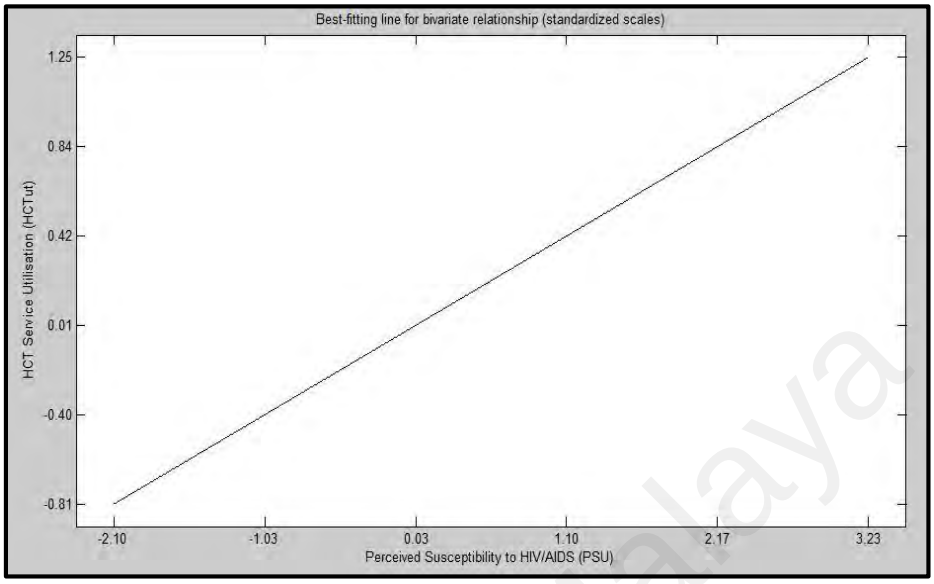

Figure 5.4: Positive and Linear relationship between PSU and HCTut

Hypothesis 2: Result of the path analysis of the relationship between perceived severity of AIDS disease and HCT utilisation was negative (PSE: $\beta = -0.214$, $p < 0.001$, $f^2 = 0.055$). The result does not support the research hypothesis. The relationship between these two variables is negative as depicted in Figure 5.5.

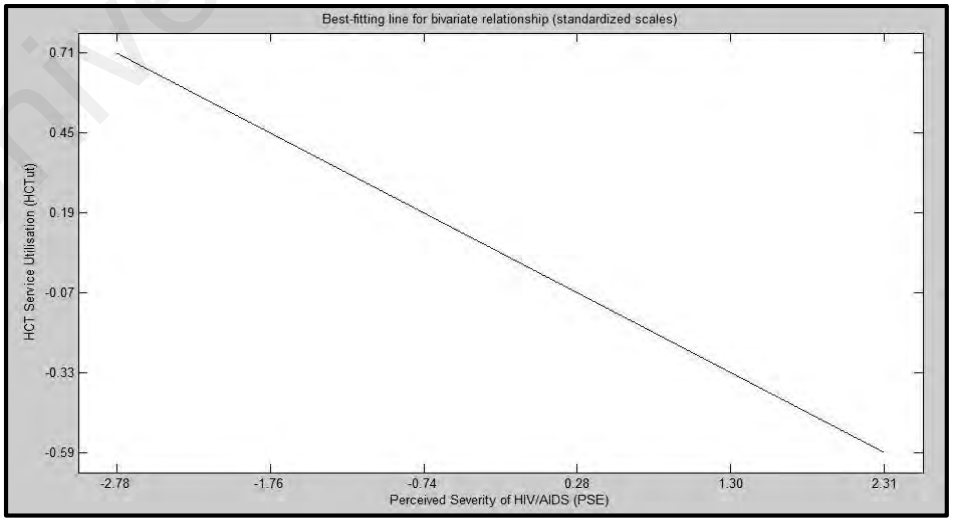

Figure 5.5: Linear relationship between PSE and HCTut

Hypothesis 3: The PLS-SEM analysis revealed that the relationship between perceived benefits of HCT and HCT utilisation is both positive and significant (PBE: $\beta = 0.459$, $p < 0.001$, $f^2 = 0.291$). Thus, it supported the research hypothesis that the higher the perception of the benefits of HCT the more likely HCT utilisation. Perceived benefits of HCT is a significant predictor of HCT utilisation. The linear relationship between the two constructs is graphically depicted in Figure 5.6.

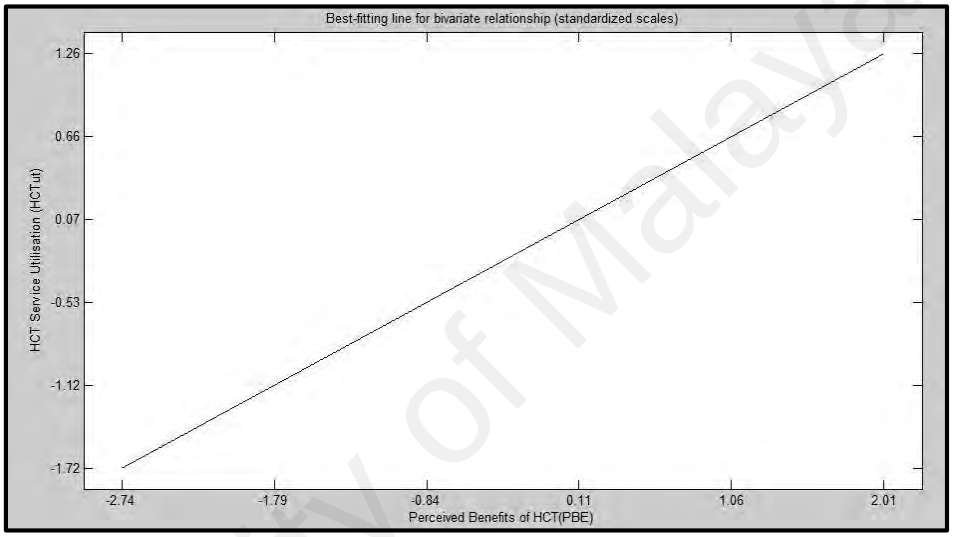

Figure 5.6: Linear relationship between PBE and HCTut

Hypothesis 4: Results from PLS-SEM analysis indicated that perceived barriers to HCT was negatively associated with HCT utilisation and a statistically significant predictor (PBA: $\beta = -0.358$, $p < 0.001$, $f^2 = 0.175$). Thus, our research findings lend credence to the inverse relationship between perceived barriers to HCT and HCT utilisation. The inverse relationship is highlighted in Figure 5.7.

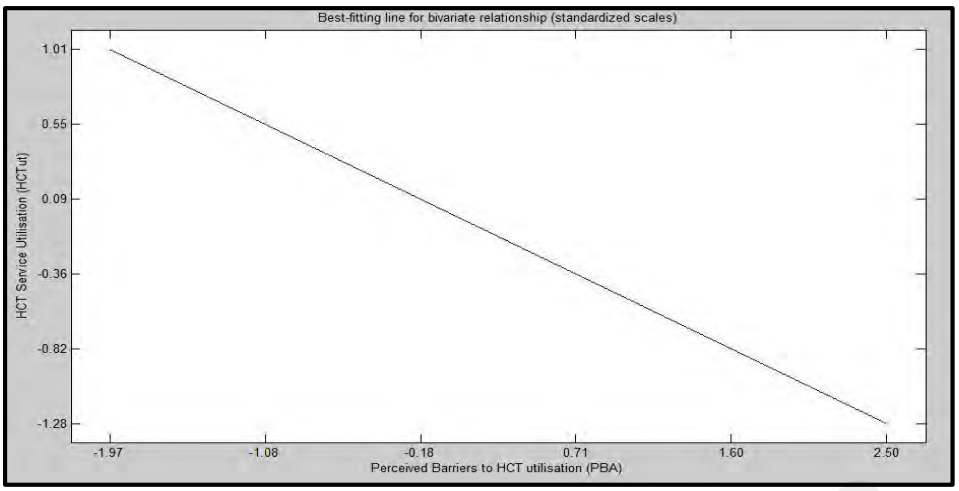

Figure 5.7: Linear relationship between PBA and HCTut

5.3.2.3 Assessment of Effect Size, (f^2)

The summary of effect sizes of the latent exogenous constructs is presented in Table 5.8. The results show that variables PSU and PSE have small effect sizes on HCT utilisation while variables PBE and PBA have medium effect size.

Table 5.7: The Effect Size, f^2, of the Predictors Latent Variables on Criterion Latent Variable

Predictor variables	f^2	Inference
Perceived Susceptibility to HIV infection (PSU)	0.109	PSU has a small effect on HCT utilisation
Perceived Severity of AIDS Disease (PSE)	0.055	PSE has a small effect on HCT utilisation
Perceived Benefit of HCT (PBE)	0.281	PBE has a medium effect on HCT utilisation
Perceived Barriers to HCT (PBA)	0.175	PBA has a medium effect on HCT utilisation

5.3.2.4 Assessment of Predictive Relevance, (Q^2)

Table 5.9 shows the predictive relevance of the criterion variable in this thesis, which is HCT utilisation and denoted as HCTut. The result indicates that Q^2 falls within the large predictive relevance category. Thus, the hypothesised research model passed the predictive relevance and it is valid for prediction purposes.

Table 5.8: Predictive relevance - Stone-Geisser Q-squared Coefficient

Endogenous Latent Variable	Stone-Geisser Q-squared Coefficient, (Q^2)
HCT Utilisation – HCTut	0.608

5.3.2.5 HBM Model fit and Quality Indices

The four common model fit indices, Average Path Coefficient (APC), Average R-squared (ARS), Average Adjusted R-squared (AARS), and Average Block Variance Inflation Factor (AVIF) were assessed in the analysis. The results showed that APC = (0.328, $p < 0.001$); ARS = (0.626, $p < 0.001$); AARS = (0.624, $p < 0.001$) all had p-values less than the recommended 0.05, and also AVIF= (1.628) was less than 3.3 recommended values (Kock, 2015d, 2016; Kock & Lynn, 2012) (Table 5.10). In conclusion, our research model perfectly fits the data.

Table 5.9: Results of the Model Fit Indices of the Study Model

Model Indices	Criteria	Value	*Decision*
Average Path Coefficient (APC)	p-value less than 0.05 (Kock, 2015)	0.328	$p < 0.001$ Satisfied
Average R-squared (ARS)	p-value less than 0.05 (Kock, 2015)	0.626	$p < 0.001$ Satisfied
Average adjusted R-squared (AARS)	p-value less than 0.05 (Kock, 2015)	0.624	$p < 0.001$ Satisfied
Average Block Variance Inflation Factor (AVIF)	Lower than 3.3 (Kock & Lynn, 2012)	1.628	Satisfied
Average full collinearity VIF (AFVIF)	Lower than 3.3 (Kock & Lynn, 2012)	2.084	Satisfied

Table 5.9: Continued

Model Indices	Criteria	Value	*Decision*
Tenenhaus GoF	≥0. 1 = small ≥0. 25 = medium ≥0. 36 = large (Wetzels et al., (2009)	0.628	Has large good of Fit Satisfied
Sympson's paradox ratio (SPR)	Acceptable if >= 0.9 (Pearl, 2009; Wagner, 1982)	1.000	Satisfied
R-squared contribution ratio (RSCR)	Acceptable if >= 0.9 (Pearl, 2009; Wagner, 1982)	1.000	Satisfied
Statistical suppression ratio (SSR)	Acceptable if >= 0.7	1.000	Satisfied
Nonlinear bivariate causality direction ratio (NLBCDR)	Acceptable if >= 0.7	1.000	Satisfied

5.3.3 The Analysis and Results of Moderating Effects of Sociodemographic Variables

The second part of the objective 2 of this study is to demonstrate the moderating effects of sociodemographic variables on the relationship between HBM constructs and HCT service utilisation.

The results of the moderating effects are both presented in Table 5.10. and Figure 5.8. Sociodemographic variables are hypothesised to have moderating effects on exogenous latent HBM constructs, Perceived Susceptibility to HIV infection (PSU), Perceived Severity of AIDS Disease (PSE), Perceived Benefits of HCT (PBE), and Perceived Barriers to HCT (PBA) on HCT utilisation (HCTut).

