PREVALENCE OF HIV-RELATED NEUROPATHIES, DISABILITY PATTERNS, AND QUALITY OF LIFE OUTCOMES AMONG PERSONS ON HAART IN SELECTED PUBLIC HEALTH FACILITIES IN BUSIA COUNTY, KENYA

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(Physiotherapy)

JOMO KENYATTA UNIVERSITY OF

AGRICULTURE AND TECHNOLOGY

2021

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A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in Physiotherapy (Orthopaedic) of the Jomo Kenyatta University of Agriculture and Technology

2021

DECLARATION

Thisthesis is my original work and has not been presented for adegree in any other university.

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ACKNOWLEDGEMENT

Let me begin by thanking our Almighty God, without whomI would not have realized this work. My appreciation goes to P.C.E.A Busia for their prayers for me and my family in this journey. Really, it is great joy to realize that after going through the various challenges in this journey, I have been able to turn an idea that came into my head into some piece of new information.

I want to thank my dear wife Rahab for she stood by me during this struggle and always ensured I had what I required (like a cup of hot coffee) at the reading table as I sat to put the pieces together. Truly this is true friendship. I thank my two sons (Joe and Brian), my daughter Purity for their support and patience, not forgetting Johny my grandson. I denied them all, something in life but they were very understanding and offered their best support. The best part is that we promised each other something during this moments and I am happy that we continue to achieve this promises one by one for each one of us

I am forever grateful to my brother Samuel Kimani for taking me in his residence whenever I was attending classes at the university and for his assistance as pertains to computer skills and how to search for evidence based materials. For sure it would have been tough and costly for me to have rented a premise for my accommodation.Special appreciation to my sister Elizabeth for the accommodation especially as I was finaliziing this work.

Special thanks go to Dr. J. M. Matheri, Dr. N. Tawa, Dr. D. Nyamomgo and Dr. W. Karuguti for their input and guidance towards this work. Dr. Matheri in particular was special in encouraging me by his messages even at 11.00pm in the night,*"John, its too early to go to bed can you work on your thesis"*In a special way I want to thank JKUAT as an institution for developing me into what I am now.

I want to thank all those individuals who in one way or the other contributed to the success of this work (Juma, Doreen (May her soul rest in peace), Evans, Patrick, Oscar among many others). Lastly, I want to appreciate my County Directors of Health (Dr. Lutomia and Dr. Ambuchi) for their support during this study. I want to acknowledge all the readers who will have time to read this work and make use of its findings and even carry out further research in the areas that have been raised. To all, I am humbled by your prayers and support.

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ABBREVIATIONS

ABC	Abacavir
ACTG	AIDS Clinical Trials Group
ADL	Activities of Daily living
AIDS	Acquired Immune Deficiency Syndrome
ANOVA	Analysis of Variance
ART	Anti retroviral therapy
ATN	Anti retroviral therapy toxic neuropathy
ATV/r	Atazanavir
AZT	Azidothymidine
CA	Capability Approach
CART:	Combined Anti Retroviral therapy
CCC	Comprehensive Care Clinic
CD4	Cluster of Differentiation 4
CDC	Centers for Disease Control and Prevention
CHANT	Clinical HIV-associated Neuropathy Tool
DALYs	Disability adjusted life years
DAP	Data analysis plan

DTG	Dolutegravir
EQ 5D	Euro Qol 5Dimension
ESA	East and South Africa
HAART	Highly active antiretroviral therapy
HAART-PN	Highly active antiretroviral therapy with peripheral neuropathy.
HIV	Human immunodeficiency virus
HIV-SN	Human Immunodeficiency Virus with sensory neuropathy
HRQOL	Health Related Quality of life
IADL	Instrumental activities of daily living
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KMO	Kaiser-Meyer-Olkin
LPV/r	Lopinavir
MS	Microsoft
NACOSTI	National Council for Science, Technology and Innovation.
NASCOP	The National AIDs and STI control programme
OHCHR	Office of the High Commissioner for Human Rights
P.C.E.A	Presbyterian Church of East Africa
PLHIV	Person living with Human Immunodeficiency Virus

PN	Peripheral Neuropathy
QOL	Quality of Life
RAL	Raltegravir
SPSS	Statistical Package for the Social Scientists
STI	Sexually transmitted infection
TB	Tuberculosis
TC	Lamivudine or Epivir
TDF	TenofovirDisoproxil Fumarate
UC	University of Califonia
UCSF	University of California, San Francisco
UHC	Universal health care
UK	United Kingdom
UNAIDS	United Nation WHO - World Health Organization
UNICEF	United Nations Children's Fund
USA	United States of America
WG	Washington group long Questinarre
WHO	World Health Organization
WHOQOL	World Health Organization Quality of Life.

DEFINITION OF TERMS

Peripheral neuropathy any affliction of the peripheral nerves that connect skin, joints, muscles and internal organs to the spinal cord and the brain (Norman Latov, 2006). The peripheral nerves lie outside the spinal cord. Peripheral Neuropathy also refers to damage or disease affecting nerves, which may impair normal functioning in sensation, movement, gland or organ function and other aspects of life.

HIV-associated sensory neuropathy (HIV-SN) As per Clinical HIV-associated Neuropathy Tool CHANT, is a major source of morbidity that afflicts approximately 50% of patients on antiretroviral therapy and a frequent complication of HIV infection that is associated with significant neuropathic pain.

The Convention on the Rights of Persons with Disabilities, describes disability as a long-term physical, mental, intellectual, or sensory impairment which interacts with various factors that hinder full and effective participation in society on an equal basis with others (UNAIDS, WHO, OHCHR Policy Brief (2009).

Quality of life (QOL) individuals' perception of their position or status in the cultural and value system in the context, which they live in (Alder, 2009).

HIV (*human immunodeficiency virus*) virus that interferes with the body's ability to fight infections by attacking body cells that help the body fight infection. This way the person becomes more vulnerable to many other infections and diseases and ends

up getting AIDS (Acquired Immune Deficiency Syndrome) .Transmision of the virus is through contact with infected blood and body fluids e.g. semen or vaginal fluids.

ABSTRACT

Prevalence of peripheral neuropathies and disability among seroreactive persons is increasing globally with deteriorating quality of life (QOL).The objective was to determine the prevalence of HIV-related neuropathies, patterns of disabilities and the QOL outcomes of this population that were attending Comprehensive Care Clinics (CCCs) in Busia County, Kenya. A descriptive cross-sectional research design was used. A time-constrained method was used to sample 289 adults living with HIV/AIDS and attending care in CCCs in Busia County, Kenya. The screening tools used to collect data were CHANT, EQ 5D and the Washingtong group long Questionarre. Data was analyzed using the Statistical Package for Social Sciences (SPSS) and used to calculate the descriptive and inferential statistics. The results indicated a prevalence of 61.19% (male), 70.27% (female) and 68.1% as the overall of peripheral neuropathy (PN) in the respondents. Female were 76.8% (n=222) as compared to male 23.2% (n=67). Correlation analysis indicated that there was strong positive (r=0.621, p-value=.000) relationship between foot vibration and illness. Regression analysis revealed that there was statistically significant influence of peripheral neuropathy domain on demographic characteristics on person on HAART as they accounted for 98.5 % of the variation in (R^2=.985). Mobility had the highest prevalence rate of 51.90% (n=150). Regression analysis indicated that there was statistically significant relationship between demographic characteristics and disability core-activity domain at 95.8 % variation in (R^2=.958). The QoL in the physical, psychological, social relationship and environmental domains was affected.In conclusion, peripheral neuropathy (PN) is prevalent amongst persons on HAART and is predominantly characterized by pain, numbness, absent or diminished ankle tendon reflexes and loss of vibration sense of the big toe. While diagnosis of PN remains generally clinical, other illnesses that complicate distal neuropathies should be excluded. Peripheral neuropathy is prevalent and is influenced by socio-demographic characteristics of persons on HAART-PN. However, early diagnosis and treatment / exercise guided by physiotherapists have a higher likelihood of success in forestalling severe symptoms, impaired function, disability, and poor quality of life. This call for interventions to screen for neuropathy symptoms, to minimize disabling outcomes and that way optimize the Quality of Life. Theimplication is to screen persons living with HIV on HAART for PN to establish their medical, physiotherapy and rehabilitation needs, ensuring early interventions to prevent progression of impairment, onset of disability and deterioration in quality of life. Therefore, adaptation of PN screening tools and physiotherapeutic interventions should be considered.

CHAPTER ONE

INTRODUCTION

1.1 Background information

The prevalence of peripheral neuropathies and disability among seroreactive persons is increasing globally raising a public health concern (Donofrio, 2012; Portegies, 2007; Wulff, Wang & Simpson, 2000). Peripheral neuropathy (PN) is the presences of either pain/burning sensation, aching or numbness combined with absence of reflexes or impairment of vibration sense in the great toe (Evans *et al.* 2011). Globally, between 30-60% individuals with HIV are diagnosed with neuropathic conditions. With the improved use of chemoprophylaxis, (Highly Active Antiretroviral Therapy [HAART]) the prevalence of HIV-related neuropathies and disability has significantly changed (Evans, *et al.* 2011). In their study to determine the effects of HIV on the nervous systemit was observed that although there was a decline in the incidence of HIV-related neuropathies, the prevalence of neurological impairments and disability has increased significantly due to the improved survival of persons with HIV/AIDs. This is largely attributed to the introduction and uptake ofHAART.

In a United States of America (USA) central nervous system and HIV anti-retroviral therapy research amongst 1,539 individuals with HIV-SN, Ellis, *et al.* (2010) found that 881 (57%) had neuropathic pain, which caused substantial disability and reduced quality of life [QoL]. Researchers have also linked HIV-related immunosuppression to high incidence of tuberculosis, herpes zoster and/or Guillain-Barre syndrome, which often elicit peripheral neuropathy (Callaghan *et al,* 2015). Though seldom seen in children, peripheral neuropathy is the most frequent neurological complication among adults who have HIV infection (Robert & Patricio, 2007; Bennett, Dolin, & Blaser, 2015). Variable incidences of HIV associated distal symmetrical polyneuropathy have been reported ranging from 19% to 66% (Afzal, *et al*. 2015). This peripheral neuropathic complication has often been misdiagnosed or the diagnosis is overlooked (Wulff, Wang & Simpson, 2000). There is also a growing body of evidence linking the use of antiretroviral agents (HAART) to neuropathic disease (Rathbun, 2017). For instance, Wulff and colleagues (2000) noted that distal symmetrical polyneuropathy is a common form of peripheral

neuropathy reported among persons with HIV infection who have neurotoxic levels of antiretroviral agents or advanced immunosuppression. In the United States of America, where HAART is readily available, the greatest proportion of neuropathic disease burden is peripheral neuropathy and HIV-associated cognitive dysfunction. In contrast, in developing countries where HAART is not readily available, opportunistic infections of the Central Nervous System account for the greatest proportion of the reported neuropathic disease burden (Kongsiriwattanukul & Suankratay, 2011). In a cross-sectional study conducted in Bangkok, Asia to determine the frequency and characteristics of HIV-SN amongst 118 patients, Sithinamsuwan, *et al*. (2008) found a 28% possibility of HIV-SN among those not on HAART. Regardless of the improved control of the virus in the past few decades, the incidence of neuropathy among HIV/AIDS patients had significantly increased from 13% in 1993 to 50% in 2015 (Cashman & Hoke,2015). Most of these studies were conducted in developed countries such as the USA (UCSF, 2017) and UK (Evans, *et al.* 2011, Portegies, 2007). In Africa, a report compiled by a Japanese team, alleged that HIV was diagnosed in Nigeria in 1966 (Ajayi, 2003). However, Song'ony (2008) argues that HIV/AIDS was first reported in 1983 in Central Africa.

Different from USA and other European countries, African victims were not homosexuals or drug addicts, and this led to the realization that the virus was most likely transmitted through heterosexual intercourse (Song'ony, 2008). The spread of HIV /AIDS in Africa has been blamed largely on globalization (migration, trade and travel) (Kieh, 2008). Severe political and economic disruptions in countries such as Nigeria, Angola and Sudan as well as civil unrest in countries such as Uganda, Zaire, and South Africa is believed to have brought HIV/AIDS to new locations as a result of large populations migration. In Sub-Saharan Africa region little is reported concerning the impact of HIV/AIDSother than a cross-sectional study involving 800 sero-positive participants conducted in Uganda on risk factors, prevalence, and disabilities associated with peripheral neuropathies, in which Saylor *et al*. (2017) found a 19% prevalence of neuropathy. In Kenya, the first case of HIV/AIDS was diagnosed in 1984 (HIV and AIDs in Kenya, 2019). Following an initial rise in infections and subsequent health actions, a decline in infections attributed to behavioural change and increased access to antiretroviral therapy was reported (Lombe & Ochumbo, 2016). For instance, the

National Adult HIV prevalence fell from 10% to 6.1% in 2013. This notwithstanding, the researcher found no studies published or reported concerning the impact of HIV/AIDS–related neuropathies, disability and the quality of life of HIV survivors in the Sub Saharan region, more specifically in Kenya. This study sought to fill this gap. Therefore, the purpose of this study was to determine the prevalence of HIV/AIDs-related peripheral neuropathies, disability patterns and the quality of life outcomes amongst persons on HAART in selected public health facilities in Busia County, Kenya. The research would inform policy development, planning of services and design of strategies to reduce HIV/AIDs-related peripheral neuropathies and disability that are likely to impact on the Quality of life negatively among HIV survivors.