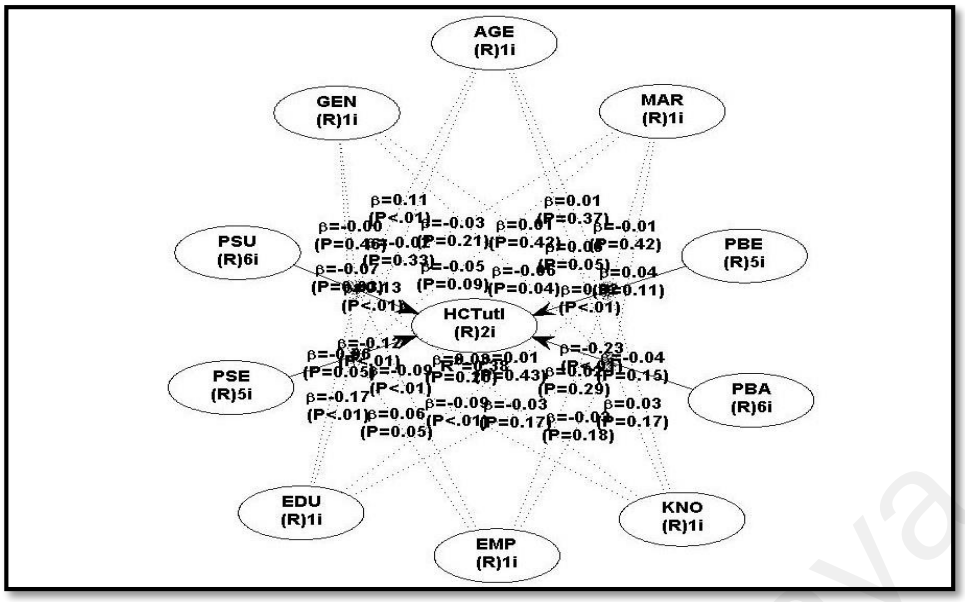

Figure 5.8: An Estimated model of moderating effect of Sociodemographic variables on the relationship between latent exogenous HBM constructs and HCT utilisation.

The results as indicated in the Table 5.11 reveal that nine paths statistically significantly different from zero and thus, moderated the relationship between the four HBM constructs and HCT utilisation.

Table 5.10: Results of the Moderating effects of Sociodemographic

Path (Hypothesis)	*β*	SE	*p*-value	f^2	Decision
PSU→HCTut	0.135	0.036	<0.001	0.043	Sig.
PSE→HCTut	-0.123	0.036	<0.001	0.025	Sig.
PBE→HCTut	0.319	0.035	<0.001	0.157	Sig.
PBA→HCTut	-0.246	0.035	<0.001	0.088	Sig.
Gender moderating effects:					
H2a: PSU→HCTut	-0.004	0.036	0.458	0.001	n.s.
H2b: PSE→HCTut	-0.045	0.036	0.103	0.005	n.s.
H2c: PBE→HCTut	0.002	0.036	0.475	0.001	n.s
H2d: PBA→HCTut	-0.058	0.036	0.054	0.004	Sig.
Age moderating effects:					
H3a: PSU→HCTut	0.107	0.036	0.001	0.024	Sig.
H3b: PSE→HCTut	-0.016	0.036	0.329	0.001	n.s
H3c: PBE→HCTut	0.011	0.036	0.379	0.002	n.s
H3d: PBA→HCTut	0.060	0.036	0.049	0.011	Sig.
Marital status moderating effects:					
H4a: PSU→HCTut	-0.033	0.036	0.183	0.006	n.s
H4b: PSE→HCTut	-0.063	0.036	0.040	0.007	Sig.
H4c: PBE→HCTut	-0.011	0.036	0.376	0.002	n.s
H4d: PBA→HCTut	0.040	0.036	0.135	0.006	n.s
Educational status moderating effects:					
H5a: PSU→HCTut	-0.057	0.036	<0.001	0.008	Sig.
H5b: PSE→HCTut	-0.161	0.036	0.056	0.013	Sig.

Table 5:10 continued

H5c: PBE→HCTut	0.006	0.036	0.147	0.001	n.s
H5d: PBA→HCTut	-0.020	0.036	0.432	0.002	n.s
Employment status moderating effects:					
H6a: PSU→HCTut	-0.084	0.036	0.290	0.018	n.s
H6b: PSE→HCTut	0.046	0.036	0.363	0.003	n.s
H6c: PBE→HCTut	0.013	0.036	0.099	0.002	n.s
H6d: PBA→HCTut	-0.020	0.036	0.010	0.003	Sig.
Knowledge of HIV/AIDS moderating effects:					
H7a: PSU→HCTut	0.008	0.036	0.409	0.001	n.s
H7b: PSE→HCTut	-0.110	0.036	0.001	0.016	Sig
H7c: PBE→HCTut	-0.063	0.036	0.041	0.011	Sig.
H7d: PBA→HCTut	0.033	0.036	0.177	0.004	n.s.

R^2=0.394; Adjusted R^2=0.374; n.s = not significant; sig = significant

5.3.4 Moderating Effects Results and Post-Hoc Probing

In the previous analysis, the presence of moderating effects was established for only nine paths. Recall that these moderators are categorical variables with two levels (groups), the significant paths did not reveal which group contributed most to the significant impact in the model. Therefore, to determine the level that contributes most it is suggested that there is a need to conduct post-hoc tests (Holmbeck, 2002). This section examined the relationship between the moderators and HCT utilisation together with the post-hoc test for the significant paths. We followed Kock (2014) steps to conduct the post-hoc probing. These steps involved creating data labels for each category of moderator variables in Microsoft Excel and imported them individually into WarpPLS software for further confirmatory analysis. The software generated results showing graphs with the best-fitting lines for the two levels of the moderators. The results are considered below.

5.3.4.1 Moderating Effects of Gender

As shown in the Table 5.11, the results of the moderating effect of Gender only supported H2d (Gender on PBA→HCTut, β = -0.058, p = 0.054, f^2 = 0.004). The results revealed that Gender moderated the relationship on PBA→HCTut. Closer examination of the results as presented in Figure 5.9 reveals that at every measured point, the effect

of PBA on HCT decreased in female than male, but reversed at very high levels of PBA. The slopes of both lines were warped, i.e., curvilinear and almost identical. In this instance, the results show that irrespective of Gender type, there was evidence of negative PBA on HCT utilisation. As for the remaining HBM constructs, PSU, PSE, and PBE, no significant categorical moderating effect of gender type is observed in the model. Therefore, we can conclude that their effect on HCTut does not differ according to the sex of the respondents.

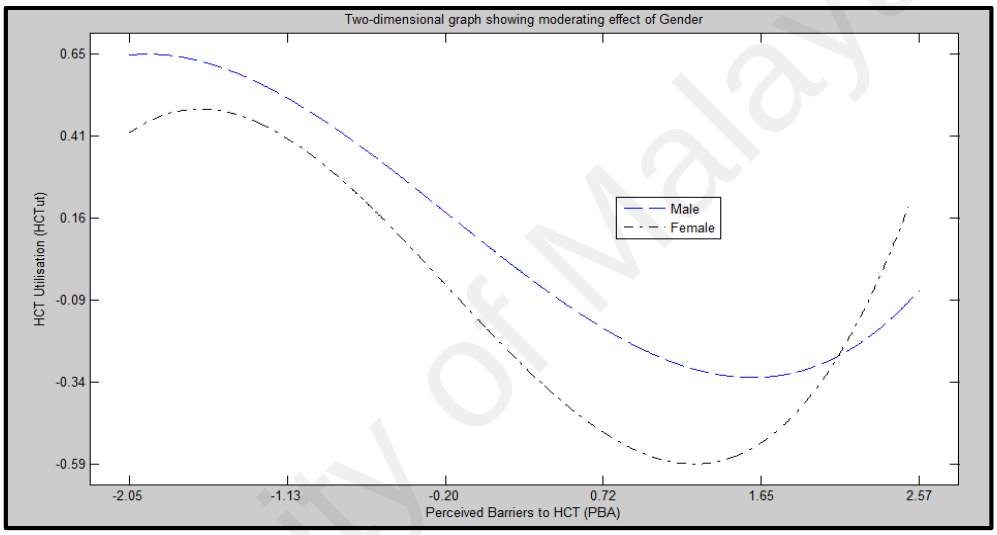

Figure 5.9: Moderating Effect of GENDER on PBA-HCTut

5.3.4.2 Moderating Effects of Age

The next moderator, age, was positive and statistically significant with Perceived Susceptibility (PSU) on HCT utilisation (AGE on PSU→HCTutl, $\beta = 0.107$, $p = 0.001$, $f^2 = 0.024$) and thus supported H3a, which means Age changes the strength and the form of the PSU→HCTut relationship. Figure 5.10 suggests that the PSU relationship with HCT utilisation was higher for young ones than for older people. In other words, younger people who seemed more susceptible to HIV infection have higher HCT utilisation than older people, but it was reversed at higher rates of PSU with older people having higher HCT utilisation than younger ones.

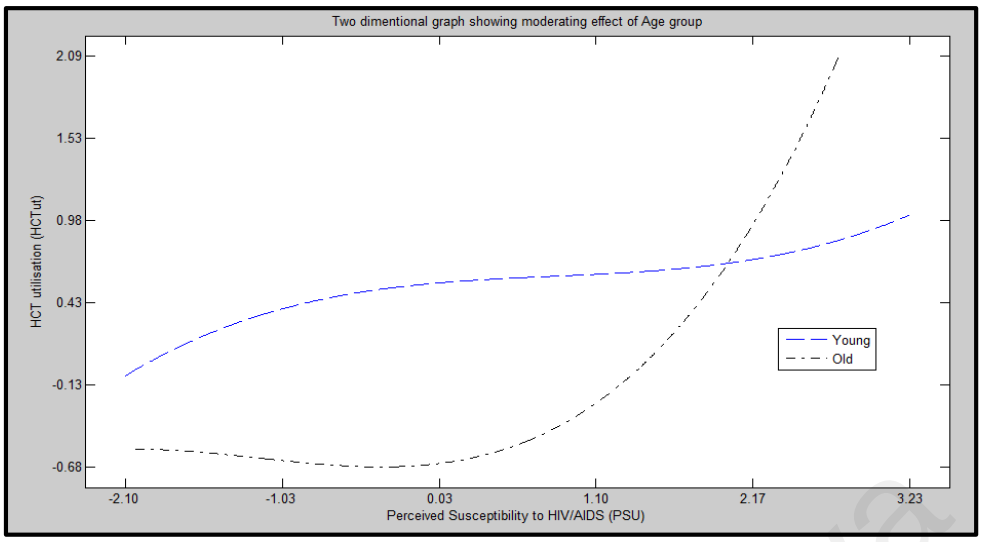

Figure 5.10: Moderating Effect of AGE group on PSU-HCTut

Also, Age statistically moderated the relationship between PBA and HCT utilisation (AGE on PBA→HCTutl, β = 0.060, p = 0.049, f^2 = 0.011). As shown in Figure 5.11, the relationship between PBA and HCT seems higher for young ones than older people. Both young and old exhibited a negative relationship between PBA and HCT. The moderating effects of age on the relationship of other HBM constructs (PSE and PBE) and HCT utilisation were not statistically significant.

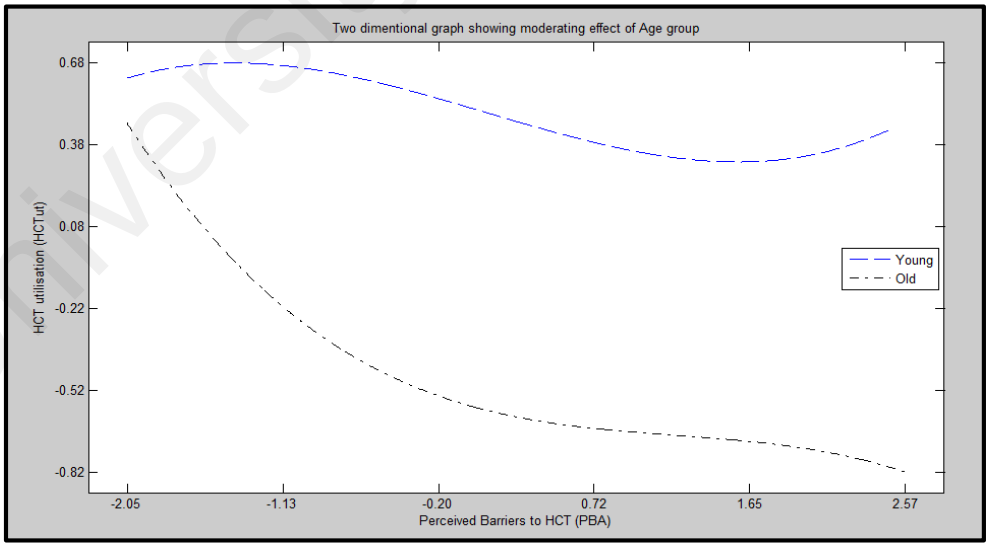

Figure 5.11: Moderating Effect of Age Group on PBA-HCTut

5.3.4.3 Moderating Effects of Marital Status

As for the marital status moderator, it was positive and statistically significant for only PSE construct (MARTL on PSE→HCTutl, β = -0.063, p = 0.040, f^2 = 0.007). The

moderating effects result indicates that increased in perceived severity (PSE) had lesser effect on the respondents who were married than for those who were not. Both lines of marital status group exhibit warped characteristics (Figure 5.12). Thus, we can draw inference that the more the non-married perceived severity of HIV the less they were interested in HIV testing.

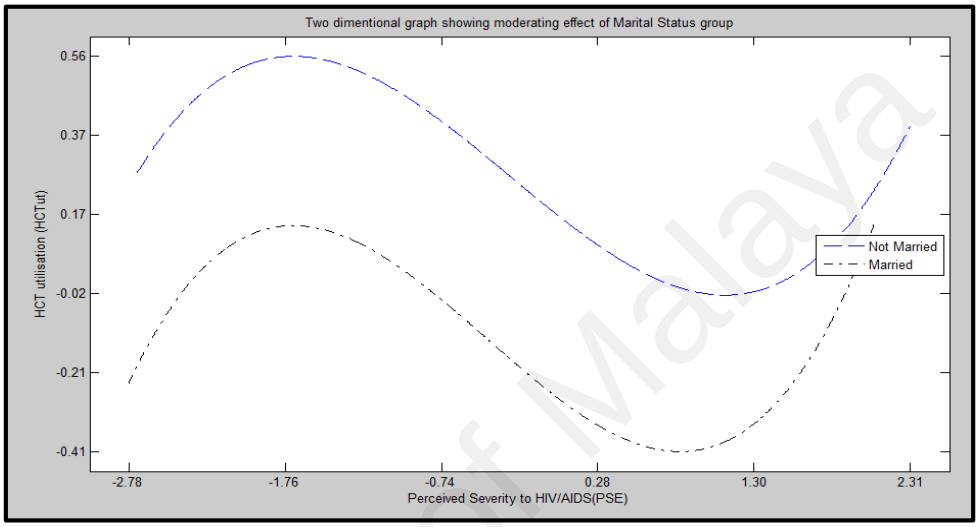

Figure 5.12: Moderating Effect of MARITAL STATUS on PSE-HCTut

5.3.4.4 Moderating Effects of Educational Status

As per educational status moderator (EDUC) it was statistically significant for two constructs; (PSU), (EDUC on PSU→HCTutl, β = -0.057, p = 0.056, f^2= 0.008), and (EDUC on PSE→HCTutl, β = -0.161, $p < 0.001$, f^2= 0.013). Both education status groups were positively sloping. At every measured point the effect of PSU on HCT seemed higher for people with lower education than those with higher education (Table 5.13).

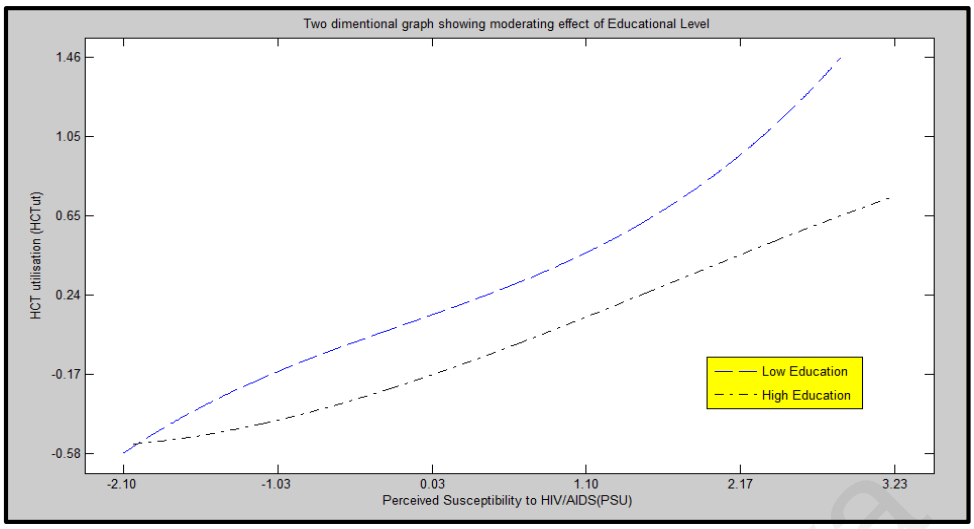

Figure 5.13: Moderating Effect of EDUCATIONAL Level on PSU-HCTut

HCT utilisation increases with increasing perceived susceptibility to HIV infection (PSU) and the effect was moderated by level of education; individual with higher education seems to have higher utilisation compared to those with lower education. Thus, level of education is a moderator of perceived susceptibility to the use of HCT. The slope of both educational levels exhibited a warped relationship (Figure 5.14).

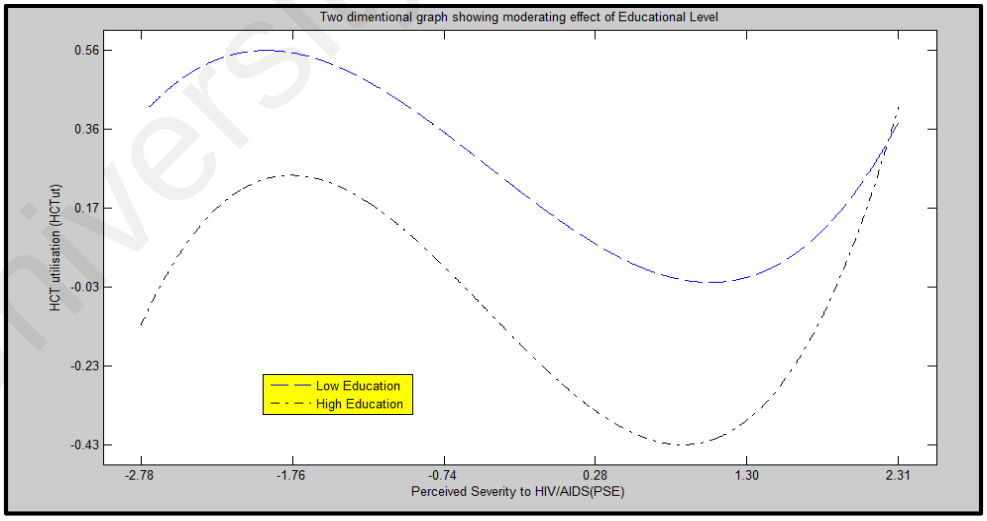

Figure 5.14: Moderating Effect of EDUCATIONAL Level on PSE-HCTut

5.3.4.5 Moderating Effects of Employment Status

The moderating effect of the employment status of the respondents (EMP) is statistically significant for only one out of the four HBM latent constructs, PBA (EMP on

PBA→HCTutl, β = -0.020, p = 0.010, f^2 = 0.003). This shows that the impacts of our exogenous focal variable, (PBA) on the utilisation of HCT are moderated by the moderator variable, employment status of the respondents. The negative sign of PBA might indicate that increase in perceived barriers to (HCT) will result to lower HCT utilisation (Figure 5.15). At every measured point the relationship between PBA and HCT seems higher for those unemployed than the employed ones.

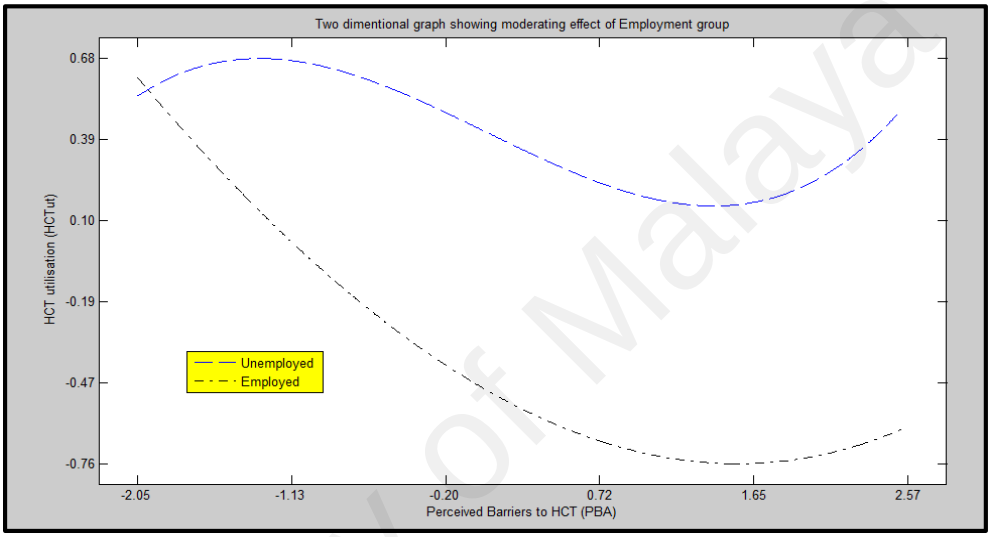

Figure 5.15: Moderating Effect of EMPLOYMENT Level on PBA-HCTut

5.3.4.6 Moderating Effects of HIV/AIDS Knowledge

Knowledge about the HIV/AIDS (KNW) had negative and significant moderating effects on Perceived Severity (PSE), (KNW on PSE→HCTut, β = -0.110, p = 0.001, f^2 = 0.016), and Perceived Benefits (PBE), (KNW on PBE→HCTutl, β = -0.063, p = 0.041, f^2 = 0.011). The relationship between the PSE and HCT was higher for people without knowledge of HIV/AIDS than those knowledgeable (Figure 5.16).

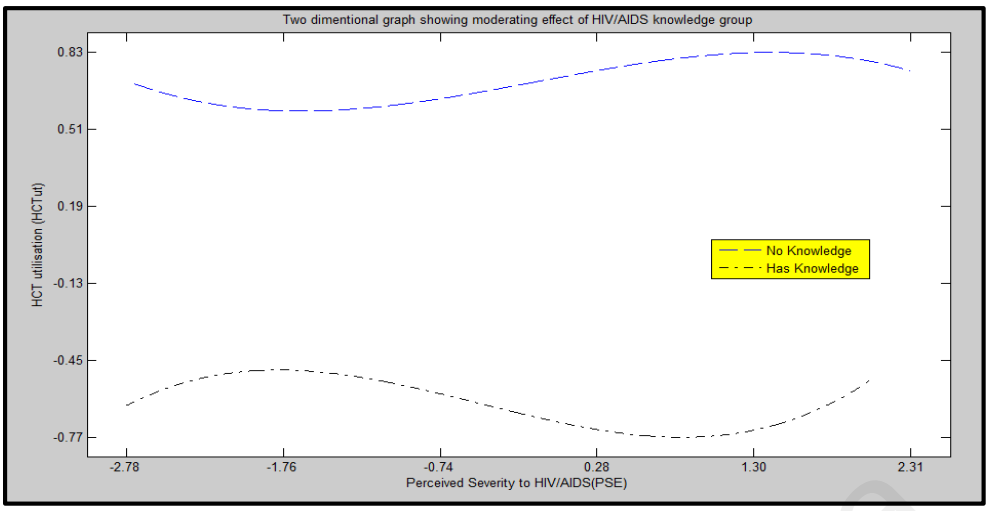

Figure 5.16: Moderating Effect of HIV/AIDS Knowledge on PSE-HCTut

The moderating effect of PBE→HCTut seems higher for those with little or no knowledge about HIV/AIDS that those knowledgeable about the HIV/AIDS.

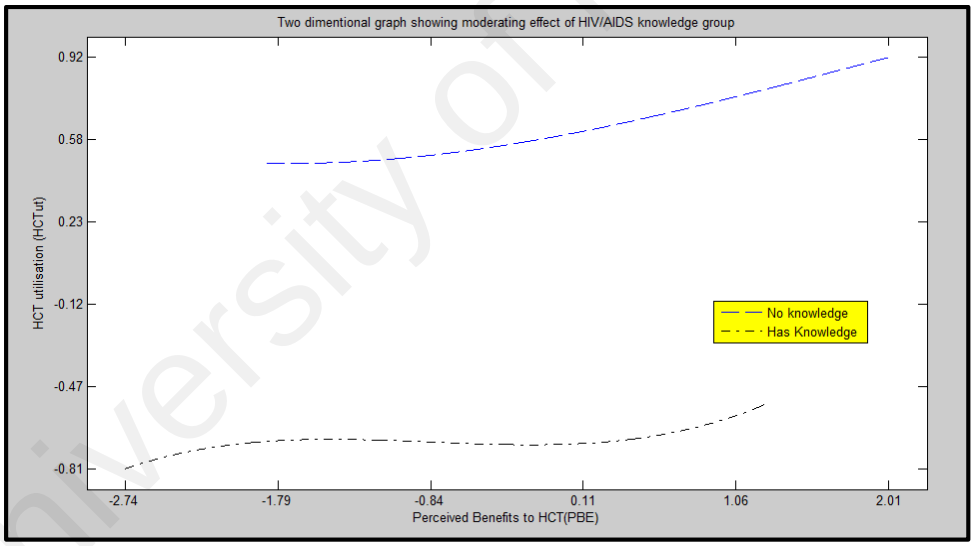

Figure 5.17: Moderating Effect of HIV/AIDS knowledge on PBE-HCTut

5.4 Discussion

This section presents the discussion about the findings in the second broad objective of this study. As stated earlier, the purpose of the chapter is to empirically analyse the factors that predict the utilisation of HCT service utilisation in Nigeria in the context of HBM framework. Also, the chapter aims at analysing moderator variables

(sociodemographic variables) that influence the relationship between the four HBM predictors and HCT service utilisation.