1.2 Statement of the problem

HIV/AIDS has been ranked the fifth leading cause of the burden of disease globally with a total disability adjusted life years (DALYs) of 3.8%, (WHO, 2004). By 2018, Kenya was having 1.6 million people living with HIV. A total of 25,000 people died in the same year from HIV/AIDS-related illnesses which recorded a decline from 64,000 people in 2010 because of HAART uptake. However the numbers of deaths are still high while the prevalence of neurological impairments and disability has significantly increased due to a larger pool of long-term survivors as a result of the introduction of HAART. The estimate of pain prevalence among HIV/AIDS victims ranges from 30% to 93% depending on the severity of the disease (Smith and Passik, 2008). Cashman and Hoke (2015) observed a significant increase of neuropathy among HIV/AIDS patients from 13% in 1993 to 50% in 2015. Over the years, HIV/AIDS-related peripheral neuropathy and associated disability have not had their fair share of attention from neurological and rehabilitation researchers. In Sub-Saharan Africa, more specifically Kenya, very few studies have been conducted concerning the impacts of HIV/AIDS-related neuropathies, disability patterns, and how this impact on quality of life of HIV/AIDS survivors. In addition, there is paucity of information on the prevalence of HIV/AIDs-related peripheral neuropathy, disability patterns and quality of life outcomes amongst group of persons.More importantly; disabilities resulting from HIV/AIDs-related peripheral neuropathy contribute to increased total economic burden and quality of life loss associated with HIV. With the increase of HAART use in developing

countries, more specifically in Kenya, data on the prevalence of HIV-related neuropathies, disability and the quality of life amongst HIV survivors on HAART is worthy being generated. This study sought to determine the prevalence of HIV-related neuropathies, disability patterns and the quality of life outcomes of persons on Highly Active Antiretroviral Therapy (HAART) in Busia County, Kenya.

1.3 Justification

HIV-associated sensory peripheral neuropathy afflicts approximately 50% of patients on antiretroviral therapy as recorded in a study by Evans *et al*. (2011). This is further compounded by lack of comprehensive research for African and more so the Kenyan populations on PN in HIV, disability resulting from it and how it affects the QOL. This knowledge gap is even more pertinent as African populations are most affected by HIV/AIDs.

1.4 Objective

1.4.1Broad objective

To determine the prevalence of HIV-related neuropathies, disability patterns and quality of life outcomes among persons on HAART in selected public health facilities in Busia County, Kenya.

1.4.2Specific objectives

To determine the prevalence of peripheral neuropathy among persons on HAART attending Busia County, Comprehensive Care Clinics (CCCs).

To determine the patterns of disability among persons with HIV–related peripheral neuropathy attending Busia County, Comprehensive Care Clinics (CCCs).

To determine the health-related quality of life outcomes among persons with HIV-related peripheral neuropathy, attending Busia County, Comprehensive Care Clinics (CCCs).

1.4.3 Research questions

What is the prevalence of peripheral neuropathy among persons on HAART attending Busia County, Comprehensive Care Clinics?

What are the patterns of disability among persons on HAART attending Busia County, Comprehensive Care Clinics?

What are the health-related quality of life outcomes among persons on HAART attending Busia County, Comprehensive Care Clinics?

1.4.4 Theoretical Framework: The capability approach

This study was founded on the Capability Approach theoretical framework (Amartya Sen, 1985). The capability approach is a moral framework for evaluating the dimensions to persons' functioning (in activities of their choice) and/or wellbeing. The approach emphasizes "freedom to achieve well-being" as of primary moral importance, and that "freedom to achieve well-being should be viewed in terms of the individual's capabilities, that is, his/her real opportunities to do and to be what they have reason to value (Nussbaum, 2003). The Capability approach helps to explain how deprivations in personal characteristics (such as impairment), commodities (such as income) and environmental factors (such as social, economic, culture among others) impair one's functioning or wellbeing (Robeyns, 2005; Clark, 2005; Nussbaum, 2007). Figure 1 Illustrates the CA.

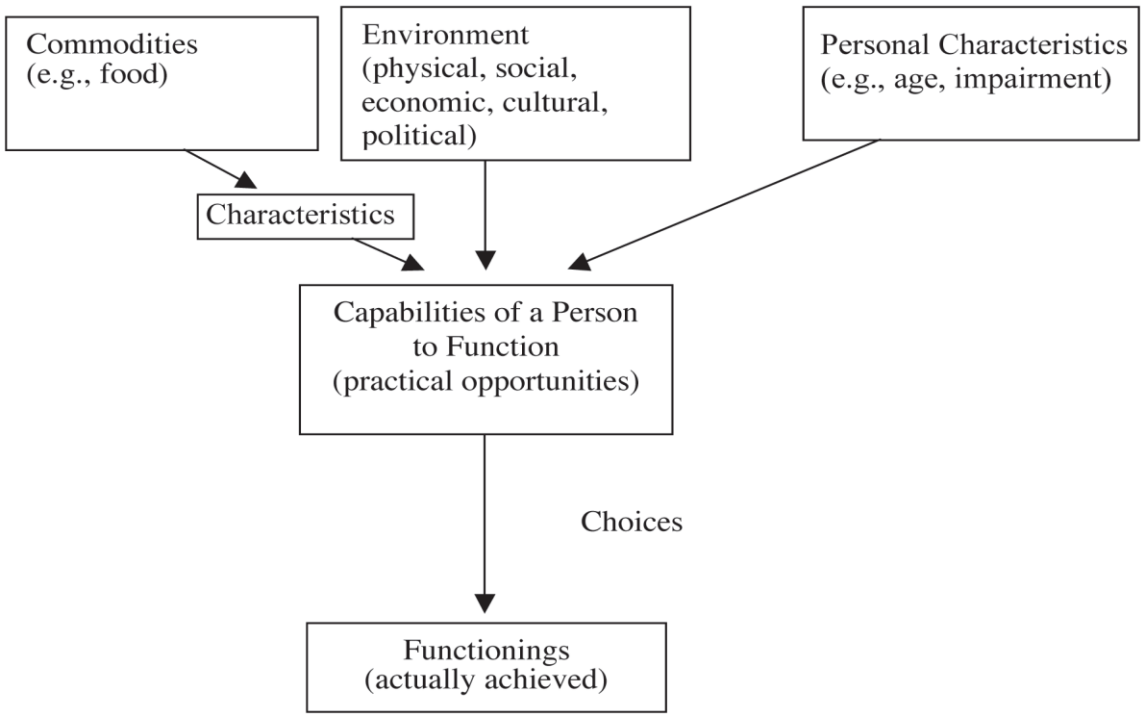


Figure 1.1:Theoretical Framework

According to Clark (2005) the framework distinguishes between commodities, human functioning/capability and utility (achieved health-related QOL) as follows:

Commodity→	Capability →	function(ing) →	Utility
(means),	(freedom to function),		(achieved wellbeing or QOL)

The Capability approach highlights how disability may result from the interactions of: the individual's personal and clinical characteristics (such as age, race, gender and peripheral neuropathy or impairment), the individual resources, and the individual's environment (physical, social, economic, political) (Mitra, 2006)). In this study, the use of the Capability approach will aid to identify the dimensions of deprivation that have implications on an individual's wellbeing and quality of life.

The conceptual framework describes the study variables and demonstrates how they relate to each other in this study. The demographic characteristics (age, gender, level of education, marital status and health status) were the independent variables while the

dependent variables comprised of Peripheral Neuropathy, Quality of life and Disability. The intervening variables were foot pain, foot numbness; vibration loss of the big toe(tested using a calibrated tuning fork and diminished or absent Achilles tendon (ankle) reflex tested using a patella hammer.

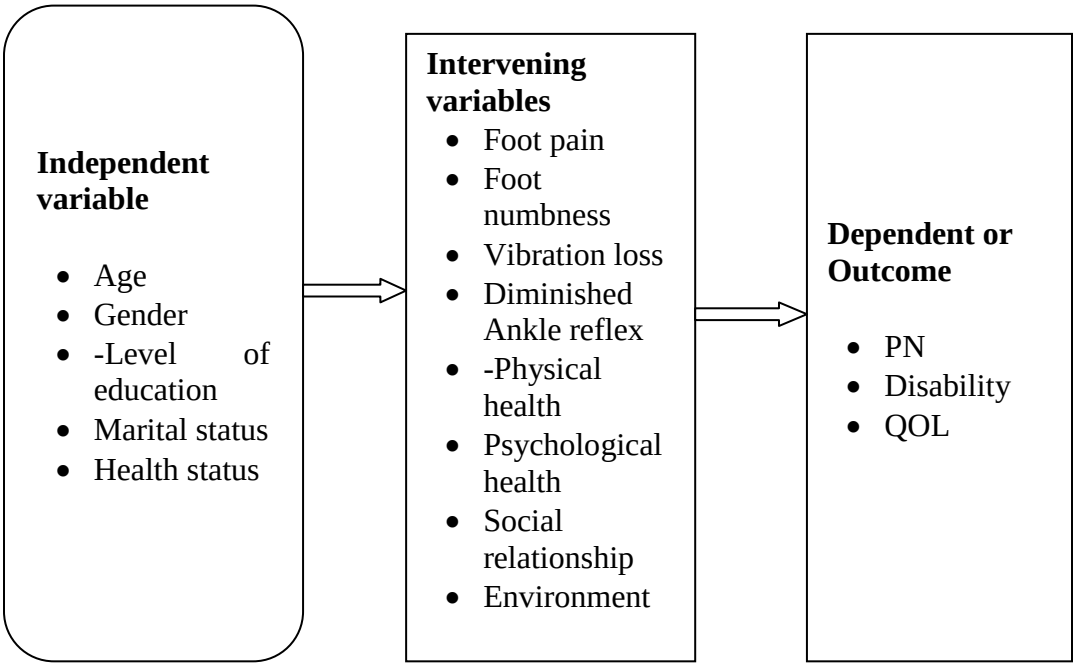


Figure 1.2: Conceptual framework

CHAPTER TWO

LITERATURE REVIEW

2.1 Historical Perspective

The Center of Disease Control issued Morbidity and Mortality weekly report on June 5, 1981 on five homosexual men in USA who had developed unexplained pneumoniawith evidence of severe immune deficiency. At the time, it became largely believed that HIV/AIDS is a disease for homosexuals and drug addicts (Mayer & Pizer, 2004). As an infectious disease that only began with a few cases, HIV affects a big population in the world both directly and indirectly. In Kenya, the first case of HIV/AIDS was recorded in 1984 (Barz & Cohen, 2011; Steinberg and Rosner, 2003). Due to the high morbidity and mortality among HIV infected persons, the government of Kenya declared it as a national disaster in 1997 (Barz et al, 2011). However, since the advent of HAART, the survival of HIV infected persons has improved, although with manifestations of various impairments including peripheral neuropathies, disabilities and reduced quality of life.

2.2 Prevalence of Peripheral Neuropathies among HIV/AIDS Survivors

Despite improved immunological function and viralogical control with cART and decreased ART use, researchers have shown that the prevalence of HIV/AIDS-related peripheral neuropathy among survivors have become more prevalent (Evan, *et al*, 2011; Jay, 2016; Puplampu et al, 2019; Zhu *et al*., 2007; Pardo, McArthur & Griffin, 2001).

In a cross-sectional study conducted at the Lagos State University Teaching Hospital HIV clinic, Olajumoke, Akinsegun and Oluwadamilola (2012) found that the prevalence of sensory neuropathy among HIV/AIDS patients on HAART remains high irrespective of improved immunity. Similarly, Bennet, Dolin and Blaser (2015) noted that over half (58%) of persons living with HIV/AIDs develop distal sensory polyneuropathy. In a study conducted in Rwanda among 185 subjects, Biranguma and Rhoda (2012) found that 40.5%(n=75) had three symptoms of peripheral neuropathy, namely: pain, aching or burning and pins and needles.

In an ACTG Longitudinal Linked Randomized Trial, amongst 2,141 participants Evans et al. (2011) found that 30 – 67% of them had HIV/AIDS-related distal sensory neuropathy and Anti retroviral therapy toxic neuropathy (ATN). In an international cohort study involving six randomized trials with 19; 566; 214; 38; 771 and 533 participants with HIV/AIDS, Volberding and Sande (2012) found a 50% prevalence of symptomatic peripheral neuropathy. Further, in a cross-sectional study conducted in UC San Diego among 436 HIV-positive and 55 HIV-negative persons Banerjee et al. (2011) found that 55% prevalence of sensory neuropathy was associated with HIV/AIDS. Moreover, in South Africa, Kamerman, Wadley and Cherry, (2012) found that complications like HIV–SN were prevalent, affecting between 20% - 57% of ambulatory seropositive patients.

Disparate risk factors for peripheral neuropathy have been reported in previous studies (Bashey, Abonour, & Huston, 2014; Volberding & Sande, 2012; Olajumoke *et al*., 2012). Most importantly, research evidence has linked the use of medications such as zidovudine (Lindsay et al., 2010), stavudine and didanosine (Volberding & Sande, 2012) to the development of peripheral neuropathies amongst seropositive people. Furthermore medications primarily used in the treatment of pneumonia, tuberculosis and cancer, that is, Dapsone (Wu, 2012), Isoniazid (Boullata, & Armenti, 2010; Donofrio, 2012) and Thalidomide (Bashey, Abonour, & Huston, 2014) respectively have been linked to the development of various neuropathies. Researchers have also identified age and height as specific risk factors for sensory neuropathy and debilitating neuropathic pain amongst persons with HIV (Olajumoke et al., 2012) including gender (Mehta *et al*., 2011; Volberding & Sande, 2012). In a study on sex differences in the incidence of peripheral neuropathy conducted among 100 Kenyans on HAART, Mehta *et al* (2011) found that women were almost ten times more likely to develop peripheral neuropathy in their first year of using HAART than men.

Whereas the causes may be different, HIV–SN and distal sensory polyneuropathy are indistinguishable from other toxic neuropathies caused by exposure to antiretroviral drugs such as Didanosine, Stavudine, and Zalcitabine (Wang, Ho, & Grill, 2014). However, generally very little work has been done to determine the prevalence of HIV–SN in this era of cART. This calls for further research in the most affected African

populations that are more susceptible to HIV-SN, which has been linked to long-term disability and poor quality of life in some studies.