To answer the research question, "What are the health belief factors that predict HCT service utilisation in Nigeria?" four hypotheses were formulated based on the HBM theoretical framework adopted for this study. Hypotheses were tested and the results obtained in the previous sections. The results show that three out of the proposed four hypotheses were supported. Discussion about these findings is presented below.

5.4.1 *The relationship between perceived susceptibility to HIV infection (PSU) and HCT service utilisation*

The first hypothesis tested is, "perceived susceptibility to HIV infection (PSU) will positively and significantly predict HCT service utilisation." HBM theorised that before an individual could take an action aim at preventing him from a disease or improving his/her health, such individual must perceive that he/she is at risk of contracting particular health condition (Rosenstock, 1974; 1990; 2005; Champion & Skinner, 2008). All things being equal, the stronger the belief, the more individuals will be willing to engage in behaviour that prevents them from contracting health condition. Thus, perceived susceptibility, was predicted to be positively related to HCT utilisation. Our research findings supported this prediction. The relationship is significant with an effect size of 0.109. The result suggested that the more people perceived themselves of the likelihood of contracting HIV the more likely they would want to engage in HCT testing activities (Champion & Skinner, 2008). Various research findings in the literature as touching the relationship between perceived susceptibility and HIV/AIDS protective behaviours are not consistent with HBM theory. However, our result is in consonance with Grover & Miller (2014) which found that perceived susceptibility to HIV/AIDS was related to HIV testing intentions and behaviour among undergraduate students.

Also, the result agrees with some studies which found perceived risks of HIV/AIDS to be an essential determinant of condom use (Gielen et al., 1994, Basenengquist, 1992; 1994; Mahoney, Thombs, & Ford, 1995; Steers et al., 1996; Hounton, Carabin, & Henderson, 2005). Furthermore, our results support findings from studies that employed HBM framework to study the behaviour of students toward using HCT. Studies by Abebe & Mitike (2009) and Nothling & Kagee (2013), revealed that perceived susceptibility to HIV/AIDS was significantly associated with the willingness to do the HIV test among the students surveyed. Likewise, perceived susceptibility to HIV was found to be related to the desire to have HCT among the pregnant women attending antenatal care (dePaoli, Manongi & Klepp, 2004; Workagegn, Kiros, & Abebe, 2015). On the other hand, the result contrasts with some studies which found perceived susceptibility not related to HIV-preventive behaviour (Yep, 1993a; 1993b; Volk & Koopman, 2001). As noted earlier in chapter 3, all the six measurement items – PSU1, PSU2, PSU3, PSU4, PSU5, PSU6 – significantly explained the latent predictor variable, perceived susceptibility to HIV infection (PSU), with loadings of 0.625, 0.673, 0.702, 0.684, 0.656, and 0.921 respectively. In this study, we found that individual's belief of their future vulnerability to HIV infection, higher chance of contracting HIV than any other person, likelihood of contracting HIV on the basis of their physical condition or way of life, worry and anxiety associated with HIV infection, family health history, and higher chances of contracting HIV could motivate them to partake in HIV testing. These are good indicators of perceived susceptibility to HIV infection (PSU). These elements are crucial to the stimulating risk perception among individuals.

5.4.2 The relationship between perceived severity to HCT (PSE) and HCT service utilisation

The second hypothesis examined is, “perceived severity of AIDS disease (PSE) will positively and significantly predict HCT service utilisation.” The second variable,

perceived severity of HIV infection, was predicted to be positively associated with HCT utilisation (Champion & Skinner, 2008). Although significant, the results instead revealed a negative relationship which was inconsistent with the assumption of HBM and thus failed to support this prediction. It shows that higher perception of HIV/AIDS severity does not translate to higher HCT utilisation. The finding is consistent with a study by Zak-place & Stern (2004) which found perceived severity to be negatively related to STD and HIV prevention behaviour among college student in the US. Two reasons could be advanced for this finding. One, the lack of personal knowledge of the people that died of AIDS may make people feel AIDS may not be a serious problem to them. It was reported in this study that 71% did not know anybody died of AIDS. Another reason may be the respondents' knowledge of the availability of Anti-Retroviral (ART) drugs, especially in the urban city, which potentially gives longevity to an infected person and enables him to live a healthy life (UNAIDS, 2015).

5.4.3 The relationship between perceived benefits of HCT (PBE) and HCT service utilisation.

The third hypothesis stated is, "Perceived benefits of HCT will be positively related and significantly predict HCT utilisation." HBM theory suggested that if individual perceived that the benefits of taking a particular action which could prevent him from contracting a specific health condition are worth more than the costs involved in such action, then such individual would be more likely to participate in such health action (Champion & Skinner, 2008). In other words, if an individual believes that the benefits of testing for HIV to discover his status is higher than the costs involved in the decision to get tested then he will be more willing to be tested for HIV. This third variable, perceived benefits of HCT (PBE), was predicted to be positively associated with HCT utilisation. Specifically, of all the three supported hypotheses, this was found to be the highest significant predictor of HCT with effect size (0.291). The finding signifies that

the higher the understanding of the benefits of HCT, the more individuals will like to partake in the HIV testing. The result agrees with Li et al., (2016) and Bakker et al, (1997), which found prevention of HIV infection and other sexually transmitted infections as perceived benefits of using condoms as a self-protective measure against HIV/AIDS among men who have sex with men (MSM) in China and Amsterdam respectively. Perceived benefits are also related to condom use among female sex workers in Zhao et al. (2012). Among the young men and students, perceived benefits of HIV testing was found to be associated with the willingness to partake in HCT (Abebe & Mitikie, 2009; Nothling & Kagee, 2013). Five items significantly measured perceived benefits: PBE2, PBE3, PBE6, PBE7, PBE8. The loadings of these items, 0.711, 0.802, 0.711, 0.920, and 0.666 lend credence to their significance in explaining perceived benefits of HCT.

Findings as revealed in these items, indicated that individuals believe that the benefits of early detection of HIV in the body is worth more than the cost of treatment of AIDS disease, HIV testing as potential means of preventing an HIV infection from degenerating to AIDS, peace of mind and sense of relief of knowing their HIV status, fatality of HIV/AIDS if not detected early, and being protected from deadly AIDS disease by partaking in regular HIV testing are critical indicators of perceived benefits of HCT. These are essential elements which must be emphasised when designing programmes aimed at increase HIV testing uptake.

5.4.4 The relationship between perceived barriers to HCT (PBA) and HCT service utilisation

The last HBM variable, perceived barriers to HCT (PBA), was predicted to be negatively related to HCT utilisation. Our findings agree with the HBM theory and revealed there was an inverse relationship between perceived barriers and HIV testing,

thus supported the fourth hypothesis in this chapter. Therefore, it implies that the higher the barriers to HCT utilisation, the lesser the likelihood of people interested in participating or assessing the HIV Counselling and Testing. Consequently, all encumbrances to HCT utilisation must be removed to realised increase in the uptake of HCT. Our finding was consistent with McKinney, McSpirit, & Pomeroy (2000); Babalola, (2007); Schwarcz et al., (2011); Hoyos et al. (2013) ; Buldeo & Gilbert, (2015) studies which found the fear of rejection, denial, shame as significant barriers to HIV testing. It also aligned with a survey among the long-distance truck driver in Nigeria, which found perceived barriers to be associated with condom use (Sunmola, 2005). As indicated earlier, six of the measurement items – PBA4, PBA5, PBA6, PBA7, PBA10, PBA11 – with loadings of 0.772, 0.582, 0.514, 0.680, 0.962, and 0.777 respectively, shown to be significantly described perceived barriers. In effect, the findings in this study showed that far distance location of HCT, lack of trust in HCT personnel in divulging HIV results and status to others, dread of being tested positive for HIV probably due to the stigma attached to AIDS, lack of knowledge of the HCT location in the community, embarrassment of being seen in HCT location, and inconvenience of operating hours of HCT are good indicators of perceived barriers to HCT service utilisation. These elements are very crucial if the increase in the uptake of HCT in Nigeria is to be achieved.

5.4.5 Moderating effect of sociodemographic variables on the relationship between HBM factors and HCT service utilisation

In the previous sections of this chapter we examined the significant impact of factors that determine HCT service utilisation using HBM framework. According to the proponents of the HBM, some factors can influence or modify the components of the model which are not part of the four elements. These factors are what we termed as moderators or moderator variables. The moderators are sociodemographic variables –

gender, age, marital status, education status, employment status and HIV/AIDS knowledge.

The results of the moderating effects partially supported only nine paths of the hypothesised relationships among the variables. The results reveal that none of the moderator variables was significant across all the four categories of the HBM constructs. We further discussed the results below.

Gender: Gender inequality play a crucial role in the HCT service utilisation (WHO, 2014). The findings in this study revealed that gender (GEN) only showed significant moderating effects on the relationship between the perceived barriers to HCT (PBA) and HCT utilisation. Further post-hoc analysis revealed that the perceived barriers have much impact on female than their male counterpart. This could be interpreted that perceived barriers had more impact on the female than the male in utilising HCT. In other words, it seems females responded more to the barriers than the males, thus, their participation in HCT utilisation might be lower than their counterparts. This finding agrees with the reports by the Federal Ministry of Health, Nigeria, which showed that young females had lower HCT utilisation (375,138) compared to males (397,851) in 2014 (FMOH, 2014). Perceived barriers to HCT could manifest as fear of negative consequences of testing positive to HIV which include but not limited to the following - possible breakdown in the social relationship among the people, loss of property, housing or employment, discrimination, and violence. Fear of possible negative consequences are much frequently recorded among women than men, which invariably inhibiting them from participating in HIV testing (WHO, 2004; Obermeyer et al., 2009). Our findings aligned with Obermeyer et al., (2007) which reported that women were less frequently tested for HIV than men especially outside prenatal care programme due to perceived barriers. It was suggested that HCT service should be expanded to include

other entry points such as family planning, workplace and so on, in order to increase the uptake of HCT among women who are not pregnant. Therefore, to increase HCT utilisation across gender, efforts must be geared towards removing the barriers, especially as it affects female folks.

The results of age moderator (AGE) were only significant for two factors – perceived susceptibility to HIV (PSU) and perceived barriers to HCT (PBA). Additional analyses revealed that the young people perceived themselves to be more susceptible to HIV than the old people. This may be attributable to their active sexual behaviour which is higher than old people. UNAIDS (2016), unveiled that younger people are more infected with HIV than the older people. In the same vein, barriers to HCT affected young people than older adults as revealed by the post-hoc analysis. Barriers must be removed to encourage young people to participate in HCT activities to reduce the incidence of HIV in the country.

Marital status moderator (MAR) was only significant for perceived severity of HIV (PSE) on HCT utilisation. The findings revealed that those who perceived HIV infection as severe, the effect was more among the non-married than married people.

Education status moderator (EDU) as one of the moderators had significantly moderates two of the HBM constructs, PSU and PSE. The post-hoc analysis revealed that the effect of perceived susceptibility to HCT utilisation was more among those having lower education compared to those with higher education level. It seems that individuals with low education had higher believe in their vulnerability to HIV infection and want to engage in HCT than those with higher education.

The results of the employment status (EMP) moderator variable revealed it was only significant for perceived barriers to HCT (PBA) on HCT utilisation. The further post-

hoc analysis showed that the effect of perceived barriers to HCT utilisation is higher for the individuals who were unemployed than those currently employed. Those who were unemployed had more perceived barriers on HCT utilisation compared to those employed. This is true since the unemployed would have financial difficulty as additional barrier to utilise health care.

HIV knowledge status (KNO) moderator variable only has a significant impact on two of HBM factors – the perceived severity of HIV/AIDS (PSE) and perceived benefits of HCT (PBE). The post-hoc analysis revealed that the effect of PSE on HCT is higher for those without much knowledge of HIV/AIDS. In the same vein, the KNO moderating effect is higher for those with little awareness about HIV/AIDS on the relationship between PBE and HCT. They perceived benefits of taking HCT higher than the those with higher knowledge. It is noteworthy, the dearth of studies that examined the effect of moderating variables, sociodemographic variables, on the HBM factors/HCT utilisation relationship makes a comparison with other previous studies challenging.

From the results of the moderating effects of the sociodemographic moderators of the relationship between the latent HBM constructs and HCT utilisation revealed that they are small. The effect sizes ranged from 0.001 – 0.016, which fall within the recommended Cohen's small effect size, 0.02 (Cohen, 1988). Considering the practical point of view, these effect sizes showed that the strength of the moderators of the relationship between HBM constructs and HCT utilisation is small. However, According to Chin, Marcolin, & Newsted (2003), small effect size does not mean that moderating effects of these variables are inconsequential. Despite the small effect sizes of these moderators they are still important in the relationship between health beliefs and HCT service utilisation in Nigeria.

5.5 Summary

The main thrust of this chapter is to empirically investigate the factors that may likely influence the behaviour of people towards the use of HIV Counselling and Testing (HCT) in Nigeria in the context of the Health Belief Theory. The thesis adopted the original Health Belief Model (HBM) of Hochbaum (1958) as the appropriate model to study the utilisation behaviour of people with the aim of identifying those factors that may significantly contribute to the understanding of what might influence people to engage in HCT services. The four original constructs of the model were adopted together with the modifying (moderating variables) as proposed by Hochbaum (1958; Rosenstock, 1974).

PLS-SEM variant of Variance-Based Structural Equation Modelling was deployed to exhaustively analyse the study model with the four constructs, Perceived Susceptibility to HIV infection (PSU), Perceived Severity of AIDS (PSE), Perceived Benefits of HCT (PBE) and Perceived Barriers to HCT (PBA). The moderating effects of the moderator variables, which are Gender, Age, Marital Status, Educational Status, Employment status, and knowledge about the HIV/AIDS were also examined.

Before the analysis of the model, the reliability and validity of the research instrument was established to be sure that they actually measure what they intend to measure and the same time ascertained that if administered over again to the same set of people it will still produce a valid result (Kock, 2014; Hair et al, 2014). All the measurement instruments passed the reliability and validity test and thus make our instrument appropriate for the study.

Four hypotheses that take care of the relationship between the four latent constructs and the dependent variables were tested. The results of the analysis revealed that three out of the four hypotheses were supported. The results showed that the more people

perceived themselves of being at risk of contracting HIV the more they likely engage in the HCT activities. The results also suggested that if people perceived HCT service to be of significant benefits especially in averting HIV infection and HIV-related death the more they would be willing to participate in HIV testing activities. Furthermore, barriers play a significant role in determining the utilisation of HIV testing in Nigeria as revealed in the results obtained in this study. The more the barriers are present, the lesser willingness of individuals to partake in HIV testing. Efforts must be geared towards eradicating these barriers to enhance its uptake. Lastly, moderator variables (sociodemographic variables) also play significant roles in the relationship between the perceived susceptibility to HIV infection, perceived benefits of HCT and perceived barriers to HCT service utilisation in Nigeria. The different levels of these moderators that contribute most to the moderating relationship are highlighted as well.

CHAPTER 6: THE MEDIATING EFFECT OF HIV-RELATED STIGMA ON THE HCT SERVICE UTILISATION

6.1 Introduction

In chapter two of this thesis, previous studies about the effect of HIV-related stigma on HCT services utilisation suggested that HIV-related stigma plays essential roles in HCT services utilisation. Hence, this chapter presents the result of the mediating effect of HIV-related stigma on the HCT utilisation as hypothesised in chapter two of this thesis. Following this introduction is the descriptive statistics of HIV/AIDS stigmatising attitudes and behaviours, the analytic framework of mediating effect of HIV-related stigma, PLS-SEM estimation method, mediational model analysis, findings, and discussion.

6.2 The Descriptive Statistics of HIV/AIDS Stigmatising Attitudes and Behaviours.

Table 6.1. reports the HIV-related stigma attitudes and behaviours toward persons living with HIV and AIDS. It shows that there is high positive attitudes and behaviours among the people, although there is still a substantial number with negative attitudes. The percentage ranges between 71 and 90 of the nine stigma measurement items.

Table 6.1: Descriptive Statistics of Stigmatising Attitudes and Behaviours Toward Persons Living with HIV and AIDS (PLWHA)

	Stigmatisation attitudes and behaviours toward persons living with HIV/AIDS (PLWHA)	**Positive attitudes (Yes)**		**Negative attitudes (No)**		**Don't Know/Not Sure/Depends**	
No	**Measurement items**	**No**	**%**	**No**	**%**	**No**	**%**
1	Play with person living PLWHA	630	82	90	12	48	6
2	Eat/share food with PLWHA	571	74	137	18	60	8
3	Buy things from PLWHA	623	81	95	13	47	6
4	Stay in the same house with PLWHA	621	81	93	12	54	7
5	Share same room with PLWHA	571	74	124	16	73	10
6	Share same office with PLWHA	641	83	83	11	44	6
7	Share same classroom with PLWHA	666	87	70	9	32	4

Table 6.1: Continued

	Stigmatisation attitudes and behaviours toward persons living with HIV/AIDS (PLWHA)	Positive attitudes (Yes)		Negative attitudes (No)		Don't Know/Not Sure/Depends	
No	**Measurement items**	**No**	**%**	**No**	**%**	**No**	**%**
8	Attend the same church / mosque with PLWHA	696	90	44	6	28	4
9	Enter same vehicle with PLWHA	664	87	49	6	54	7

6.3 The Analytic Framework of Mediating Effect of HIV-related stigma – Hypotheses and Regression Path

HIV-related stigma is one of the major factors militating against HCT utilisation in Nigeria as profoundly established in chapter two of this thesis. Stigma is hypothesised to mediate in the relationship of HIV-related knowledge, HIV/AIDS transmission misconception, perceived seriousness of HIV/AIDS and HCT service utilisation as indicated in chapter 2 of this thesis. Figure 6.1 presents the analytic framework of the mediating effect of HIV-related stigma. The measurement items of the three predictors, HIV-related knowledge (KNHA), HIV transmission misconception (MSHIV), and perceived seriousness of HIV/AIDS (PHSEV) in the model are presented in Table 3.5, Chapter 3 of this thesis.

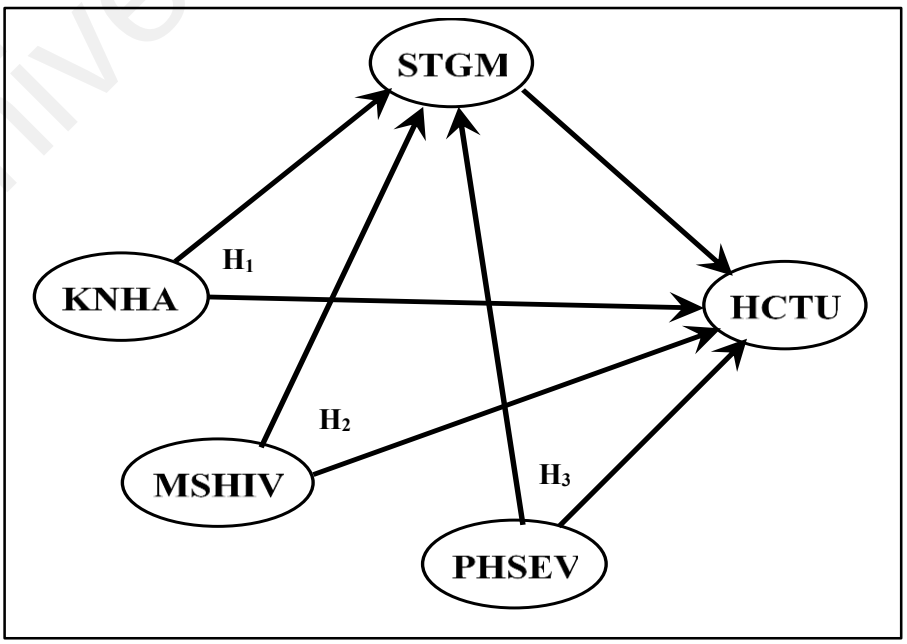

Figure 6.1: The Analytic framework of the HIV-related stigma mediator.

Three hypotheses were drawn and tested in this mediation model:

Hypothesis 1: HIV-related stigma mediates the relationship between HIV-related knowledge (KNHA) and HCT service utilisation.

Hypothesis 2: HIV-related stigma mediates the relationship between HIV transmission misconception (MSHIV) and HCT service utilisation.

Hypothesis 3: HIV-related stigma mediates the relationship between the perceived seriousness of HIV/AIDS (PHSEV) and HCT service utilisation.

6.4 Analysis and Results of the Mediation Model – PLS-SEM Approach

The mediation analysis also follows Anderson & Gerbin (1988) recommended two-step approach of PLS-SEM analysis as done in chapter 5. We first assessed the measurement model to establish the measurement items are valid and reliable for the mediation model. After satisfying the validity and reliability conditions we proceed to analyse the structural model to establish the mediating roles of HIV-related stigma to answer the question raised in chapter one and as hypothesised in chapter two of this thesis.

6.4.1 Stage 1: Assessing the Measurement Model

The two critical issues we considered to establish the measurement model in this analysis are the reliability and validity of the items used to measure each latent construct. The criteria for confirming both tests were enunciated in chapter 3.

6.4.1.1 Reliability

The individual item loadings were first examined to ensure they complied with the recommended loading of 0.4 (Bagozi & Yi, 1988). The measurement indicators that passed the items reliability test with their loadings which were more than the

recommended value 0.50 are presented in Table 6.2. Therefore, all the constructs measurement items individually show a very satisfactory level of item reliability.

Table 6.2: Measurement Items Loadings and Cross-loadings (Individual Item Reliability)

	HCTU	STGM	KNHIV	MSHIV	PHSEV	Type	SE	P value
STGM1	-0.020	**0.801**	-0.009	-0.022	0.027	Reflective	0.036	<0.001
STGM2	0.009	**0.779**	0.045	-0.110	0.036	Reflective	0.022	<0.001
STGM3	-0.027	**0.797**	-0.027	-0.049	-0.066	Reflective	0.033	<0.001
STGM4	0.021	**0.804**	0.100	0.007	0.048	Reflective	0.033	<0.001
STGM5	-0.041	**0.799**	0.107	-0.013	0.020	Reflective	0.020	<0.001
STGM6	-0.063	**0.850**	0.002	-0.005	0.002	Reflective	0.035	<0.001
STGM7	-0.020	**0.842**	-0.058	0.062	-0.027	Reflective	0.046	<0.001
STGM8	0.044	**0.765**	-0.065	0.043	-0.029	Reflective	0.063	<0.001
STGM9	0.110	**0.754**	-0.099	0.089	-0.011	Reflective	0.049	<0.001
KNHA1	-0.063	-0.022	**0.839**	-0.018	-0.083	Reflective	0.025	<0.001
KNHA2	0.063	0.022	**0.839**	0.018	0.083	Reflective	0.046	<0.001
MSHIV1	0.031	0.054	-0.146	**0.656**	-0.024	Reflective	0.056	<0.001
MSHIV2	0.002	0.020	-0.034	**0.822**	-0.017	Reflective	0.089	<0.001
MSHIV3	-0.025	0.055	0.043	**0.831**	-0.035	Reflective	0.099	<0.001
MSHIV4	-0.002	-0.161	0.147	**0.603**	0.097	Reflective	0.090	<0.001
PHSEV1	-0.066	0.052	0.086	-0.064	**0.637**	Reflective	0.032	<0.001
PHSEV2	-0.189	-0.047	-0.070	0.003	**0.680**	Reflective	0.030	<0.001
PHSEV3	0.097	0.058	-0.034	0.009	**0.660**	Reflective	0.031	<0.001
PHSEV4	-0.161	-0.033	-0.037	0.010	**0.666**	Reflective	0.029	<0.001
PHSEV5	0.127	-0.053	0.122	0.009	**0.635**	Reflective	0.033	<0.001
PHSEV6	-0.106	0.005	-0.028	-0.026	**0.898**	Reflective	0.026	<0.001
PHSEV7	0.318	0.017	-0.018	0.061	**0.719**	Reflective	0.038	<0.001
HCTU1	0.750	0.008	0.002	0.052	-0.256	Reflective	0.178	<0.001
HCTU2	0.750	-0.008	-0.002	-0.052	0.256	Reflective	0.279	0.004

6.4.1.2 Validity Assessment – Convergent Validity

The convergent validity measurement model was assessed and the results presented in Table 6.3. All the measurement items loadings were more than the recommended minimum value of 0.50 (Hair et al, 1987; 2009; 2010; Chin 1998b). Also, the measurement items were significantly loaded on the parent factor $p < 0.05$ (Table 5.3) (Kock, 2015; Gefen & Straub, 2005). The next item examined under convergent validity

was the Average Variance Extracted (AVE) (Hair et al., 2010; Urbach & Ahlemann, 2010). All the latent constructs satisfied the recommended AVE minimum value (0.50).