2.3 Disabilities among patients with HIV related PN.

An estimated 10% of the world population lives with disability. However, the relationship between HIV/AIDs and disability has not been given due attention in both research and condition management. Researchers have revealed that many HIV/AIDs survivors with or without peripheral neuropathy, experience disability (Banks, Zuurmond, Ferrand & Kuper, 2015; Olajumoke, Akinsegun & Oluwadamilola, 2012; Ellis *et al*, 2010). For example, in a systematic review, Hancock *et al*. (2013) found that people living with HIV experience a variety of disabilities. These disabilities range from limitations in activities of daily living (Banks, Zuurmond, Ferrand & Kuper, 2015) to debilitating neuropathic pain (Nakamoto *et al*, 2010). According to Merlin et al (2016) pain is a ubiquitous experience in human beings, and is normally a sensation triggered in the nervous system as an alert to injury and so the need for rest and/or recuperation. Smith and Passik (2008) estimated that up to 50% of in-patients with HIV/AIDS in New York public hospitals are treated for pain. In a scoping study conducted in British Columbia and Canada to assess prevalence of disability among 762 persons living with HIV, O'brien and Nixon, (2010) found that 80% of this population had impairment, 81% suffered activity limitation and 93% had participation restriction. Further, in a cross sectional study conducted among 142 men and women living with HIV/AIDs in Redwood City, Calif and San Francisco, researchers found that they faced multiple challenges including difficulties in engaging in activities of Daily Living (ADL) and lack of energy to participate in social life (Vosvick, *et al*, 2003). According to Molenaar, Haan, and Vermeulen (1995) pre-existing motor and sensory impairments caused multiple disabilities amongst subjects living with HIV/AIDS. In East and South Africa (ESA), it has been established that disability maybe more correlated to HIV than in any other part of the world (UNAIDS 2011). The reason given is that ESA forms the epicenter of the global HIV epidermic (Joint United Nations Programme on HIV/AIDS [UNAIDS] 2010 (UNAIDS 2011). According to UNAIDS (2011) sub-Saharan Africa is home to approximately 68% of persons living with HIV (PLHIV) and it is here that there is a high prevalence of disability. According to the Institute of development studies

(2020),living longer with chronic HIV may take place alongside other co-morbidities and the risk of disability. People living with HIV experienced high numbers of diverse aspects of disability. These include impairments (e.g sensory, musculoskeletal, cardiovascular and mental), activity limitations (e.g. mobility, daily activities) and participation restrictions (e.g. work, social lif). For this to be adequately addressed, it is expected that health care workers will have to manage the increased complexity of chronic HIV. In many countries, health care systems are planned to provide acute HIV care and lack integration with rehabilitation services that strive towards preventing or minimalizing impairment and that way guarantee participation and assure good QOL. The health care needs of living long term with chronic HIV therefore require new skills from health care staff and an effort in reforming the health departments so as to embrace a more integrated and comprehensive care that provides for disability and rehabilitation services. A person centred approach is required in addressing disability as it is a cross-cutting issue in the response to HIV. There is the urgency to incooporate social, cultural and economic development areas that will enable a broad approach in disability care that will address the unique barriers that face people with disabilities, in particular people living with HIV. Various approaches are available and need to be put in place to address matters of disability. One of them is a three track approach that looks at disability-specific activities for people with disabilities, mainstreaming disability across all sectors and consideration of political good will and funding. HIV prevalence data among people with disabilities is scarce in Kenya (Sightsavers, 2018, p. 4; Owino, 2020b, p. 4). However in a preliminary analysis of data in the 2019 census, using the Washington Group Questions, the results indicated 2.2% (0.9 million people) (aged 5 and above) of Kenyans live with some form of disability (Owino, 2020b, p. 6). Thus, the need for further study that aims at establishing the association between HIV/AIDS, disability and quality of life led by people living with disabilities.

2.4 Quality of Life outcomes among persons living with HIV/AIDS

While life expectancy amongst persons living with HIV/AIDs improved as a result of the introduction of HAART, their quality of life remains threatened. Quality of life (QOL) is defined as an individuals' perception of their position or status in the cultural and value system in the context, which they live in (Alder, 2009). People living with

HIV face the challenges of living with HIV-related complications, toxicity of HAART, adherence to medication, stigmatization, relationships and sex life problems as well as the fear of early death (Biraguma and Rhoda, 2012; Pierret, 2000). These challenges bear a negative implication on the quality of life led by People living with HIV as they affect their physical health, mental and social wellbeing (Biranguma &Rhoda, 2012; Pierret, 2000). To an extent the spiritual nature among HIV-infected individuals was perceived as a bridge between hopelessness and meaningfulness in life which directly affects QOL (Tuck, McCain, & Elswick, 2001). Several studies have established the negative effects of HIV-related peripheral neuropathy on individuals QOL. In a cross-sectional descriptive study conducted at Rutongo hospital in Uganda, Biranguma and Rhoda, (2012) found that persons living with HIV/AIDs on HAART who had peripheral neuropathy had lower quality of life. Similarly, in a Canadian study, Power *et al*, (2009) found that HIV/AIDs-related nervous system complications, negatively affects the quality of life, employment and the survival of people living with the HIV.

Previous studies have also reported that functional decline, incapacity or disability arising from HIV/AIDs – related neuropathies reduce the QOL of HIV survivors (Banks *et al*, 2015; Pandya, 2005; Worthington & Krentz, 2005; Vogelaers *et al*, 2014). Further, in a study conducted in Royal Perth Hospital in Western Australia, Herrmann *et al*, (2013) found that Health-related QOL reduced in PLHIV and was compounded by poor physical health, unemployment and depression. In a cross-sectional study conducted in a Southern Alberta clinic, Pandya, et al, (2005) found that PLHIV related neurological diseases scored poorly in health-related QOL.

In contrast, other researchers have shown that HAART use improves health-related quality of life amongst people living with HIV. In a Quasi-experimental prospective study conducted in South Africa involving 117 participants using EQ 5D, Jelsma *et al*, (2005) reported that HAART improves health-related quality of life. Similary, in a study carried out in Ouagadougou involving 344 PLHIV on HAART, Jaquet *et al*. (2013) noted that they had a remarkable increase in health related quality of life (HRQOL). This notwithstanding, very few studies have documented data on prevalence of peripheral neuropathy, disability and quality of life amongst people living with HIV/AIDS in the sub-Saharan region, more specifically in Kenya. In addition, most previous studies were

cross-sectional based on small samples and therefore their findings cannot be generalized. The purpose of this study therefore is to determine the prevalence of peripheral neuropathy and disability patterns among subjects living with HIV/AIDS and on HAART in Busia County. This data will help to determine the impact of these clinical characteristics on their health-related quality of life.

CHAPTER THREE

METHODOLOGY

3.1 Study location and setting

Busia County is number 40 of the 47 county governments of Kenya established under devolution. It is located in Western Kenya, within the Lake Victoria Basin. It borders the Republic of Uganda to the West and North, Bungoma County to the Northeast, Kakamega County to the East and Siaya County to the South.

Fishing and agriculture are the main economic activities in Busia supported by favorable climate with annual rainfall of between 760mm and 2000 mm, multiple rivers and Lake Victoria as well as mean maximum temperatures ranging between 26°C and 30°C and mean minimum temperature ranging between 14°C and 22 °C. According to the 2009 National Census, Busia County had an estimated population of 823, 504 or 1.9% of the Kenya population, majority being women (52%). The County has a poverty level of 64.2 per cent compared to national poverty level of 45.9 per cent. It has an estimated 164,701 households with average family size of 5 members. The County literacy level is estimated at 75.3 percent for the age group 16 years and above.

Women in Busia County are more vulnerable to HIV than men. HIV prevalence in this County is 6.7%. In 2016/2017 period, 2.5% of the entire population infected with HIV/AIDS in the country came from Busia County. The hospitals in the county serve locals, inhabitants of neighbouring counties Siaya, Bungoma, Kakamega as well as the neighboring country, Uganda. Busia County is administratively divided into 7 sub-counties (namely, Teso North, Teso South, Butula, Samia, Nambale, Bunyala and Matayos), 35 wards, 60 locations, 181 sub-locations and 7 parliamentary constituencies (see figure 3).

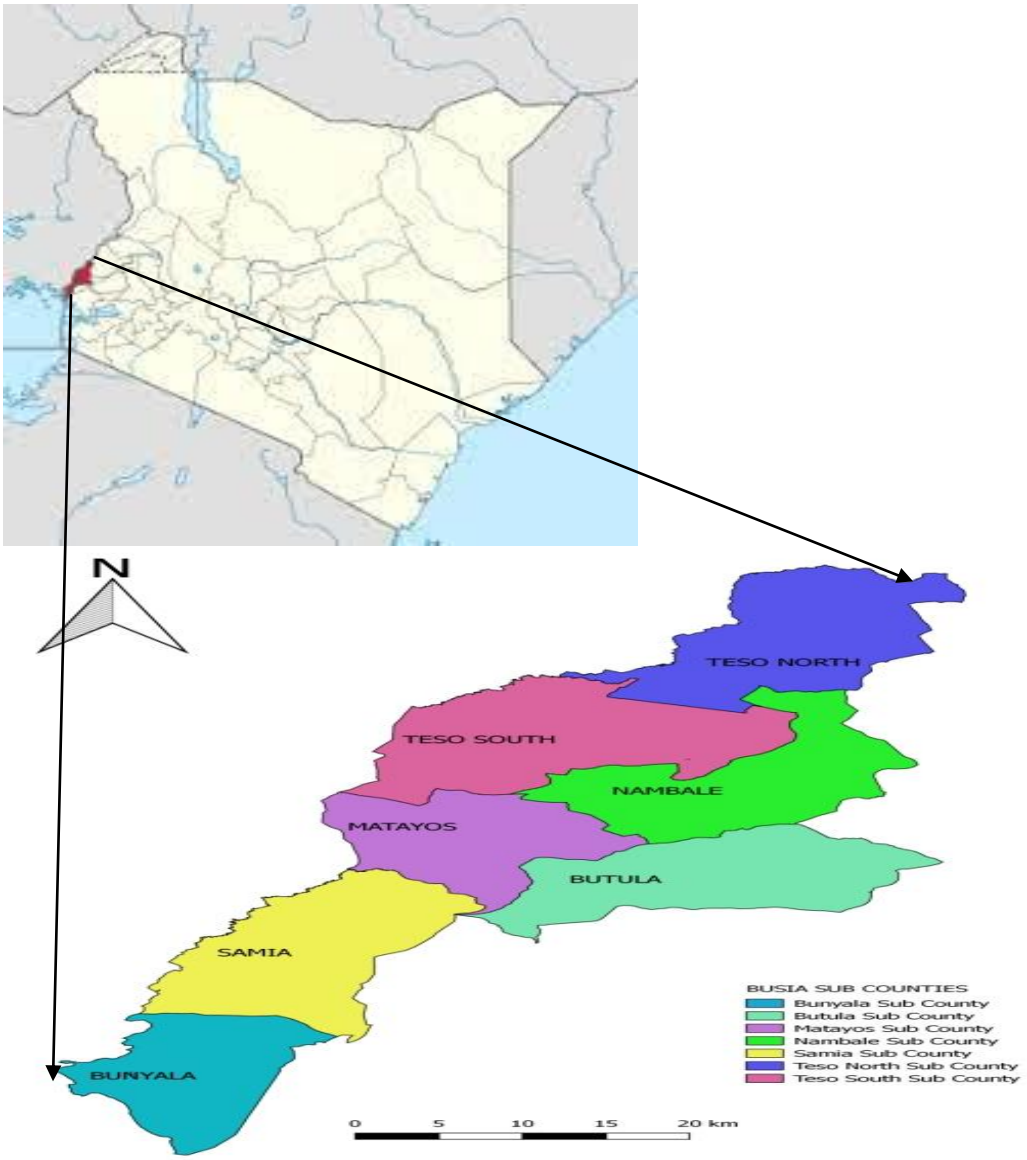
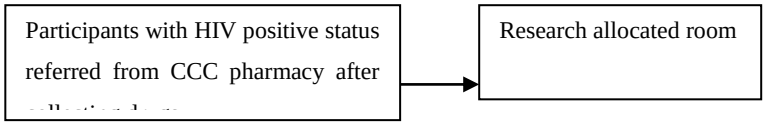


Figure 3.1: Area Map of Busia County showing the 7 Constittuencies and its location on the Kenyan map (marked red)

3.2 Study Design

This study was conducted using a descriptive cross-sectional research design.Here below is a flow chart for the data collection.



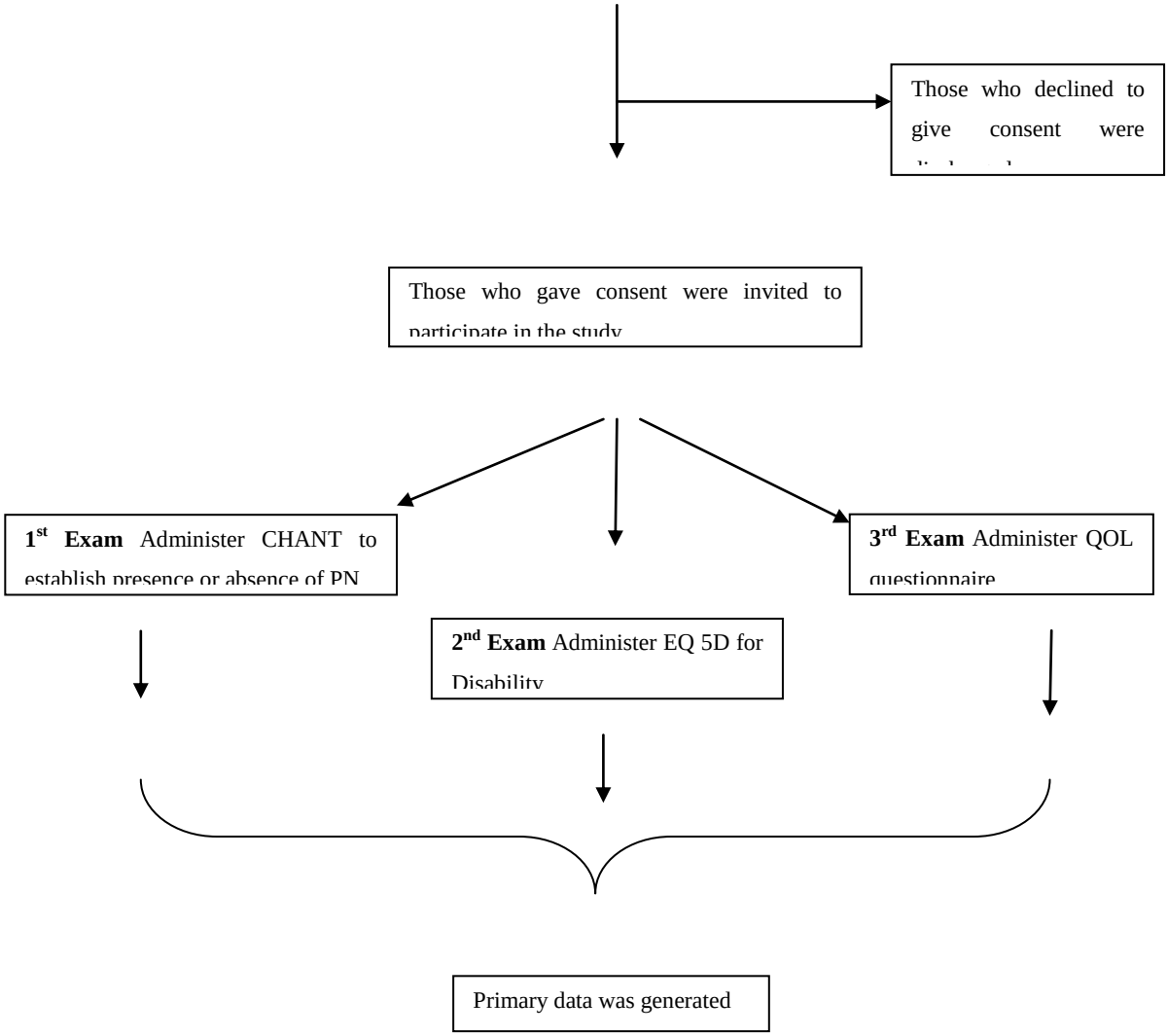


Figure 3.2: Study design

3.3 Study Sites

The public health facilities were selected through simple radom sampling (folded papers with names of the facilities were picked) and the facilities picked were Busia County Referral hospital, Matayos Heath centre, Port Victoria Sub County Hospital and Khunyangu Sub County hospital based on level of care. The four facilities are in Busia County in the following sub counties, Matayos, Butula and Bunyala. In terms of service provision, there was no discrepancy between larger and small facilities as all Amphath services were available in these facilities. Using facility patient volume generated from Amphath clinic registers for the month of March 2019, a total of 7223 patients visited

the facilities for care and this guided in apportioning equitably the 289 study subjects in the selected facilities as shown in Table 3.1.

3.4 Study Population

The target population for this study was persons living with HIV/AIDS attending Comprehensive Care Clinics in selected public health facilities in Busia County. According to a report by *The National AIDS and STI Control Programme (NASCOP) in 2016,* Busia County had 2.5% of the population living with HIV/AIDS in the country. The report further showed that the prevalence of HIV among females was higher than that of males.

The study enrolled the population of sampled adults of both gender aged 20 to 68 years with HIV infection and on HAART living in Busia County. The Kenya HIV County profiles (2016) reported that Busia County had 38,549 people infected with HIV/AIDS. According to the same report, females were more represented (8.3%) than males (5.0%). Persons on HAART were spread in 67 Comprehensive Care Clinics. According to 2018 Kenya guidelines for treating and preventing HIV, patients testing positive for HIV are put on AZT+3TC+EPV or RAL, ABC +3TC +LPV/r, AZT +3TC +EPV (or RAL), TDF +3TC +ATV/r, AZT + 3TC +DTG (or EPV), TDF + 3TC + ATV/r^2 as either first or second line HAART treatments.

3.5 Sample size determination

The Cochran formular was used to determine sample size for this study. Because this was a cross-sectional study, in a county with a population size exceeding 10,000 people, and the prevalence of HIV in the County was unclear, a 25% HIV prevalence rate was assumed, to calculate the sample size.Cochran 1963 Equation

$$n = \frac{z^2 p\,(1-p)}{e^2}$$

Where n = is the sample size;

z = level of confidence;

p = estimated proportion of the population that presents the characteristic;

e = confidence interval.

Given the established prevalence of HIV/AIDS is 25% and the Busia population living with HIV is over 10,000 people;

$$n = \frac{1.962\ 0.25\ (1 - 0.25)}{0.05^2} = 288.12$$

The study therefore had 289 participants

Table 3.1: Sample distribution to selected facilities

Facility Selected	**March Returns**	**Apportioned per facility**	**Picked every**
Busia C. R. Hospital	3754	153	12th subject
Port Victoria hospital	1245	52	4th subject
Khunyangu S. C. Hospital	1609	57	5th subject
Matayos Health center	615	38	2nd subject
Total	**7223**	**289**	

3.6 Inclusion and Exclusion Criteria

3.6.1 Inclusion Criteria

The participants who were enrolled in the study were patients who were HIV positive as determined by their HIV positive test results and who were attending Comprehensive Care Clinic (CCC) in the four selected public health facilities in Busia County. For inclusion in the study, participants had to be twenty years and above and had to give a signed consent. This ages were guided by CCCs levels of differenciated care e.g. adolescence (10 -19 years old).

3.6.2 Exclusion Criteria

Those excluded in this study were patients who were too ill with co-morbidities that could cause PN, e.g. diabetes mellitus, mental illness among others. Also excluded were those who could not talk or respond to the questions in the tools to be administered.

3.7 Data collection tools

Three data collection tools used included a piloted version of the Clinical HIV Associated Neuropathy Tool (CHANT) to establish the prevalence of PN. Woldeamanuel et al, 2016 found that CHANT requires minimal training and provides practical, valid, reliable, measurable and sensitive results. The tool (CHANT) assesses symptoms (pain and numbness) and signs (ankle reflexes and vibration sense) to establish presence of peripheral Neuropathy among persons living with HIV using the two sets of questions (subjective and objective). For the objective part, a patella hammer was used to test ankle reflex and a calibrated Tuning fork (128-Hz) was used to test vibration sense of the big toe. The second tool was the Washingtong Group Long Questionnairewhich helped to determine the QOL. This covers 26 facets that address quality of life in the area of physical, psychological, social and environmental domains. The tool covers vision, hearing, mobility, communication, cognition (remembering), self care, upper body, Affect (anxiety & depression), pain and fatigue. The third tool used to determine disability was the EuroQol 5 Dimension (EQ-5D) as approved by the Euro Qol task team. The EQ-5D measures health status (Disability) of individuals in five dimensions (5D). These include; Depression, Mobility, Self-care, Usual activities and Pain or discomfort.

All the tools, information sheet and the participants consent were taken through a process of translationinto Kiswahili language which is understood well by the population in the study site.

In the CHANT tool, those that presented with a combination of the following diagnostic indicators as per CHANT tool were regarded as having Peripheral Neuropathy. The numbers in the brackets indicate either unilateral (1) or bilateral (2) presence of the diagnostic indicator.

The scoring which fell in twenty one (21) categories was as follows: category one = bilateral feet pain (2) and bilateral feet numbness (2); category two = bilateral feet pain (2), bilateral feet numbness (2) and unilateral vibration of great toe (1); category three = bilateral feet pain (2), bilateral feet numbness (2) and unilateral ankle reflex(1); category four = bilateral feet pain (2), bilateral feet numbness (2), unilateral vibration of great toe(1) and unilateral ankle reflex (1); category five = bilateral feet numbness (2) and bilateral vibration at great toe (2); category six = unilateral feet pain (1), bilateral feet numbness (2) and bilateral vibration at great toe (2); category seven = bilateral feet numbness (2), bilateral vibration at great toe (2) and unilateral ankle reflex(1); category eight = unilateral feet pain(1), bilateral feet numbness (2), bilateral vibration at great toe (2) and unilateral ankle reflex (1); category nine = bilateral vibration at great toe (2) and bilateral ankle reflex(2); category ten = unilateral feet numbness (1), bilateral vibration at great toe(2) and bilateral ankle reflex (2); category eleven = unilateral feet pain (1), bilateral vibration at great toe (2) and bilateral ankle reflex (2); category twelve = unilateral feet pain (1), unilateral feet numbness (1), bilateral vibration of big toe (2) and bilateral ankle reflex (2); category thirteen = bilateral feet numbness (2), bilateral vibration of big toe (2) and bilateral ankle reflex (2); category fourteen = unilateral feet pain (1), bilateral feet numbness (2), bilateral vibration of big toe (2) and bilateral ankle reflex (2); category fifteen = bilateral feet pain (2), bilateral vibration of big toe (2) and bilateral ankle reflex (2); category sixteen = bilateral feet pain (2), unilateral feet numbness (1), bilateral vibration of big toe (2) and bilateral ankle reflex (2); category seventeen = bilateral feet pain (2), bilateral feet numbness (2) and bilateral ankle reflex (2); category eighteen = bilateral feet pain (2), bilateral feet numbness (2), unilateral vibration of big toe (1) and bilateral of ankle reflex (2); category nineteen = bilateral feet pain (2), bilateral feet numbness (2), bilateral vibration of big toe (2); category twenty = bilateral feet pain (2), bilateral feet numbness (2), bilateral vibration of big toe (2) and unilateral ankle reflex (1); category twenty one = and lastly bilateral feet pain (2), bilateral feet numbness (2), bilateral vibration of big toe (2) and bilateral ankle reflex (2).

3.7.1 Validity of the Instruments

According to the developers, CHANT tool was validated clinically and field tested on sero-positive clients in UK and South Africa (Woldeamanuel, *et al*., 2016). In both South Africa and the UK samples, it recorded good sensitivity = >74%, specificity = >85%, internal consistency = .88 (Cronbach alpha) and inter-item correlation = 0.73 (Spearman's Rho) and inter-rater agreement >0.93 (Spearman's Rho). The EQ 5D scales has been used in South Africa involving 117 participants living with HIV and on HAART (Jelsma et al, 2005) and in a study that involved patients with an upper extremity impairment, Slobogean et al. (2010). Both found EQ-5D reliable and valid for functional outcome.EQ 5D scored a reliability [intra-class correlation coefficient =0.70] which is acceptable for aggregate level data. The Washingtong Group long Questionnaire was found to have an excellent stability on test-retest reliability (0.88).

3.7.2Reliability Tests

To evaluate the quality of the instrument used in the study, reliability test was conducted. Reliability refers to the consistency of measurement and is frequently assessed using the test–retest reliability method. Internal consistency of the questionnaire was computed using Cronbach's Alpha techniques. Churchill (1979) argues that a test of reliability of a research instrument should precede its use. In addition Sekeran (2006) asserts that Cronbach's Alpha can be considered as an adequate index of the inter-item consistency reliability of the predictor and criterion variables. As a rule of thumb, Nunnally (1978) suggests that reliability values of 0.70 and above are statistically acceptable for internal consistency for scales. Likewise, Bollen, et al. (2005) propose that an Alpha value which is above 90 percent is an indication of very high reliability of the scale, values between 75 and 90 percent indicate useful reliability while values below 75 percent indicate weak reliability. There are those who accept values of 0.6-0.7 (Ursachi, 2015) or even 0.5 and above (Cronbach, 1951).

3.8 Pilot Study

A pilot study was conducted in Alupe sub-county hospital CCC in Teso South sub County of Busia County, where ten persons living with HIV and on HAART

volunteered for the exercise. These ten participants were not included in the main study. Piloting was vitally important for this research in order to assess the user friendliness of the three research tools before adopting them in the context. Piloting also helped to familiarize with the tools and the research procedures before the actual data collection process. Adjustments were done where possible and this related the process and not the tools content.

3.9Data Management and Analysis

3.9.1 Data management

Data for this study was correctected for three months. Data management included storage of completed questionnaires (to ensure confidentiality), coding, developing a variable code book, extraction and cleaning of data and data analysis plan (DAP).

3.9.2 Data analysis

Data obtained was entered into the Microsoft excel and then imported to the Statistical Package for the Social Sciences (SPSS), Version 25.0 for processing and cleaning. Descriptive statistics were calculated for each data set and and compared for discrepancies. Once, data cleaning was completed, data analysis was conducted to assess the data validity, reliability, and sample adequacy test. Thereafter, data generated using CHANT tool in MS Excel sheet was imported to the Statistical Package for Social Sciences (SPSS) software for analysis. Descriptive statistics for demographic variables (including gender, level of education, marital status and Health status) were measured based on the frequencies and percentage distributions. Correlation analysis using Pearson's was used to analyze the relationship between the demographic characteristics and prevalence of PN. The statistical influence of demographic characteristics on peripheral neuropathy amongst persons on HAART was further analyzed by ANOVA as well as linear regression analysis at significant level of $p<0.05$.

Data generated from the Washingtong Group Long Questionnaire (WG) and EQ-5D was then analyzed separately using SPSS software. In addition the descriptive and inferential statistics were computed using SPSS to establish statistical significance and relationship.Descriptive statistics calculated were presented in summary tables. In the analysis, Pearson moment was used to establish the correlation coefficient between the variables.