Table 6.3: Convergent Validity Test of the Measurement Model

Latent Construct	Construct Indicators	Loadings	Composite Reliability	Cronbach Alpha	AVE
HIV-related Stigma (STGM)	STGM1	0.801	0.941	0.929	0.639
	STGM2	0.779			
	STGM3	0.797			
	STGM4	0.804			
	STGM5	0.799			
	STGM6	0.850			
	STGM7	0.842			
	STGM8	0.765			
	STGM9	0.754			
Knowledge of HIV/AIDS (KNHA)	KNHA1	0.839	0.826	0.578	0.703
	KNHA2	0.839			
The misconception of HIV/AIDS transmission (MSHIV)	MSHIV1	0.656	0.822	0.708	0.540
	MSHIV2	0.822			
	MSHIV3	0.831			
	MSHIV4	0.603			
Perceived seriousness of HIV/AIDS (PHSEV)	PHSEV1	0.637	0.872	0.826	0.500
	PHSEV2	0.680			
	PHSEV3	0.660			
	PHSEV4	0.666			
	PHSEV5	0.635			
	PHSEV6	0.898			
	PHSEV7	0.719			
HCTU	HCTU1	0.750	0.720	0.522	0.562
	HCTU2	0.750			

6.4.1.3 Discriminant Validity

The discriminant validity results as shown in Table 6.4 reveal that all the values in the diagonal are larger than correlation values in both column and row (Wong, 2013; Hair et al., 2010; Fornell & Larker, 1981; Chin, 2010). The results, therefore, show that the discriminant validity for all the constructs in the mediation model is satisfied.

Table 6.4: Discriminant Validity of the measurement

	STGM	KNHA	MSHIV	PHSEV	HCTU
STGM	**(0.800)**	-0.047	-0.246	-0.124	0.106
KNHA	-0.047	**(0.839)**	0.018	-0.085	0.119
MSHIV	-0.246	0.018	**(0.735)**	0.087	-0.092
PHSEV	-0.124	-0.085	0.087	**(0.704)**	-0.270
HCTU	0.106	0.119	-0.092	-0.270	**(0.750)**

6.4.1.4 Reliability Assessment- Internal consistency reliability

Table 6.5 reports both Cronbach's alpha and composite reliability for all mediation measurement model constructs. The results indicated that both Cronbach's alpha and composite reliability of all the latent variables ranged from 0.820 – 0.920 and 0.876-0.934 respectively (Cronbach & Meehl, 1955; Nunnally & Berstein, 1994; Urbach & Ahlemann, 2010; Hair et al., 2012). Therefore, the reliability results indicate that the measurement items for all the constructs were suitable for their latent variables and thus reliable.

Table 6.5: Results of Reliability Test for the Measurement Model - Cronbach's Alpha and Composite Reliability

Latent Construct	Measurement Items	Cronbach's Alpha	Composite Reliability	Loading Range	Number of Items
HIV-related Stigma (STGM)	STGM1 - STGM9	0.929	0.941	0.754 - 0.850	9
HIV-related Knowledge (KNHA)	KNHA1- KNHA2	0.578	0.826	0.839 - 0.839	2
HIV transmission Misconception (MSHIV)	MSHIV1 - MSHIV4	0.708	0.822	0.603 - 0.831	4
Perceived seriousness of HIV/AIDS (PHSEV)	PHSEV1 - PHSEV7	0.826	0.872	0.635 – 0.898	7

6.4.1.5 Variance Inflation Factor for the Reflective Latent Constructs.

The presence of multicollinearity in the measurement models was assessed by the Variance Inflation Factor (VIF). Although, Hair et al., (2009) recommended VIF 10, while Kline (2011) preferred VIF less than 5, however, we used Kock, (2015) recommendation of VIF less than 3.3. The VIF results showed that there was an absence of multicollinearity in the model as the VIF values for all constructs were less than 3.3 (Table 6.6).

Table 6.6: Latent constructs and Variance Inflation Factors

Latent Construct	VIF
STGM	1.059
KNHA	1.001
MSHIV	1.048
PHSEV	1.021

6.4.2 Stage 2: Assessing Structural Model of HIV-related Stigma Mediator

In stage one, the reliability and validity of our measurement model were estimated and established to ensure they fully satisfied all the measurement criteria. The individual item reliability, convergent validity and discriminant validity were satisfactory and as such provided the basis for the second stage, which is to assess the structural model of the mediating relationship of HIV-related stigma on HCT utilisation and independent constructs in the model (Wong, 2013).

Before the assessment of the mediating effect in the path analysis, the mediation model coefficient of determination (R^2) and effect sizes were first considered. The coefficient of determination (R^2) as revealed in Figure 6.2 shows that all the four exogenous variables accounted for 13% variation in HCT. According to Hair et al., (2013), this value falls within the threshold of the weak coefficient of determination. The effect sizes of both direct and indirect effects range from 0.001 - 0.062 as shown in both Table 6.6 and 6.7, which signify small effect sizes.

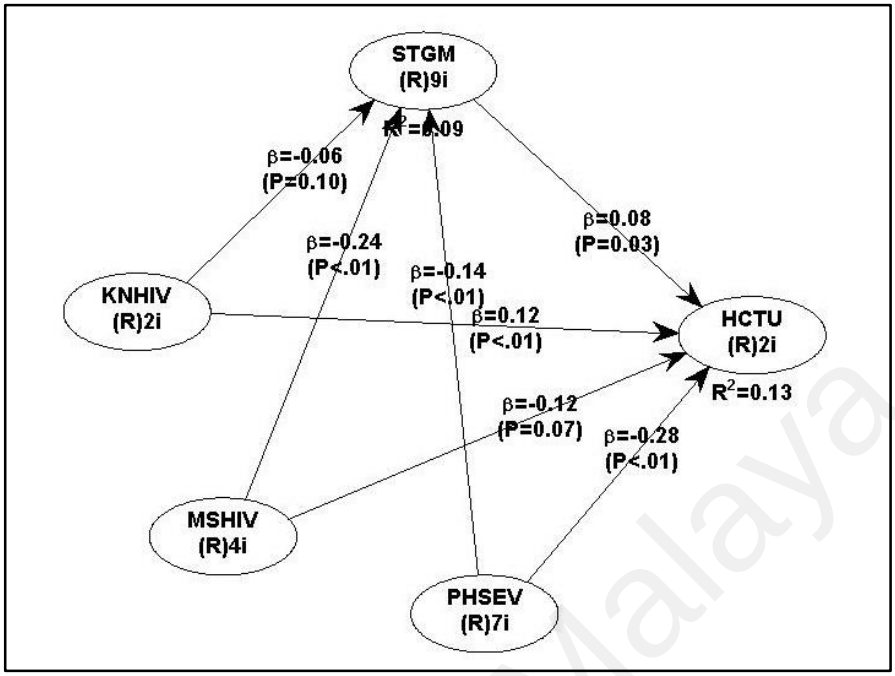

Figure 6.2: The estimated mediating model of HIV-related stigma.

Figure 6.2 displays the estimated path analysis of the mediating model while Table 6.7 shows the summary of the estimated mediating model for direct, indirect, and total effects alongside with their standard errors, *p*–values and effect sizes.

6.4.2.1 Determination of the Mediation Effect of HIV-related Stigma

To establish the mediation effect of a mediating variable in the model, literature suggested three outcomes of mediating effect as follows: full or complete, partial, and none mediation effect (Preacher & Hayes, 2004; James & Brett, 1984; Kock, 2014; 2015; Baron & Kenny, 1986). Full mediation effect is achieved when the path running from independent variables to the dependent variable (Direct Effects) is not significant (that is, the *p*-value must be less than 0.05) while the path through the mediator variable (Indirect Effect) is significant. On the other hand, if both the direct and indirect effects are significant then there is partial mediation. And lastly, if the path running from the mediator to dependent variable is not significant, then there no mediation effect.

6.4.2.2 The Mediation Results– HIV-related Stigma

In this section presents the results of the mediation effect of HIV-related stigma on the relationship between HIV-related knowledge, HIV transmission misconception, perceived seriousness of HIV/AIDS and HCT service utilisation. The study employed Kock (2014) mediation analytical approach which involved testing for the significance of both the direct and indirect effects in the model.

Table 6.7: Summary of Direct, Indirect, and Total Effect of the Structural Mediating Model

	Direct Effects					
	Paths	**Path coefficient**	**SE**	***p*-value**	**Effect sizes**	**Decision**
A	**KNHA→ HCTU**	0.119	0.039	0.001	0.015	Significant
B	**MSHIV→ HCTU**	-0.121	0.084	0.074	0.019	Not significant
C	**PHSEV→ HCTU**	-0.285	0.109	0.005	0.088	Significant
	Indirect Effects					
a_1	**KNHA→STGM→HCTU**	-0.005	0.005	0.181	0.001	Not significant
b_1	**MSHIV→STGM→HCTU**	-0.018	0.011	0.054	0.003	Significant
c_1	**PHSEV→STGM→HCTU**	-0.011	0.007	0.059	0.003	Significant
	Total Effects					
	$a + a_1$	0.114	0.040	0.002	0.001	Significant
	$b + b_1$	-0.140	0.084	0.049	0.003	Significant
	$c + c_1$	-0.296	0.108	0.003	0.003	Significant

Hypothesis 1: The results as revealed in Table 6.7 shows that the direct path from KNHA to HCTU was significant ($\beta = 0.119$; $SE = 0.039$; $p = 0.001$) while the indirect path from KNHA to HCTU through STGM was not significant ($\beta = -0.005$; $SE = 0.005$; $p = 0.181$). Thus, we can conclude that HIV-related stigma did not mediate between the HIV-related knowledge and HCT services utilisation.

Hypothesis 2: As for HIV transmission misconception, the direct path running from MSHIV to HCTU was not significant, ($\beta = -0.121$; SE = 0.084; $p = 0.074$). However, the indirect path as shown in Table 6.7 was significant (β=-0.018; SE=0.011; p=0.054).

Thus, there is evidence of full mediation effect. In another word, HIV-related stigma acts as a mediator in the relationship between the misconception of HIV transmission and HCT service utilisation. The effect size of the relationship is small.

Hypothesis 3: The mediating effect of HIV-related stigma was examined to establish whether it satisfied the criteria for mediation analysis in the relationship between perceived seriousness of HIV/AIDS and HCT service utilisation. The results as shown Tables 6.7 revealed that the direct path running from PHSEV to HCTU was significant (β = -0.285; SE = 0.109; p = 0.005), while the indirect effect, from PHSEV to HCTU was also significant (β = -0.011; SE = 0.007; p = 0.059). The results indicate the stigma partially mediates in the path of the perceived seriousness of HIV/AIDS to HCT utilisation of the participants. The effect size of the mediational relationship is small.

6.5 Discussion

The results of the mediational analysis of HIV-related stigma are discussed in this section. Two of the three hypotheses formulated were satisfied. Stigma was found to be significant in fully mediating between HIV transmission misconception (MSHIV) and HCT utilisation while it partially mediates between the perceived seriousness of HIV/AIDS (PHSEV) and HCT service utilisation. The findings are discussed in the subsequent sub-sections of this section.

6.5.1 Mediating Effect of HIV-Related Stigma on the Relationship Between the HIV transmission misconception and HCT Service Utilisation

The findings revealed that the relationship between individuals' misconception of HIV transmission and HCT service utilisation was mediated by the HIV-related stigma as demonstrated in the analysis of mediation model. This indicates that the stigma associated with HIV/AIDS is very crucial in determining how individuals who are willing to do HIV test will respond to HCT offer. Information about HIV/AIDS

transmission and specific methods of prevention are necessary requirements of action or behaviour aim at reducing HIV infections (Fisher & Fisher, 2000; 1992; Fisher et al., 1996).

Perusing the past works as shown in chapter two of this thesis, revealed that HIV-related stigma plays some major roles in the utilisation of HIV intervention programmes in Nigeria and globally. The stigma associated with being HIV positive was featured among the determinants of willingness to pay for HCT service in chapter four . Also, it was among the measurement items that significantly described perceived barriers to HCT utilisation in Chapter five.

According to Adeokun, Okonkwo & Ladipo (2006) and Qian et al (2008), misconception about the HIV transmission mechanisms could impact on HIV-related stigma and discriminating attitudes. An increase in stigmatising and discriminating attitudes toward individuals infected with HIV or living with AIDS can outrightly hamper the utilisation of HCT service. The findings agree with a qualitative study by Meiberg et al. (2008), in which AIDS stigma was found to be a solid barrier towards HIV voluntary counselling and testing among university students in South Africa. Also, the findings is in agreement with a study among the rural-urban migrants in China by Yang et al. (2004). In their study, although not particluarly focused on testing mediating effects of HIV-related stigma on the relationship between the HIV transmission misconception and HCT utilisation per se, but rather on willingness of individuals to disclose their HIV status. Their findings from bivariate regression analysis revealed that the individuals' low willingness to participate in the intervention programmes designed to protect from HIV infections and other sexually transmitted diseases was associated with the negative attitudes toward PLWHA as result of HIV-related stigma. This lend

credence to the negative roles that HIV-related stigma plays in the utilisation of HCT service.

6.5.2 The Mediating Effect of HIV-Related Stigma on the Relationship Between the Perceived Seriousness of HIV/AIDS and HCT Service Utilisation.

The findings show that the third hypothesis in the mediational analysis was supported. It reveals that stigma associated with HIV infection mediated the relationship between the perception of individuals concerning the potential threats of HIV and HCT service utilisation. This shows that an individual may perceive HIV/AIDS to be a severe issue to him and his household but the presence of stigma may somehow hinder him/her from participating in HIV testing. In other words, people may be aware of the threats that AIDS pose to them and the society at large and yet may not come forth to participate in HIV testing because of the fear of being stigmatised in case the HIV test result turns out to be positive. Individuals perceptions about the seriousness of HIV and AIDS could lead to stigmatisation of PLWHA which in turn could impact on HCT service utilisation. The results agree with the findings by Meiberg et al (2008) and Odimegwu, Adedini, & Ononokpono (2013) where fear and stigma associated with HIV were found to be strong barriers to HIV voluntary counselling and testing in the two states of Nigeria. In addition, findings agree with Bova et al. (2016) in which the low testing rate recorded and appalling attitudes toward HIV testing among African born men in the US were due to the stigma attached to AIDS. Denial of individuals' legitimate rights, fear of disclosure of HIV positive status to spouses, fear of knowing individual's HIV status, social exclusion and isolation, and negative reactions from partners and other people toward those tested positive to HIV, were all tied up to HIV stigma which invariably dissuaded people from participatng in the HCT activities as revealed in the extant studies (Lindkvist, Johansson, & Hylander, 2015; De Jesus et al., 2015; Ma et al., 2007; Sarker et al, 2007). Our findings also partially agrees with a study by Yang et al. (2006), which

tested the mediating effect of the HIV-related stigma on the relationship between the HIV knowledge and willingness to disclose HIV serostatus among rural to urban migrants in China. Although, the mediating role of HIV-related stigma in their study was not focused on the relationship between perceived seriousness of HIV/AIDS and HCT utilisation as aimed in this study, nonetheless, their findings give credence to the dreadful impact of the stigma on HCT utilisation. Thus, extirpation of stigma is necessary for HIV/AIDS threat perceptions to effectively influence HCT uptake. Furthermore, the finding is in line with a study in northern part of Nigeria, in which stigma was found to be a significant predictor of readiness to do the HIV test among males and females (Babalola, 2007). From these findings, it can be asserted that individuals' knowledge about the potential seriousness of HIV/AIDS is not enough to compel them to a decision to get tested for HIV. Individual's choice about HCT can be significantly influenced by the attitude and behaviour of people toward PLWHA in his/her community. If stigmatising practices and attitudes towards PLWHA which often manifest in the form of ostracisation, abuses, rejection, mistreatment, and denials are still widespread in the community, individuals might be disinclined to know their HIV status through HIV testing. Unwillingness of individuals to partake in HCT is as a result of the fear of being subjected to these unwholesome attitudes by those around him/her including the family members should they be tested positive for HIV. Therefore, the focus should not only be on promoting the benefits of having HIV test, but more importantly in eliminating HIV stigma in all its ramification and manifestations in the society. Elimination or at least reduction in the HIV stigma in the society can effectively rev up the uptake of HCT in Nigeria.

6.5.3 The Mediating Effect of HIV-related Stigma on the Relationship Between HIV-related Knowledge and HCT Service Utilisation.

One of the central goals of this chapter is to determine whether HIV-related stigma plays a mediating role in the relationship between knowledge of HIV and AIDS and HCT utilisation. The findings from the mediation analysis revealed that the stigma associated with HIV/AIDS did not mediate in the relationship between individual's HIV-related knowledge and HCT utilisation. However, the findings show that HIV-related knowledge has significant direct effects on HCT utilisation and the relationship between them was positive, which suggests that increase in awareness about HIV might lead to increase in the uptake of HCT. These findings agree with the proposed Fisher & Fisher (1992) AIDS-risk reduction behaviour with three components: Information, motivation, and behavioural skills. Information about HIV can be a guide for an individual to engage in activities that will reduce his/her risk of contracting the deadly disease. Also, the findings align with Fisher & Fisher (1996), which found that the information about HIV/AIDS was germane to the AIDS risk reduction behaviour among the college students in the USA. Information about HIV and AIDS could lead to AIDS-risk reduction behaviour (Fisher & Fisher, 1992). Extant studies have demonstrated that individual and community with higher knowledge of HIV were less likely to show stigmatising and discriminating attitudes towards PLWHA (Zhao et al., 2011; Sullivan et al., 2010; Chen et al., 2007; Lau & Tsui, 2005). The findings on mediating role of HIV-related stigma contrast with Yang et al. (2006) which found that the HIV-related knowledge component had significant impact on mediating effect of stigma on the relationship of HIV misconception and HIV status disclosure. Knowledge about HIV and AIDS is very important, although, not a sufficient factor for effective and efficient HIV prevention and intervention programmes as inferred in the literature (Ajzen, 1991; Fisher & Fisher, 2000).

Furthermore, it is noteworthy that the effect sizes, which show the magnitudes of the relationship in the mediational models are small. As opined by Chin (2003), little effect size does not signify that the impact of stigma is inconsequential. The small effect sizes may not be unconnected with the responses to the HIV stigma questions which skewed positively in attitudes and behaviours towards PLWHIV as shown in Table 6.1, where about 71 - 90% showed a positive attitude in their relationship with those infected with HIV behaviour as revealed in the measurement items for stigma. This is much higher than the reported 37.8% of non-stigmatizing attitudes toward PLHIV at the national level in 2012 according to NARHS (2012) survey. This suggests that there has been improvements in the reduction of HIV-related stigma in the country, most especially in Lagos State, which is our study area. Nevertheless, the presence of stigmatisation is still noticeable and somehow intolerably high which must be eradicated in order to improve the uptake of HCT and other HIV/AIDS programmes to achieve 90-90-90 targets for 2020 and SDGs goals for 2030 in Nigeria. The Nigerian government aims to achieve zero stigmatisation and discrimination towards PLWHA in the society.

6.6 Summary

This chapter was set out to achieve the third objective of this thesis, which is to explore the mediating effect of HIV-related stigma on the relationship of HIV-related knowledge, HIV transmission misconception, perceived seriousness of HIV/AIDS and HCT service utilisation. Three hypotheses were formulated to test the mediating effects of HIV-related stigma.Two of the three hypotheses were confirmed. By using the PLS structural equation modelling analytical technique for mediation analysis as recommended in the literature, it was found out that the HIV-related stigma mediated the relationships of misconception about HIV transmission, perceptions about the

threats posed by HIV/AIDS and HCT service utilisation. Thus, stigma plays significant roles in determining the response of people to HCT service. Therefore, to enhance HCT uptake, the issue of HIV-related stigma must be adequately addressed. In fact, HIV-related stigma must be eradicated to increase the HCT uptake in Nigeria.

CHAPTER 7: SUMMARY AND CONCLUSION

7.1 Introduction

The current chapter provides summary and conclusion of the main vital findings discussed in analytical chapters 4, 5, and 6 of this thesis in relation to the research questions asked and specifically to the research problem statement stated in Chapter 1. The three main objectives of the thesis restated below were all achieved.

(1) To assess the amount people will be willing to pay (WTP) for HCT service; and also to evaluate the determining factors of WTP for HCT service in Nigeria.
(2) To explore the health belief factors that predict HCT service utilisation in Nigeria and analyse moderator variables that moderate the relationships between these factors and HCT service utilisation.
(3) To investigate the mediating effect of HIV-related stigma on the relationship of HIV-related knowledge, misconception about the HIV transmission, perceived seriousness of HIV/AIDS and HCT service utilisation in Nigeria.

Following this introduction is section 7.2 which presents the summary of the key findings. The contributions of the study are presented in section 7.3. Sections 7.4 and 7.5 both present the theoretical and policy implications of the study, respectively. Limitations of the study are discussed in section 7.6, while suggestions for future research are presented in section 7.7.

7.2 Summary of the Thesis (Key Findings)

Chapter 1 of this thesis provided the background information and general introduction to the study – problems related to increasing HCT service utilisation in Nigeria were highlighted; research questions specific to these issues were raised and research objectives to be addressed in the study were stated. The theoretical and empirical literature were reviewed in chapter 2 to unveil the existing gaps in knowledge. The

conceptual/theoretical framework and hypothesis presented in this chapter were developed based on the study objectives. Chapter 3 was dedicated to the research methodology which provided the road maps necessary to answer the research questions and achieve the formulated research objectives. The empirical results achieved based on the three primary objectives of the study were presented in Chapters 4, 5, and 6. They are restated thus:

Chapter 4 (Objective 1) - *To assess the* amount *people are willing to pay* (WTP*) for HCT service; and also, to evaluate the determining factors of WTP for HCT service in Nigeria.*

This chapter investigated the factors that determine the willingness to pay for HCT service utilisation in the context of a contingent valuation model. Some factors such as sociodemographic, socioeconomic, knowledge and attitude about HIV/AIDS and HCT, and general health status of the participants were employed to analyse and explain the contingent valuation (CV) model of willingness to pay for HCT service. Descriptive statistics, non-parametric estimation, and general linear model regression analyses were conducted. The empirical analysis results indicated that two of knowledge and attitudes about HIV/AIDS and HCT variables, (HIV/AIDS knowledge and worry about HIV), were related to willingness to pay for HCT. The results also indicated that knowing someone infected with HIV and personal insurance was the two variables that showed a significant difference in the amount respondents are willing to pay. Also, regression analysis showed that income is a most prominent factor that determines the WTP for HCT. Other factors that significantly determined WTP are: knowing someone who is infected with HIV, the chance of contracting the HIV infection, worry about the stigma associated with HIV/AIDS, and knowing someone died of AIDS-related sickness. The amount of WTP is much lower than the cost of providing the service in Nigeria and lower than WTP elsewhere. The contingent valuation model passed the validity tests.

The results reveal that the mean WTP is [(₦1, 291.15 ($4.22)], which accounted for about 0.16% GDP per capita in Nigeria as at 2015. By implication, this stated WTP seemed affordable should co-payment for HCT service be introduced to cover the cost of providing the service.

Chapter 5 (Objective 2) - *To explore the health belief factors that predict HCT utilisation in Nigeria and analyse moderating effects of moderator variables (sociodemographic variables) on the relationships between health belief factors and HCT service utilisation.*

The purpose of this chapter is to demonstrate the factors that predict the uptake of HCT service in Nigeria. Predictors of HCT utilisation were examined under the HBM framework. The four traditional factors of HBM used in the analysis were: perceived susceptibility to HIV infection, perceived severity of AIDS disease, perceived benefits of HCT, and perceived barriers to HCT service utilisation. Also, the moderating effects of moderator variables (categorical sociodemographic variables – gender, age, marital status, education status, employment status, knowledge of HIV/AIDS) on the relationship between model constructs were examined. The empirical results of the PLS-SEM analytical estimation indicate three out of the four hypotheses were satisfied, that is, perceived susceptibility of HIV infection, perceived benefits of HCT, and perceived barriers to HCT significantly predicted HCT service utilisation in Nigeria. The perceived benefits of HCT play larger roles as indicated by its effect size. The measurement items that significantly describe these latent constructs were identified. This implies that manipulation of these factors may contribute to the uptake of HCT in Nigeria.

The moderating effect analysis revealed that of the twenty-four hypothesised paths of the moderating relationships among the model constructs, only nine paths showed

significant moderating effects. The results showed that there was a significant categorical moderating effect of gender on the relationship between Perceived benefits of HCT and HCT service utilisation; age moderator was significant on perceived barriers to HCT and perceived susceptibility to HIV infection; marital status moderator was significant on perceived severity of AIDS; education level moderator on was significant on perceived susceptibility and perceived severity of AIDS; employment status moderator was significant on perceived barriers to HCT; and HIV/AIDS knowledge moderator on perceived severity of AIDS and perceived benefits of HCT. Results from significant moderating effects imply that these factors are important in designing programmes that are targeted at manipulating peoples' perception about the risks and severity of HIV/AIDS, benefits of HCT and barriers to HCT.