From the analysis the mean score were calculated by multiple comparisons of means using Tukey's test for the physical health domain (the impact of the disease on the activities of daily living, dependence on medical substances, a lack of energy and

initiative, restricted mobility and the capacity to work), the psychological domain (the patient's own thoughts about body image and appearance, negative feelings, positive feelings, self-esteem and personal beliefs), the social domain (individual's personal relationships, social support and sexual activity) and the environmental domain (financial resources, the work environment, accessibility to health and social care, freedom, security and opportunities for participation in leisure activities). The Student's t-test and ANOVA was done to determine the significant difference between varaibles. Correlation and frequency outcomes of the data were calculated and presented in form of summary tables.

3.10 Ethical Consideration.

Authority to carry out the study was sought from the JKUAT Institutioanal Ethical Review Committee (IREC), National Council for Science, Technology and Innovation (NACOSTI) and Busia County Director of Health and Sanitation. As a requirement of NACOSTI the researcher was required to get permission from the Busia County Commissioner and Ministry of Education offices in Busiawhich and this was granted. Participation was voluntary and all participants in the study were required to give written consent. The researcher gave a written explanation of the nature and purpose of the research to the participants. They were free to withdraw from the study if they so wished, any time during the course of the data collection. The respondents were assured of anonymity and confidentiality. The researcher ensured that courtesy and confidentiality were upheld throughout the study

CHAPTER FOUR

RESULTS

4.1 Descriptive statistics

Out of a total of 300 questionnaires administered to persons on HAART attending CCCs, 289 were completed correctly hence a 96.33% response rate was achieved.

The results in Table 4.1 show that Cronbach's Alpha coefficient ranged between 0.711 (Disabilities core-activity domain) to 0.802 (Quality of life). The results indicate that measurement scales used were sufficiently reliable and adequately measured variables of the study. The reliability coefficient for all the constructs used in this study exceeded the 0.6 lower level of acceptability recommended by Hair *et al.* (1998) and were within the 0.70 and above as advocated by Nunnally (1978) and are therefore reliable and acceptable for further analysis.

Table 4.1: Reliability tests

Domains	Measure	Cronbach's Alpha	Number of items
Peripheral Neuropathy (PN)	Right foot pain Left foot pain Right foot numbness Left foot numbness Right big toe vibration Left big toe vibration Right ankle reflex Left ankle reflex	.719	8
Disability Core-activity Domain	Mobility Self-care Usual activities Pain/discomfort	.711	5
Quality of Life (QoL)	Physical Physiological Social Environment	.802	26

Table 4.2: Kaiser-Meyer-Olkin (KMO) and Bartlett's Test

		Bartlett's Test of Sphericity			
Factor	KMO Test	**Approx. Chi-Square**	**df**	**Sig.**	Determinant
Peripheral Neuropathy (PN)	.814	192.373	8	.000	0.212
Disability Core-activity domain	.873	352.067	3	.000	0.058
Quality of Life (QoL)	.793	150.832	10	.001	0.297

SOURCE: Primary data

Table 4.2 summarises the reliability analysis derived from responses in the questionnaires

4.2 Sampling Adequacy

In order to assess the validity of this study's variables, tests of sampling adequacy were used. This enabled the study to identify whether the items were appropriate for further analysis. Table 4.2 shows Kaiser-Meyer-Olkin (KMO) test of sampling adequacy and Bartlett's test of sphericity.

4.3 Sampling Adequacy

The results in table 4.2 above show that the scales had values above the threshold of 0.7 as established by Williams et al. (2010). Peripheral neuropathy scored 0.814, disability core-activity domain scored 0.873 and the score for quality of life was 0.793. Williams et al. (2010) stated that KMO of 0.50 is an acceptable degree for sampling adequacy with values above 0.5 being better.Bartlett's Test of sphericity which analyzes if the samples are from populations with equal variances produced p-values less than 0.05 ($p < .001$). Since the Bartlett's test significances were less than 0.05 this further indicates an acceptable degree of sampling adequacy. Disability had a chi-square value of 352.056 ($p < 0.001$), Quality of life X^2=150.832 ($p < 0.001$) and neuropathy X^2=192.378, ($p < 0.001$). Determinant values are more than 0: Disability (0.058), Quality of life (0.297), neuropathy (0.212). Unlike the study findings, values closer to 0 depict computational problems with the factor analysis, an issue of singularity, which implies multicollinearity in the data. Thus, it was acceptable to proceed with the analysis.

4.4 Sociodemographic Characteristics of the participants

The results show that majority of the respondents were female 76.8% (n=222) and males 23.2% (n=67). Out of 289 respondents, majority 38.06% (n=110) were of age between 41 to 50 years old followed by those aged 50 years and above at 35.99% (n=104). Of the 289 respondents, majority, 34.95% (n=101) were widowed and 28.02% (n=81) were married. According to the level of education, majority, 53.6 % (n=155) had no formal education, 27.68 (n=80) primary School education while 16.25 % (n=47) had secondary school education.

4.5 Prevalence of peripheral neuropathy among persons on HAART

The results for prevalence of Peripheral Neuropathy among male was 61.19%,female 70.27% and the overall was 68.17% (197 out of 289) as shown in Table 4.3 below. Looking at the varying representation of each gender, computation was done as per each gender.

Table 4.3: Prevalence of PN among male and female on HAART

Diagnostic-Indicators	With PN		Without PN		Total %
	N	%	N	%	
Male	41	61.19	26	38.81	100
Female	156	70.27	66	29.73	100
Totals	197	68.17	92	31.83	100

SOURCE: Primary data PN: Peripheral Neuropathy

The results in Table 4.4 belowfor females on HAART indicated that more had: Right foot pain (n=160; 72.07%) compared to those with Left foot pain (n=154; 69.36%), Right foot numbness (n=146; 65.76%) compared to those with Left foot numbness (142; 63.96%); Right foot vibration (n=156; 70.27%)compared to those with Left foot vibration (n=157; 70.72%), including Right Ankle reflex (n=149; 67.12%) compared to Left ankle reflex(n=150, 67.57%) respectively. Among females on HAART right foot pain compared to left foot pain and right foot toe vibration compared to left foot toe vibration were the most prevalent clinical characteristics for peripheral neuropathy.

Table 4.4: Distribution of Diagnostic Indicators of PN according to gender of persons on HAART

		Gender					
		Males (67)		Females (222)		Total	
Diagnostic-Indicators		N	%	N	%	N	%
Right foot pain	With	41	61.19	160	72.07	201	69.55
	Without	26	38.80	62	27.92	88	30.45
Left foot pain	With	37	55.22	154	69.36	191	66.09
	Without	30	44.77	68	30.63	98	33.91
Right foot numbness	With	46	68.65	146	65.76	192	66.44
	Without	21	31.34	76	34.23	97	33.56
Left foot numbness	With	44	65.67	142	63.96	186	64.36
	Without	23	34.35	80	30.03	103	35.64
Right foot big toe vibration	With	66`	98.51	156	70.27	222	76.81
	Without	1	1.49	6	2.70	7	2.422
Left foot big toe vibration	With	64	95.52	157	70.72	221	76.47
	Without	3	4.48	5	2.25	8	2.77
Right ankle reflex	With	67	100	149	67.12	216	74.74
	Without	0	0.0	3	1.35	3	1.04
Left ankle reflex	With	63	94.03	150	67.57	213	73.70
	Without	4	66.7	2	33.3	6	2.08

The results (Table 4.4) indicate that amongst the males on HAART, more reported of Right foot pain (n=41, 61.19%) compared to Left foot pain (n=37, 55.22%): Right foot numbness (n=46, 69.65%) compared to Left foot numbness (44, 65.67%); Right foot vibration (n=66, 98.51%), compared to Left foot vibration (n=64, 95.52%), and Right Ankle reflex (n=67, 100%) compared to Left ankle reflex (n=63, 94.03%). From the resultsamong males on HAART right foot was affected more that the left by all diagnostic indicators.This analysis indicates that over ¾ males (79.85%) and 2/3 females (68.35%) on HAART had PN in the selected facilities.

4.6 Patterns of disability among persons on HAART-PN

The findings of this study on the prevalence of disability, patterns and relationship with core activity domains among persons on HAART-PN are as presented in the following sub-sections.

4.6.1 Prevalence of disability-core activity domain and demographic characteristics

Results indicate that women (n=222, 76.8%) had a higher prevalence of disability, compared to men (n=67, 23.18%). Women had a higher prevalence of mobility disability (n=120, 54.05% as compared to men, (n=30, 44.77%). Regarding usual activity disability, women (n=32, 14.41%) had a lower prevalence compared to men (n=13, 19.40%). Also women (n=23, 10.36%) had almost similar levelsof prevalence of pain or discomfort disability, compared to men (n=7, 10.44%). In self-care, men (n=17, 25.37%) had a higher prevalence of disability, compared to women (n=47, 21.17%).

Regarding disability by age category, persons of 20 years old had a minimal prevalence of disability in all categories, mobility (n=5, 50%), self–care (n=2, 20%) and pain and discomfort (n=1, 10%). Further, persons aged 21-40 years reported low prevalence of disabilities (in mobility, self-care, usual-activity and pain/discomfort domains). The results also indicate that persons aged 41-50 years had high prevalence for mobility (n=70, 63.64%) and usual activity (n=20, 18.18%) disabilities. Regarding disability experience based on participants' marital status, widows had the highest prevalence of mobility (n=66, 66.35%) and self-care (n=15, 14.85%) disabilities. Similarly married persons on HAART-PN had relatively high prevalence of mobility (n=39, 48.15%), self-care (n=18, 22.2%), usual-activity (n=13, 16.5%) and pain/discomfort (n=11, 13.6%) disabilities. However, low prevalence of disability on separated person was recorded at the following rates, mobility (n=8, 44.4%), self-care (n=5, 27.7%), usual-activity (n=4, 22.2%) and pain/discomfort (n=1, 5.55%) disabilities. However, there was high prevalence of disability on divorced persons on mobility (n=8, 55.3%), but recorded low prevalence rates on self-care (n=4, 26.7%), usual-activity (n=2, 13.3%) and pain/discomfort (n=1, 6.6%) disabilities. It can be argued that widowed and married persons on HAART-PN are the most vulnerable and prevalent to core-activity disabilities domains evaluated in this study. The prevalence of mobility disability

increased with the decrease in the level of education, for example mobility tertiary (42.86%), Secondary (42.6%), primary education (52.5%) and no formal education (54.84%). However in the other domains(self-care,usual-activity and pain/discomfortpresented a different format, that is self care (28.57%, 21.28 %, 25 % and 20.65%), usual-activity (14.29%, 21.28%, 12.5% and 15.48%) and pain/discomfort (14.29%, 14.89%, 10% and 9.03%). The person on HAART-PN with no formal schooling had highest prevalence of mobility disability. However, low prevalence of disability was recorded among those with tertiary education; to mobility (42.86%), usual-activity(14.29%) and pain/discomfort (14.29%), while those with no formal education experienced higher prevalence of disablity,mobility (54.84%), self-care (20.65%) and usual activity (15.48%). Respondents living with illness had higher rates of mobility disability (n=110, 54.46%), compared to those without illness (n=40, 46%). (Table 4.5)

Table 4.5: Prevalence of disability in core-activity domains by demographic characteristics.

Characteristic	Mobility		Self-Care		Usual Activity		Pain/discomfort		Total	
	N	%	N	%	N	%	N	%	n	%
Gender (n=289)										
Male	30	44.77	17	25.37	13	19.40	7	10.44	67	23.18
Female	120	54.05	47	21.17	32	14.41	23	10.36	222	76.82
Total	150	51.90	64	22.15	45	15.57	30	10.38	289	100.0
Age Group (n=289)										
20years	5	50	2	20	2	20	1	10	10	3.46
21 - 30 years	7	38.8	4	22.2	5	27.8	2	11.1	18	6.23
31 - 40 years	20	45.56	10	21.28	14	29.79	3	6.38	47	16.26
41 - 50 years	70	63.64	17	15.45	20	18.18	3	2.73	110	38.06
> 50 years	48	46.15	31	29.81	4	3.85	21	20.2	104	35.99
Total	150	51.90	64	22.15	45	15.57	30	10.38	289	100.0
Education level (n=289)										
No formal school	85	54.84	32	20.65	24	15.48	14	9.03	155	53.63
Primary school	42	52.5	20	25	10	12.5	8	10	80	27.68
Secondary school	20	42.6	10	21.28	10	21.28	7	14.89	47	16.26
Tertiary	3	42.86	2	28.57	1	14.29	1	14.29	7	2.42
Total	150	51.90	64	22.15	45	15.57	30	10.38	289	100.0
Marital Status (n=289)										
Single	12	37.5	10	31.25	8	25	2	6.25	32	11.07
Married	39	48.15	18	22.2	13	16.5	11	13.6	81	28.02
Cohabiting	17	40.48	12	25.6	10	23.8	3	7.14	42	14.53
Separated	8	44.4	5	27.7	4	22.2	1	5.55	18	6.22
Divorced	8	53.3	4	26.7	2	13.3	1	6.6	15	5.19
Widowed	66	65.35	15	14.85	8	7.92	12	11.9	101	34.95
Total	150	51.90	64	22.15	45	15.57	30	10.38	289	100.0
Health Status (n=289)										
With illness	110	54.46	40	19.8	30	14.85	22	10.9	202	69.90
Without illness	40	46	24	27.6	15	17.2	8	2.3	87	30.10
Total	150	51.90	64	22.15	45	15.57	30	10.38	289	100.0

4.6.2 Patterns of disability

Table 4.6 summarizes results of the patterns of disability among persons on HAART-PN. This was scored using a scale of moderate-severe.

Table 4.6: Patterns of Disability by core activity domains

	Patterns of disability (n=289)					
	Mild		Moderate		Severe	
Disability core activity domain	N	%	N	%	N	%
Mobility	79	52.7	63	42.0	8	5.30
Self-care	32	50.0	26	40.6	6	9.40
Usual Activity	14	31.1	21	46.7	10	22.2
Pain/discomfort	9	30.0	16	53.3	5	16.7

Scale: 1=Mild-(At least some difficulty) 2=Moderate-(At least a lot of difficulty 3=Severe- (Unable to do at all)

The results (Table 4.6) indicate that mobility was the highest pattern of disability (mild-n=79; 52.7%) followed by self-care (mild-n=32; 50.0%), usual activity (mild- n=14; 31.1%), and pain/discomfort (mild-n=9; 30.0%) in a reducing order. Under moderate pattern, pain/discomfort scored highest 53.5%, followed by usual activity 46.7%, mobility 42.0%, and lastly self care 40.6%. In this respect, mobility disability and pain/discomfort had the highest prevalence of disability pattern among person on HAART-PN

4.6.3 Relationship between PN and Demographic Characteristics

The results of the relationship between peripheral neuropathy and demographic characteristics are summarized in Table 4.7:

Table 4.7: Relationship between demographic characteristics (n=289) and Peripheral Neuropathy (PN)

		Foot Pain	Foot Numbness	Foot Vibration	Ankle Reflex
Age	Pearson correlation	.331	.221	.026	.069
	Sig(2-tailed)	.000	.000	.000	.000
	N	289	289	289	289
Gender	Pearson correlation	.026	.026	.033	.056
	Sig(2-tailed)	.000	.000	.000	.000
	N	289	289	289	289
Education	Pearson correlation	.083	.013	.670	.024
	Sig(2-tailed)	.000	.000	.000	.000
	N	289	289	289	289
Marital Status	Pearson correlation	.483	.308	.084	.016
	Sig(2-tailed)	.000	.000	.000	.000
	N	289	289	289	289
Illness	Pearson correlation	.837*	.896*	.621	.541
	Sig(2-tailed)	.000	.000	.000	.000
	N	289	289	289	289

Foot Pain (Right and Left foot pain) ; Foot Numbness (Right and Left foot numbness); Foot Vibration (Right and Left foot vibration); Ankle Reflex (Right and Left ankle reflex)

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level

Table 4.7 indicates that there was strong and positive relationship (r=0.837, p-value=.000) between foot pain and illness. However, there was weak and positive relationship between age, gender, education as well as marital status and the foot pain. Similarly there was strong and positive relationship (r=0.896, p-value=.000) between foot numbness and illness. Again there was weak and positive relationship between age, gender, education as well as marital status and the foot numbness. There was strong and positive relationship (r=0.621, p-value=.000) between foot vibration and illness. Similarly there was weak and positive relationship between age, gender, education as well as marital status and the foot vibration. There was moderate and positive

relationship (r=0.541, p-value=.000) between ankle reflex and illness. This can be argued that there was strong relationship between the peripheral neuropathy and illness more than the other indictors.

The regression analysis results are summarized in Table 4.8. These tables show that there was statistically significant influence on peripheral neuropathy domain and demographic characteristics on person on HAART as they accounted for 98.5 % of the variation in (R^2=.985). Further the overall model also reveals a statistically significant relationship between peripheral neuropathy domain and demographic characteristics of persons on HAART (F=1880.289, p-value=.000). This analysis further indicated that peripheral neuropathy domain were positive and statistically significant with positive Beta coefficient.

The tables below illustrate regression results from the study of demographic characteristics and PN domains.

4.6.4 Relationship between demographic characteristics and disability core activities domains.

The study further sought to establish the relationship between the demographic characteristics and disability core-activity domains. Table 4.8presents the correlation analysis relationship between demographic characteristics (n=289) and disability core activity domains. In this analysis Pearsonwas used to establish the correlation coefficient between the variables.

Table 4.8: Relationship between demographic characteristics (n=289) and disability core activity domains

Characteristics		Disability core-activity domain			
		Mobility	Self-care	Usual activities	Pain/discomfort
Age	Pearson correlation	0.671	0.709	0.831	0.521
	Sig(2-tailed)	0.000	0.011	0.000	0.000
	N	289	289	289	289
Gender	Pearson correlation	0.413	0.692	0.708	0.411
	Sig(2-tailed)	0.000	0.000	0.000	0.000
	N	289	289	289	289
Education	Pearson correlation	0.428	0.512	0.399	0.362
	Sig(2-tailed)	0.044	0.000	0.023	0.032
	N	289	289	289	289
Marital status	Pearson correlation	0.731	0.570	0.415	0.465
	Sig(2-tailed)	0.000	0.000	0.000	0.000
	N	289	289	289	289
Illness	Pearson correlation	0.822	0.741	0.717	0.683
	Sig(2-tailed)	0.000	0.000	0.000	0.000
	N	289	289	289	289

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level

Table 4.8 indicate that there was strong and positive relationship (r=0.831, p- .000) usual activities and age, (r=0.671, p-value=.000) between mobility and age, (r=0.709, p-value=.000) between self-care and age. This implies that age played a critical role on prevalence of disability in persons on HAART-PN. The results also indicated a strong and positive relationship (r=0.692, p-value=.000) between self-care and gender. Similarly there was strong and positive relationship (r=0.708, p-value=.000) between usual-activity and gender, except mobility and gender which had weak and positive relationship (r=0.413, p-value=.000) as well as relationship between pain/discomfort (r=0.411, p-value=.000). This can be argued that gender of persons on HAART-PN significantly influenced self-care and Usual-activity. There was weak and positive relationship (r=0.428, p-value=.000) in education and mobility. Similarly education and usual-activity had weak and positive relationship (r=0.399, p-value=.000). Also the

results indicated weak and positive relationship (r=0.362, p-value=.000) between education and pain/discomfort. However, there was moderate and positive relationship (r=0.512, p-value=.000) between education level and self-care, therefore it can be argued that education level of persons on HAART-PN significantly influenced self-care. The relationship between marital status and disability core-activity domain results indicated that there was strong and positive relationship (r=0.731, p-value=.000) between them. Likewise there was moderate and positive relationship (r=0.570, p-value=.000) between marital status and self-care. However, there was weak and positive relationship (r=0.415, p-value=.000) between the marital status and usual-activity and relationship between marital status and pain/discomfort (r=0.465, p-value=.000). This implies that marital status significantly influenced mobility and self-care especially among the widowed and divorced persons on HAART-PN. Finally health status of the participants was evaluated and the results indicated a strong and positive relationship (r=0.822, p-value=.000) between illness and mobility. Similarly there was strong and positive relationship (r=0.741, p-value=.000) between illness and self-care, illness and usual-activity (r=0.717, p-value=.000) relationship. There was moderate and positive relationship (r=0.683, p-value=.000) between illness and pain/discomfort. This implies that poor health status of the individual significantly influenced all the domains of disability in the study group.

Table 4.9 indicate that there was statistically significant influence of demographic characteristics of persons on HAART and disability core-activity domain at 76.0 % variation in (R^2=.760). Further, the overall model also reveals a statistically significant relationship between demographic characteristics and disability core-activity domain (F=3.182, p-value=.000). Theanalysis showed there was statistically significant relationship between age (t=1.053; p-value= 0.029) and disability core-activity domains were statistically significant. In addition, all Beta coefficients for disability core-activity domain were positive and statistically significant. This implies that disability core-activity domain was mainly influenced by demographic characteristics of person on HAART-PN.

Table 4.9: Goodness of fit, Overall significance, and individualized significance

Goodness -of-fit

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.298	.089	.076	.897	.089	6.908	4	284	.000

Predictors: (Constant), Demographic characteristics

Overall significance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	8.100	5	1.620	3.182	.002[b]
	Residual	144.073	283	.509		
	Total	152.173	288			

a. Dependent Variable: Disability core-activities domain

b. Predictors: (Constant), Demographic characteristics

Individual significance

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	3.625	.213		17.02	.0000	3.206	4.044
	Gender	.022	.105	.013	.211	.0033	.184	.228
	Age	.004	.004	.062	1.053	.0029	.003	.011
	Education	.058	.060	.057	.964	.0036	.061	.177
	Marital status	-.072	.023	.191	-3.123	.0020	.118	.027
	Health status	-.102	.054	.110	-1.884	.0061	.209	.005

a. Predictors: (Constant), Demographic characteristics

b. Dependent Variable: Disability core-activities domain

*Significant at P< 0.05

In the analysis the p-value was used to evaluate the statistical significance of the mean values of the quality of life(QoL). The interpretation is that p>0.05 is statistically significant and the mean calculated value is a true refelection of the test of QoL. Statistically, this implies that $p > 0.05$ is the probability that the null hypothesis is true and $p \leq 0.05$ means that statistically the test hypothesis is false or should be rejected.

Table 4.10: Analysis of Quality of Life in Specific Domains by Selected Socio-Demographic Characteristics

Characteristic	Physical Health		Psychological Health		Social Health		Environment	
	Dissatisfied with PH	Satisfied with PH	Low QOL	Fair to good QOL	Satisfied with QOL	Dissatisfied with QOL	Dissatisfied with env't	Satisfied with env't
Gender								
Male	53 (79.1%)	14 (20.9%)	46 (68.7%)	21 (31.3%)	15 (22.4%)	52 (77.6%)	37(55.2%)	30 (44.8%)
Female	172 (77.5%)	50 (22.5%)	181 (81.5%)	41(18.5%)	186 (88.8%)	36 (16.2%)	105 (47.3%)	117 (52.7%)
	$\chi2$ =0.079 (df)	*P*>0.779	$\chi2$ =.079[a](df)	*P*> 0.779	$\chi2$ =1.349[a] (df)	*P*> 0.245	$\chi2$ =1.294[a](df)	*P*> 0.255
Age								
20	6(60%)	4 (40%)	6 (60%)	4 (40%)	8 (80%)	2 (20%)	4 (40%)	6(60%)
years21-30	16 (88.9%)	2 (11.1%)	12 (66.7%)	6 (33.3%)	12 (66.7%)	6 (33.3%)	8(44.4%)	10 (55.6%)
31-40	38 (80.9%)	9 (19.1%)	36 (76.6%)	11(23.4%)	36 (76.6%)	11(23.4%)	21(44.7%)	26 (55.3%)
41-50	80 (72.7%)	30 (27.3%)	89(80.8%)	21(19.2%)	99 (90%)	11 (10%)	59(53.6%)	51 (46.4%)
>50	85 (81.7%)	1 9(18.3%)	84 (78.5%)	20(21.5%)	83 (79.8%)	21 (20.2%)	50(48.1%)	54 (51.9%)
	$\chi2$ =5.948 (df). *P*>0.203		$\chi2$ = 4.324[a] (df) *P*>0.364		$\chi2$ = 9.047 (df) *P*> 0.006		$\chi2$ =1.804[a] (df) *P*>0.772	
Marital Status								
Single	30(90.9%)	3(9.1%)	23(69.7%)	1030.3%	25(75.8%)	8(24.2%)	17(51.5%)	16(48.5%)
Married	60(74.1%)	21(25.9%)	63(77.8%)	18(22.2%)	64(79%)	17(21%)	40(49.4%	41(50.6%)
Cohabiting	34(81.0%)	8(19.0%)	28(66.7%)	14(33.3%)	34(81%)	8(19%)	16(38.1%)	26(61.9%)
Separated	15(83.35)	3(16.7%)	13(86.7%)	5(27.8%)	15(83.3%)	3(16.7%)	12(66.7%)	6(33.3%)
Divorced	13(86.7%)	2(13.3%)	13(86.7%)	2(13.3%)	12(80%)	3(16.7%)	6(40.0%)	9(60%)
Widowed	73(73%)	27(27%)	87(87%)	13(13%)	88(88%)	12(12%)	51(51%))	49(49%)
	$\chi2$ = 6.525[a] (df) *P*>0.259		$\chi2$ = 10.335[a] (df) *P*>0.066		$\chi2$ = 3.930[a] (df) Sig.0.560		$\chi2$ = 4.979[a] (df)	*P*>0.259
Education								
No formal	119(76.8%)	36(23.2%)	122(78.7%)	33(21.3%)	132(85.2%)	23(14.8%)	73(47.1%)	82(52.9%)
Primary	33(70.2%)	14(29.8%)	39(83%)	8(17%)	41(87.2%)	6(12.8%)	24 (51.1%)	23(48.9%
Secondary	67(83.8%)	13(16.%)	61(76.3%)	19(23.8%)	60(75%)	20(25%)	43(53.8%)	37(46.3%)
Tertiary	6 (85.7%)	1(14.3%)	5(71.4%)	2 (28.6%)	5(71.4%)	2(28%)	2(28.6%)	5 (71.4%)
Total	225(77.9%)	64(22.1%)	227(78.5%)	62(21.5%)	238(82.4%)	51(7.6%)	142(49.1%)	14750.9%)
	77.9%	22.1%	78.5%	21.5%	82.4%	17.6%	49.1%	50.9%
	$\chi2$=3.560[a](df) *P*>0.313		$\chi2$=1.011[a](df)*P*>0.799		$\chi2$=5.163[a](df) *P*>0.169		$\chi2$ =2.194[a] (df)	*P*>0.533
Health Status								
With illness	160(81.2%)	37(18.8%)	151(76.6%)	46(23.4%)	159(80.7%)	38(19.3%)	91(46.2%)	106(53.8%)
Without illness	65(70.7%)	27(29.3%)	76(82.6%)	16(17.4%)	79(85.9%)	13(14.1%)	51(55.4%)	41(44.6%)
Total	225(77.9%)	64(22.1%)	227(77.9%)	62(21.1%)	238(82.4%)	51(17.6%)	142(49.1%)	147(50.9%)
	$\chi2$ = 4.061[a] (df) *P*> 0.044		$\chi2$ = 1.322[a] (df) *P*>0.250		$\chi2$ =1.148[a] (df) *P*>0.284		$\chi2$ = 2.143[a] (df)	*P*>0.143

Source: Primary data

df = degrees of freedom $\chi2$ = Chi-Square *P* value = level of Significance (2-sided)

Table 4.11: Analysis of Overall Quality of life by selected Socio-demographic characteristics.