Chapter 6 (Objective 3) - *To investigate the mediating effect of HIV-related stigma on the relationship of HIV-related knowledge, misconception about HIV transmission, perceived seriousness of HIV/AIDS and HCT service utilisation in Nigeria.*

This chapter analysed the mediating effects of HIV-related stigma on the relationship of HIV-related knowledge, misconception about HIV transmission, perceived seriousness of HIV/AIDS and HCT service utilisation. The mediator, HIV-related stigma, is a latent construct measured by nine items. PLS-SEM analytical technique used in the analysis of the mediator model. The results revealed that HIV-related stigma, fully mediated the relationship between misconception about HIV transmission and HCT service utilisation; there is evidence of partial mediation in the relationship between perceived seriousness of HIV/AIDS and HCT service utilisation. Although the effect sizes of the mediating relationships are small yet it inherently possesses some important implications, individuals may be willing to do HIV test and having strong perception of the threats posed by HIV/AIDS and yet may not want to partake in HCT testing if they

feel they would be exposed to stigmatisation and discrimination in case they are tested positive for HIV.

7.3 Contributions of the Study

After establishing the major findings based on the three main objectives of this study, the contributions of this study are highlighted below:

By achieving the main objectives, the current study has contributed to the existing knowledge gap regarding HCT in Nigeria. It has extended the empirical literature on contingent valuation (WTP) by incorporating potential factors of knowledge, attitudes, practice, and behaviour towards HIV/AIDS and HCT in Nigeria. More specifically, Knowledge of HIV/AIDS, knowledge of somebody infected with HIV and died as a result of HIV-related diseases, the chance of contracting HIV, were found to be significant in explaining the model, which were absent in previous studies.

Another contribution of this study is the use of moderator variables in HBM framework. Although the original proponents of HBM suggested that variables such as sociodemographic, could modify the impact of the HBM constructs on the health intervention studies, this was largely absent in the past studies. The modelling of moderator variables into HBM framework has provided useful insights on the effect of these variables on HBM constructs.

The present study has been able to demonstrate the mediating role of HIV-related stigma on HCT. Although, many past studies have reported the significant impact of stigma, no one used it in a mediational analysis as done in this study. The findings have helped in understanding the level of its effects on HCT service in Nigeria.

This study used a relatively new approach/analytic method, i.e. Partial Least Square Structural Equation Model (PLS-SEM), in the face of the limitations of traditional

regression analysis, to study the relationship between latent HBM constructs and HCT service utilisation. By this analytic method, individual items that significantly impacted on the latent HBM constructs were discovered and highlighted. This might help in knowing which items to manipulate when using HBM as a basis for designing policies or intervention to enhance the uptake of HCT in Nigeria.

7.4 Implications for Theory and Policy

The findings of this study have some implications for both theory and policy in HCT and HIV/AIDS areas. The analysis of the determinants of WTP for HCT with the underpinning theory was supported by some of the findings of this study. The contingent valuation theory reveals the three components (socioeconomic, general health status, knowledge, attitude, and behaviour) of WTP (Nguyen et.al. 2016). The findings as revealed lend credence to this theory; awareness of the disease, HIV, those infected, and died of HIV were influential in the decision of the people to engage in HCT in Nigeria. The evidences of this study substantiate HBM theory (Rosenstock, 1997). It is apparent that perceived susceptibility to HIV infection and perceived benefits of HCT service are both positive and significant in their relationship with the HCT service utilisation. Likewise, perceived barriers to HCT was negatively related to HCT utilisation. These three outcomes comply with HBM theory. However, findings from the perceived severity of AIDS disease, which was negative, is a departure from the theory *a priori* expectation.

Furthermore, in considering policy implications, the Contingent Valuation (CV) revealed that most of the people are willing to pay for HCT service, which suggests their awareness of the benefits of HCT and their responsibility of co-payment. This implies that the co-payment introduction and implementation as a means of sustaining HIV/AIDS programmes is feasible considering the proportion of respondents who accepted to pay for HCT and their mean WTP amount. In addition, income is germane

to WTP for HCT service as revealed. Those with higher income were willing to pay more than other categories, which implies that policymaker or government should be wary of the income levels of people so as not to impose a heavy burden on the low-income earners which can invariably lead to discouraging utilisation of HCT service. Those subjects classified as a high-risk population, such as women, who expressed lower WTP than their male counterpart should be offered incentives or subsidies to encourage them to participate more in HCT service. And lastly, individuals should be encouraged to disclose their HIV status to their close relations and deaths due to AIDS-related sicknesses. This will provide compelling evidence to engage in HCT activities. Aside the investigation of WTP in this study, although not part of the objectives of this study, we draw some suggestions, which are germane to reduce the cost of HCT provision in Nigeria. Cost-effective HCT delivery model, such as mobile HCT or HIV self-testing, which may require less huge resources to set up should be encouraged and expanded across the country. Establishment of stand-alone HCT centres and integration of HCT into existing health facilities in areas with high HIV prevalence and low-risk regions respectively, should be considered (Nguyen et al., 2016; Tran et al., 2013; Minh et al., 2012). A health insurance scheme for individuals should be encouraged, this would give an incentive to people who are willing to participate in HIV testing.

HBM constructs: The findings revealed that HBM constructs provide useful information about the factors that significantly predicted HCT service utilisation in the Nigeria context. Findings from the three significant HBM constructs in the study offer some significant policy implications in the administration of the HIV/AIDS programmes in Nigeria.

Perceived susceptibility to HIV infection: The findings imply that, to enhance the uptake of HCT in Nigeria, HCT policies/programmes, must hinge or targeted at creating more awareness of the individual risk of contracting the HIV infection. More specifically, it

must lay emphasis that every individual is prone to or at risk of contracting HIV, have high chances of contracting HIV if the necessary precaution such as HCT is not taken seriously, be worried and anxious about HIV and thus desire to know their status through HCT. We recommend that Government, policy-makers and all stakeholders in the fight against HIV/AIDS should not overlook these essential elements when designing policy or programme to enhance uptake of HCT in Nigeria simply because perceived susceptibility to HIV/AIDS has been shown to influence HCT service utilisation significantly.

Perceived benefits of HCT: Perceived benefits of HCT was found to play some major impacts in predicting the HCT utilisation in Nigeria. This imply that policies or programmes put in place to enhance HCT utilisation must stress the benefits accrued to early detection of HIV through HCT regardless of the costs incurred by the individuals, peace of mind and sense of relief associated with the knowledge of one's HIV status, and huge costs of late detection of AIDS via HCT service which could be fatal ultimately. We recommend that health education and behavioural change interventions targeted at the general population might be designed such that the emphasis would be on demonstrating the benefits of HIV testing and counselling.

Perceived barriers to HCT: Perceived barriers to HCT was also reported as playing a significant role in HCT utilisation. Programmes put in place to enhance the uptake of HCT must ensure HCT services are located near the people as long distance to obtain the services was one of the barriers to HCT service utilisation. Also, information about the location of these HCT centres in the neighbourhood must be provided to create awareness among the people. This can be achieved by advertisement in the print media, radio, television, social media such as Facebook, WhatsApp, Instagram, and so on. Operational hours of the HCT should be revised to make it convenient for the people to obtain HIV testing in the particular area where they are situated. And confidentiality of

the individuals' HIV results status must be strongly upheld as people still expressed low confidence on HCT personnel. This is not unconnected to the stigma attached to being HIV positive.

Categorical moderating effect: Based on the findings of the moderating effects of categorical variables tested on the relationship between the four HBM constructs and HCT service utilisation, we recommend that any intervention or programme hinged on perceived susceptibility should consider age groups and educational level status in designing phase. Also, intervention based on emphasising perceived benefits of HCT might consider different HIV/AIDS knowledge levels of the populace. And lastly intervention policy or programme aim at reducing or removing perceived barriers to HCT should take cognisance of the gender equality and equity, age group, and employment status, such that separate programmes might put in place for female folks, young people, and those unemployed.

HIV-related stigma: As revealed by the findings, stigma related to HIV/AIDS significantly mediated the relationship of HIV transmission misconception, perceived seriousness of HIV/AIDS and HCT utilisation. This implies that the presence of stigmatising attitudes and behaviours toward PLWHIV can hinder those who are willing to do an HIV test. Individuals who are aware of the threats posed by HIV/AIDS and also know the benefits of HIV testing may not come forth to partake in the HCT if they believe that they can be stigmatised and discriminated should they be diagnosed positive to HIV. We do recommend that government and all stakeholders should ensure that HIV-related stigma is substantially reduced to the barest minimum in the society to improve HCT service utilisation. This can be achieved by continuously educating people to have an attitudinal change towards PLWHIV. Vigorous publicity and implementation of the Nigeria HIV/AIDS Anti-Discrimination Act 2014 should be carried out to discourage people from stigmatising individuals with HIV.

7.5 Limitations of the study

In spite of the contribution of this study to the body of evaluation research, particularly the contingent valuation approach to HCT and HBM application to HCT in Nigeria, there are still some limitations we identified and discussed below:

- Study location/area: this study was conducted in an urban setting, Lagos State, which invariably has characteristics different from rural areas, and as such the results obtained might not perfectly fit into other contexts.
- Sampling method – Owing to the non-availability of the sampling frame of both users and non-users of HCT, the present study utilised the nonprobability convenience sampling method to select individual participants in the three local government areas of Lagos State. Hence, this may not entirely or truly represent of both users and non-users in the entire study location, Lagos state Nigeria, which may make generalisation somewhat difficult.
- The study employed a cross-sectional survey, which has some limitation such as the inability to determine cause and effect relationship among the variables of interest and as such could not be used to analyse behaviour over a period of time as obtain in a longitudinal study.
- The present study deployed a self-administered questionnaire as survey instruments, therefore, there might be the possibility of biases in completing the instruments, which can lead to underreporting or over-reporting.
- Although adjudged to be appropriate for the contingent valuation (CV) studies, this study deployed the iterative bidding game payment scale. There is a possibility other method might have produced better results since there is no basis for testing different methods in the study.
- The HBM framework deployed in this study only included four traditional constructs while the other two variables, self-efficacy and cues to action, which

were later added to the model by the proponents of the theory were excluded. These two variables might also provide useful information about HCT utilisation in Nigeria.

- The HIV-stigma data obtained was based on the perception of the general population and not the PLWHIV who bear the whole brunt of the stigmatisation and discrimination in the society. Therefore, there is a possibility of biases which might have led to overestimating or underestimating the level of HIV-related stigma.

7.6 Directions for Further Research

In order to advance this research on HCT utilisation in Nigeria, we offer the following suggestions for future investigation:

- This study suggests a rigorous investigation using the same frameworks for other sub-Saharan African countries and other parts of the world with similar HIV/AIDS and HCT conditions, such as Thailand and Philippines.
- Application of the contingent valuation and HBM frameworks to other HIV/AIDS intervention programmes such as, ART services, Condom programming, PMTCT, FLHE, in Nigeria are suggested.
- In addition, future studies might consider other theories or approaches and payment scale in the analysis of contingent valuation of HCT. Full cost-benefit analysis of HCT in Nigeria might be conducted to highlight the beneficial impact of the service in the continuum of other HIV/AIDS programmes.
- In the utilisation behaviour of people towards HCT, other theories such as the theory of planned behaviour, theory of reasoned action amongst others, of which this study was not able to cover can be adopted.

- Future studies may conduct prospective or longitudinal study design such as cohort or experimental study to take care of the limitations of the cross-sectional survey.
- The mixed-method which comprises of both quantitative and qualitative could be conducted to provide more insight and corroborate the findings especially in HIV-related stigmatisation.
- A study using the HBM framework for HCT might include the other two additional variables, self-efficacy and cues to action that the present study did not deploy, to give broader views of the impacts of these variables on HCT utilisation in Nigeria.
- The study used only six moderator variables, future studies can employ other moderators to analyse their effects on HBM constructs and HCT service utilisation.
- The investigation into the findings of the significant negative relationship between perceived severity of AIDS and HCT utilisation contrary to the a priori expectation of the HBM theory could be explored as well.

7.7 Conclusion

This chapter concluded the entire research project, summarised the findings in each of the analytical chapters, highlighted the contributions of the study to the theory and policy, and made recommendations about possible means of HCT uptake expansion.

HIV Counselling and Testing (HCT) service have proven to be a primary gateway and core of HIV/AIDS intervention in the HIV prevention, treatment, and care. Sustaining and increasing uptake of HCT service can speed up Nigeria's quest to achieve UNAIDS 90-90-90 targets by 2020 and 2030 SDGs targets of ending HIV/AIDS. Attaining these targets are feasible, if the financial sustainability of the programme is guaranteed, factors

that significantly predicted the service utilisation are well explored and implemented, barriers to HIV testing are eradicated. Otherwise, eradicating HIV/AIDS by 2030 would be a mirage in Nigeria.

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