Overall QoL by Socio-demographic characteristics				
Character	Poor QOL	Good QOL	$\chi 2$ (df)	*P*- value
Gender				
Male	52 (77.6%)	(22.4%)		
	196 (88.3%)	26 (11.7%)		
Female	248 (85.8%)	41(14.2%)	4.819[a] (1)	0.028
Total				
Age				
20 years	7 (70%)	3 (30%)		
21-30	14 (77.8%)	4 (22.2%)		
31-40	37 (78.7%)	10 (21.3%)		
41-50	98 (89.1%)	12 (10.9%)		
>50	92 (88.5%)	12 (11.5%)		
Total	248	41	6.519[a] (4)	0.164
Level of Education				
No formal educ.	134 (86.5%)	21 (13.5%)		
Primary educ.	68 (85%)	12 (15%)		
Secondary educ.	5 (71.4%)	2 (28.6%)		
Tertiary educ.	41(87.2%)	6 (12.8%)		
Total	248	41	1.363[a] (3)	0.714
Marital Status				
Single	26(78.8%)	7(21.2%)		
Married	71 (87.7%)	10 (12.3)		
Cohabiting	32 (76.2)	10 (23.8%)		
Separated	15 (83.35%)	3 (16.7%)		
Divorced	13 (86.7%)	2 (13.3%)		
Widowed	91 (91.0%)	9 (9.0%)		
Total	248	41	7.068[a] (5)	0.216
Health Status				
With illness	166(84.3%)	31(15.7%)		
Without illness	82(89.1%)	10(10.9%)		
Total	248	41	1.220[a] (1)	0.269

According to gender, over ¾ of male (n=53; 79.1%) and female (n=172; 77.5%) participants were dissatisfied with their physical health (see Table 4.10). In the social domain, 81.5% (n=181) of femalessuffered had poor quality of health.Regarding age, the over 50 years category dominated in those dissatisfied with physical health n=85(81.7%), while 80.8% (n=89) of the 41-50 years old participants had low QOL in the psychological domain. As per marital status all the categories had poor QOL in their physical health, while the widowed suffered poor QOL in the psychosocial domain, the

widowed had 90% poor QOL. According to the level of education n=119 (76.8%) were those with no formal education who experienced dissatisfaction with their physical health. In the health status, those with illness had poor QOL in the physical health and psychological domains, n=160 (81.2%) and n=151(76.6%) respectifully.

Table 4:11 gives the overall results which demonstrate that female n=196 (88.3%) as well as men n=52 (77.6%) had poor QOL The age category of 41 to above 50 years suffered lower QOL n=98(88.5%) as compared to other categories. In the level of education those with tertiary education suffered more poor QOL n=41(87.2%) as well as those with no formal education QOL n=134(86.5%). In the marital status category, the widowed dominated in those that had poor QOL n=91(91%) followed by married n=71(87.7%), divorced n=13 (86.7%), separated n=15(83.35%) in that order. Those that had poor health status (illness) had n=166(84.3%) representing those with poor QOL. These results indicate that demographics generally affect the QOL among persons on HAART in the selected public facilities in Busia County.

4.6.5Mean QoL domain for person on HAART with and without PN symptoms (n=289)

The current study sought to establish the significant mean differences of quality of life (physical, psychological, social and environmental) domains for person on HAART with and without PN symptoms using independent sample t-test of participants.

Table 4.12 shows the mean values of the QoL domain for the persons on HAART with and without PN symptoms. The table presents the mean values of QoL domain for person on HAART with and without PN symptoms.

Table 4.12: Mean values of QoL domain for person on HAART with and without PN symptoms (n=289)

Quality of life Domain	HAART with PN symptom Mean	HAART without PN symptom Mean	P value.
Physical health	13.72	12.72	.0017
Psychological health	15.82	14.82	.0021
Social relationship	14.63	13.63	.0028
Environment	13.67	12.67	.0032

*Significant at *P*< 0.05

The results in Table 4.12 indicate that QoL in persons on HAART with PN showed significantly higher mean scores in the physical health (13.72; p<0.0017) and psychological (15.82; p<0.0021) domains. This implies that physical health and psychological health have significant impact on quality of life for person on HAART. Social relationship (14.63; p<0.0028) and environment (13.67; p<0.0032) plays moderate significant role on quality of life (QoL) in person on HAART. Evaluation of QoL mean scores showed that the physical domain can be perceived as the intermediate level (mean=13.72) and the psychological domain as high level (15.82) among patients with HAART.

Table 4.13: Regression for demographic characteristics (n=289) and Quality of life scores (Goodness of fit

Goodness-of- fit

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.298[a]	.927	.859	.897	.089	6.908	4	284	.000

a. Predictors: (Constant), Illness, Education, Age, Gender

Overall significance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	22.242	4	5.560	6.908	.000[b]
	Residual	228.589	284	.805		
	Total	250.830	288			

a. Dependent Variable: Quality of life (QoL) domains

b. Predictors: (Constant), Illness, Education, Age, Gender

Individual significance

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
		B	Std. Error	Beta	T	Sig.	Lower Bound	Upper Bound
1	(Constant)	2.678	.260		10.290	.000	2.166	3.191
	Gender	.186	.127	.084	1.456	.003	.065	.436
	Age	.003	.005	.041	.732	.001	.006	.012
	Education	.135	.075	.104	1.799	.005	.283	.013
	Marital status	.011	.002	.062	.732	.001	.023	.012
	Illness	.497	.114	.249	4.378	.000	.274	.721

a. Dependent Variable: Quality of life (QoL) domains

Table 4.13 indicate that there was statistically significant influence on quality of life (QoL) domain and demographic characteristics on person on HAART as they accounted for 85.9% of the variation in (R^2=.859). Further the overall model also reveals a

statistically significant relationship between quality of life (QoL) domain and demographic characteristics of person on HAART (F=6.908, p-value=.000).

From the analysis on Table 4.13, illness (t=4.378; p-value =0.000) had most significant impact on the quality of life on person on HAART. In addition, allBeta coefficients for quality of life (QoL) domain were positive and statistically significant. This implies that the demographic characteristics influence the quality of life (QoL) domain for persons on HAART attending Busia County, Comprehensive Care Clinics (CCCs).

Here Goodness-of-Fit is used to check how closely observed data mirrors expected data. This helps to determine, if categorical variables are related or if random samples are from the same distribution. Here degrees of freedom are the number of values obtained from calculation of a statistic that are free to vary. The *F*-test is used to compare the factors of the total deviation for instance in this study single-factor ANOVA was used to check statistical significance by comparing the F test statistic as shown in the tables, whereas the sum of squared deviations is used as unscaled or unadjusted measure of dispersion or variability. In this case it was important to check the variability of the demographic characteristics on Quality of Life. Linear regression helped to establish linear relationship between the independent (demographic characteristics) and dependent variables (Quality of Life scores).

Table 4.14: Relationship between Disability core-activities domain and health relate QoL

		Mobility	Self-care	Usual-Activity	Pain/Discomfort
Physical Health	Pearson correlation	0.745	0.567	0.736	0.698
	Sig(2-tailed)	0.00	0.00	0.00	0.00
	N	289	289	289	289
Psychological Health	Pearson correlation	0.552	0.785	0.751	0.737
	Sig(2-tailed)	0.00	0.00	0.00	0.00
	N	289	289	289	289
Social-Relationship	Pearson correlation	0.713	0.803	0.817	0.570
	Sig(2-tailed)	0.00	0.00	0.00	0.00
	N	289	289	289	289
Environment	Pearson correlation	0.765	0.707	0.630	0.520
	Sig(2-tailed)	0.00	0.00	0.00	0.00
	N	289	289	289	289

** Correlation is significant at the 0.01 level (2-tailed);

* Correlation is significant at the 0.05 level (2-tailed).

Note: $r<0.5$ Weak; $r\leq0.5$-0.6 Moderated; $r\geq7$-9 Strong

According to Table 4.14 there was strong and positive relationship (r=0.745, p-value=.000) between physical health and mobility. Similarly there was strong and positive relationship (r=0.736, p-value=.000) between physical health and usual-activity. Though physical health and self-care had moderate and positive relationship (r=0.567, p-value=.000). Likewise there was moderate and positive relationship (r=0.698, p-value=.000) between the physical health and pain/discomfort. This can be argued that physical health significantly influence mobility, usual activity and pain/discomfort core-activities in persons on HAART-PN. The study further sought to establish the relationship between psychological health and disability core-activity domain. The results indicated there was strong and positive (r=0.785, p-value=.000) relationship between psychosocial health and self-care. Similarly there was weak and positive (r=0.751, p-value=.000) relationship between psychological health and usual-activity. Likewise, there was strong and positive (r=0.737, p-value=.000) relationship between

the psychological health and pain/discomfort. However, psychological health and mobility had moderate and positive (r=0.552, p-value=.000) relationship. This can be argued that psychological health, significantly influence the self-care, usual-activity and pain/discomfort disabilities of persons on HAART-PN. The study also sought to establish the relationship between social relationship and disability core-activity domain. The results indicated there is strong and positive (r=0.713, p-value=.000) relationship between social relationship and mobility of persons on HAART-PN. Similarly, there was strong and positive (r=0.803, p-value=.000) relationship between social relationship and self-care disability. Likewise, social relationship and usual-activity had strong and positive (r=0.817, p-value=.000) relationship. However, there was moderate and positive (r=0.570, p-value=.000) relationship between the social relationship and pain/discomfort disability among persons on HAART-PN. This implies that social relationship of persons on HAART-PN significantly influence disability core-activity domains. The study further sought to establish the relationship of environment and disability core-activity. The result indicated that there was strong and positive relationship (r=0.765, p-value=.000) between environment and mobility. Likewise there was strong and positive (r=0.707, p-value=.000) relationship between the environment and self-care. In addition there was moderate and positive (r=0.630, p-value=.000) relationship between the environment and usual-activity likewise the relationship between environment and pain/discomfort among person on HAART-PN (r=0.520, p-value=.000). From the analysis it can be argued that environment significantly influence the quality of life of persons on HAART-PN.

Table 4.16: Regression of demographic characteristics (n=289) and health related Quality of Life

The overall model (Table 15) reveals a statistically significant relationship between quality of life (QoL) and disability core-activity domains for person on HAART (F=8.238, p-value=.000). In this analysis it was evident that mobility disability (t=1.641; p-value=0.02) had significantly high impact on the quality of life (QoL). All Beta coefficients for peripheral neuropathy domain were found to be positive and statistically significant.

Table 4.15: Goodness-of-fit

Goodness-of-fit

					Change Statistics				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**R Square Change**	**F Change**	**df1**	**df2**	**Sig. F Change**
1	.356	.9874	.975	.946	.127	8.238	5	283	.0023

a. Predictors: (Constant), Disability core-activity domain (mobility, self-care, usual activity and pain/discomfort)

Overall significance

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	36.894	5	7.379	8.238	.002[b]
1	Residual	253.487	283	.896		
	Total	290.381	288			

a. Dependent Variable: Quality of life domains (physical, psychological, social and environment)

b. Predictors: (Constant), Disability core-activity domain (mobility, self-care, usual activity and pain/discomfort)

Individual significance

		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model		B	Std. Error	Beta	T	Sig.	Lower Bound	Upper Bound
	(Constant)	3.264	.282		11.583	.000	2.709	3.819
	Mobility	.228	.139	.096	1.641	.002	.045	.501
1	Self-care	.006	.005	.069	1.231	.019	.004	.016
	Usual-activity	.233	.080	.166	-2.928	.004	.390	.076
	Pain/Discomfort	.046	.031	.087	1.484	.039	.015	.106

a. Dependent Variable: Health related-QoL domains

*Significant at P< 0.05

CHAPTER FIVE

DISCUSSION

5.1 Prevalence of peripheral neuropathy among persons on HAART

The improved survival of persons with HIV/AIDs on HAART has seen an increase in the prevalence of neurological conditions (Mehta, Ahmed, *et al*., 2011; Ferrari, *et al.*, 2006; Wolfe & Barohn, 2002). The results of this study confirm that peripheral neuropathy (PN) is prevalent amongst persons on HAART in Busia County. The high prevalence of PN symptoms (68%) in this study is an indication of a growing sub-population at risk of disability and reduced quality of life. (Colloca *et al*., 2017; Keltner, *et al*., 2012; Biraguma& Rhoda 2012). Ellis, *et al*. (2010) in their study established a 57% (881 of 1539 participants) prevalence rate of HIV-associated sensory neuropathy, which agrees with our current study findings. The unearthing of the prevalence of PN is critical for clinical care, physiotherapy and rehabilitation of persons with HIV on HAART in scarcely resourced settings particularly in Kenya.

This is the first study to report the prevalence, clinical characteristics associated to PN amongst seropositive persons on HAART medication in Busia County that is a resource-limited setting. The high prevalence of 68% PN (Table 4.3) among the participants is comparable to that by Tumusiime et al, (2014) which found 59% PN in Rwanda. Another study by Wadley, Cherry, Price and Kamerman (2011) had similar findings, that is, a 57% (226 of 395) prevalence of PN amongst people on HAART in South Africa. Biraguma and Rhoda in their Rwandan study, (2012) found that 40.5% of participants had PN which again is lower than that of our study. Previous studies have found PN as a common clinical characteristic affecting over 40% of ambulatory seropositive persons (Mbuya, Kwasa, Amayo, Kioy & Bhatt 1996; Nicholas, *et al*., 2007; Smyth, et al., 2007; Choi, *et al*., 2011). However, other studies have established lower prevalence rates of PN such as Skopelitis et al. (2006) in UK and Shurie and Deribew (2010), in an Ethiopian study which reported 36% and 34.5% PN prevalence rates respectively. These low prevalence rates compared to those in the current study could be attributed to the different characteristics of the participants including the measures used to collect data (that is, clinical presentation versus electrophysiological).

Persons on HAART with PN mainly experienced pain, burning sensation or aching followed by numbness, while the most infrequent symptoms were pins and needles. Our study results indicate that symptoms were mild (no debilitating condition) in a large number of the respondents with PN (150 out of 289). In this study, (Table 4.7) pain and illness had a strong positive relationship (r=0.837, p-value=.000). This implies that pain was culturally perceived as illness which had potential to interrupt mobility, social interactions, work/schooling and overall quality of life. Evidence in support of this view shows that HIV-associated neuropathic pain is common amongst persons living with HIV (Keltner *et al*., 2012; Wallace, et.al., 2007) and is associated with pain catastrophizing and poor adherence to prescribed medication (Lucey *et al*., 2011). Moreover, it is related to poor outcomes and problematic treatment choices and decreased quality of life (Keltner *et al*, 2012; Ellis, *et al*., 2010) partly due to inappropriate classification, increased drug prescriptions (Attal & Bouhassira, 2015; Wolfe & Barohn, 2002) and visits to physicians as well as the illness from the pain itself and the aggravating condition (Colloca *et al*., 2017). Individuals usually feel a combination of symptoms, such as electric-like and burning sensations and pain from trivial (non-noxious) stimulation such as light touch (Colloca *et al*., 2017).

Further, clinical expression of neuropathic pain results in impairment of inhibitory modulation systems, anxiety, and depression (Colloca *et al*., 2017; Malvar *et al*., 2015; Keltner *et al*., 2012) which have been associated with sleep problems (Colloca *et al*., 2017; Sandoval, Runft & Roddey, 2010) and opioid use disorders (Malvar *et al*., 2015). According to Malvar *et al*. (2015) factors such as opioid use disorder, older age, being female, current and past HAAART treatment as well lack of HIV suppression predict neuropathic pain (Malvar *et al*., 2015). This implies that neuropathic pain mechanism and its accompanying complications are different from inflammatory pain caused by conditions such as rheumatoid arthritis and therefore its treatment approaches and choices (Keltner *et al*., 2012).

This notwithstanding, our findings are different from those of Konchalard and Wangphonpattanasiri (2007) who established that paraesthesia was the dominant symptom of all clinical characteristics of neuropathy related to HIV. It has been suggested that pain and paraesthesia may be early indicators of the disease, while

numbness becomes apparent as the disease advances. Severity of PN in persons on HAART can range from mild discomfort to an incapacitating disorder, causing the individual difficulty in walking or even in standing from sitting (Schifitto, et al., 2002; Keltner, *et al*., 2012). Many persons with mild PN do not suffer any symptoms, although severe symptoms mostly occur in persons with advanced immunosuppression (Simpson & Cikurel, 2006). The severe symptoms, ageing and other co morbidities amongst persons using HAART increase the risk of reduced physical functioning and disability which impacts multiple aspects of daily living in various ways (Biraguma & Rhoda 2012; Mehta, et al., 2010; Cade, Peralta & Keyser 2004).

Management of symptoms/impairments (such as neuropathic pain) using splints (Sandoval, Runft & Roddey, 2010) and physiotherapist-supervised exercise has shown promising outcomes (Tumusiime *et al*, 2019; Taylor, Dodd, Shields & Bruder, 2007). This has potential to influence deployment of physiotherapists and other rehabilitation professions in universal healthcare (UHC) and practice where exercise becomes a key strategy to prevent disability and activity limitation.

5.2 Prevalence of disability among persons on HAART

While few disability-related research studies have been conducted in Kenya, the Kenya National Bureau of Statistics (formally known as the Central Bureau of Statistics) has been collecting data in Censuses from 1948 (Odhiambo & Ndilinge, 2005). The WG/UNICEF questions enquire about the level of difficulty in performing activities in each domain, such as mobility, self-care and pain /discomfort. Therefore, the data generated in this current study is unique, in the sense that it covered the breadth of disabilities, which previous surveys have minimally captured, such as mobility, self-care, usual-activity and pain/discomfort disabilities. The data already generated provides the opportunity to study the different disabilities and their impact on persons on HAART with peripheral neuropathy.

5.2.1 Prevalence of mild-to-severe disability by activity domains

The current study revealed (Table 4.6) that mobility n=79(52.7%) was the highest and most prevalent disability followed by self-care n=32(50.0%), usual activity

n=14(31.1%), and pain/discomfort n=9(30.0%) The rate for mobility disability is comparable to that reported in a Botswana study (Eide & Mmatli, 2016).

Similarly, in a study findings using a definition of disability that included impairment, activity limitations and social participation restriction, the National Health Interview Survey, USA, 2010-2011 reported mobility (walking/climbing) problems at 45% prevalence (CDC, 2013). However, the current study findingsare different from that of Courtney-Long et al. (2015), which reported low prevalence rates of mobility (13%) disability among US citizens. Although not significant, the differences observed in the estimated prevalence of mobility disability the CDC (2013) and that in the current study, may only be explained by the differences in the clinical characteristics of the two samples, in which the USA one used older individuals (>60 years old) while the Kenyan sample were persons aged 20 to 68 years old and on HAART. This implies that some variations in the distribution of disability prevalence exist between countries, and so should policies targeting Persons with Disabilities.

5.2.2 Mobility Disability

In the current study (Table 4.6), mobility disability (mild-n=79; 52.70%) was the most prevalent disability among persons on HAART. As per gender characteristics female scored 54.05; age (31-40) 63.64%; educational level no formal school. Prevalence rate of mobility disability among persons on HAART was similar to a study conducted by Eide and Loeb (2003), which reported a 45% prevalence of mobility disability, in the living conditions of persons with activity limitations study in Zimbabwe, but also shows concurrence with those of previous studies in other countries. Zambia and Malawi national surveys on the living conditions of persons with activity limitations indicate that the prevalence of mobility disability was 42% and 43% respectively and the highest compared to other activity domains-related disabilities (Matheri *et al.,* 2017). Previous studies conducted in Kenya revealed that injuries sustained in road traffic accidents involving passengers, pedestrians, cyclists and motorcyclists (Bachani et al., 2012; Odero, Khayesi & Heda, 2003; Ingstad & Grut, 2007; Odero, Garner & Zwi, 1997), including debilitating medical problems, are major causes of mobility disabilities (Mayou & Bryant, 2003). Mobility disability is also perceived to be a consequence of

diabetic foot ulcers and deformities that are prevalent (Mugambi-Nturibi, Otieno, Kwasa, Oyoo & Acharya, 2009; Nyamu, Otieno, Amayo & McLigeyo, 2003). Persons reporting mobility disability often have limitations in other activites of daily living (ADLs), instrumental ADLs, social integration, and financial independence. Consequently, a significant proportion of PWDs endure low education, unemployment, poverty (Emerson et al., 2011), and more than likely receive cash transfer benefits (Soares, Ribas & Osório, 2010). An important implication for individuals with mobility disability is the inability to access the physical environments. Because of the difficulties of getting around, the persons with mobility disability may have interrupted schooling, or no schooling at all. The person then loses opportunities to learn, receive vocational training, work or socialize (Nussbaum, 2003). This is supported by Emerson et al. (2011), who note that disabled children and adults have greater risk of exposure to poor living and working conditions, associated with poorer health outcomes, including low education, poorer housing, lower income and employment insecurity. Another implication for them is the inability to access the assistance or support that they need, from time to time, including assistive devices for mobility and rehabilitation services, often due to the cost thereof. In addition to the cost of assistive devices, is the high cost of transport, which affects the mobility of such individuals, exacerbating their inability to secure and maintain employment and live independently (Jacobs & Price, 2006). Therefore, it can be argued that mobility disability is strongly associated with physical inactivity and non-communicable diseases such as PN that is prevalent amongst persons on HAART, which are disabling in their own right (Aboderin, 2010). It is anticipated that the data gathered in this current study, therefore, will provide a unique basis for future research, to assess the impact of mobility disability amongst persons on HAART-PN and to establish the level of physical activity participation among persons on HAART-PN with mobility disability.

5.2.3 Self-care Disability

In the current study (Table 4.6), self-care disability was the second most prevalent disability (mild- n=32; 50%) %) among persons on HAART-PN, which is lower than the reported 34.3% prevalence of self-care disability in the living conditions of persons with activity limitations study conducted in Botswana (Eide & Mmatli, 2016). The

current study's estimated prevalence of self-care disability is also higher than the global prevalence in WHO (2011) report, which revealed that at least 8.5% of PWDs experience moderate-to-severe limitations in self-care. Self-care disability is an outcome of the decline of physical functioning that could accelerate the development of secondary conditions leading to further disability (Fried *et al*., 2004). In Kenya, as in other Sub-Saharan countries in the region, spinal cord injuries and conditions such as stroke and rheumatoid arthritis (McGill, 1991) and burns-related deformities of the arms and legs, result in self-care disability (Ingstad & Grut, 2007). Ingstad and Grut (2007) observed that victims of burns often develop deformities of the arms and legs, in both sexes and across all age groups, which limit self-care abilities.

5.2.4 Usual-activity Disability

This current study (Table 4.6) found that usual activity disability was the third most prevalent disability (mild-n=14; 31.1%). The prevalence rate of usual activity disability in the current study is clearly higher than that reported (10.6%) in the USA (Courtney-Long *et al*., 2015). The difference observed in the two studies findings could be a function of the differences in the objectives of the studies. While the current one sought to establish patterns of disability among persons with HIV–related peripheral neuropathy the USA one sought prevalence of disability in the general population. However, inadequate data on prevalence of usual-activity has specific implications including those for the prevention of the development of difficulties, and for the interventions to restore social functioning amongst individuals with usual activity disability. A major implication for individuals with usual activity disability is the difficulty of accessing education, educational progression and the delay in developing adequate social capital. Another implication for individuals with usual activity disability is the difficulty of managing their own affairs and social interactions, namely, the difficulty to make friends, to express their sexuality, to achieve family lives, to earn and manage income (Comas-Herrera et al., 2007).

5.2.5 Pain/discomfort Disabilities

Pain/discomfort (mild-n=9; 30%) disabilities have implications for mobility, social interactions, work and schooling, especially reading. A key implication for persons on

HAART-PN is the difficulty to perform usual-activity such as access to health facilities for clinical treatment (Peters *et al*., 2008; Jacobs & Price, 2005). Another implication is the unavailability and inaccessibility of interventional medical care, unemployment and transportation problems. Based on the 30% prevalence, established by this current study, it is plausible to argue that pain/ discomfort among persons on HAART had a negative impact on their overall quality of life.

5.3Quality of life of persons on HAART

The third aim of the study sought to determine the health-related Quality of life of persons on HAART-PN attending Busia County, Comprehensive Care Clinics (CCCs). To accomplish this objective, quality of life domain such as physical health, psychological health, social relationship and environmental health were assessed. Studies have shown that living with PN causes severe strain among those afflicted, in diverse ways. These include the physical and psychological effects of PN-related symptoms on person on HAART: including, the difficulty of having to adhere to a rigid medication regimen, relationships and sex life, stigma and the fear of dying from the illness (Pierret, 2000). According to Burgoyne and Tan (2008) quality of life is reduces as persons with HIV using HAART live longer. This study demonstrates that QoL in the physical, psychological, social relationship and environmental domains of PLHIV on HAART are affected. Table 4:10 gives the overall results which demonstrate that female suffered more low QOL n=196 (88.3%) as compared to men n=52 (77.6%).

5.3.1 Physical health domain

The physical health domain assesses the impact of the disease on the activities of daily living, dependence on medical substances, a lack of energy and initiative, restricted mobility and the capacity to work (Skevington, 2002). In the present study, there was a strong and positive relationship between the physical health domain and demographic characteristics as well as the core-activity domain. As noted in the literature, research has shown that nearly one-third of persons living with HIV report problems with mobility, limitation in usual activity and pain/ discomfort, Hughes, Jelsma, Maclean, Darder & Tinise, (2004). These problems combined might also have contributed to the large number of subjects who rated the physical domain of Washingtong group long

questionarre with lower scores in the present study. These current study low scores are in agreement with a study that was done in Rutongo and Rulindo that found low QOL in the physical health domain amongst persons with PN compared to those without (Biraguma & Rhoda, 2012).

The physical health domain of QoL deteriorates with HIV progression; in addition, the side effects of HAART may cause as much physical discomfort as the symptoms of the illness, which includes PN, nausea, vomiting, anaemia, headaches, skin rashes, neutropenia, diarrhoea and abdominal discomfort (Liu et al., 2006; Maenza & Flexner, 1998). Furthermore, a factor found to have a significant effect on the physical health domain was the level of education. In this current study, lower scores were seen among subjects who did not attend school compared to those with primary education. These results support the findings of a study by Dos Santos, Junior and Lopes (2007), where lower scores were seen among subjects who did not attend school or only completed middle school education compared to those with higher education (see results in Table 4.12, In gender, male scored n=53(79.1%) dissatisfaction with their physical health while female reported n=172(77.5%).

5.3.2 Psychological domain

The psychological domain assesses the patient's own thoughts about body image and appearance, negative feelings, positive feelings, self-esteem and personal beliefs (Skevington 2002). According to Herrmann et al, (2013), Health-related QoL is known to be affected by psychological distress due to other factors like unemployment, stigma among others. In the current study, there was a strong relationship between psychological domain and demographic characteristics as well as disability in core-activity domain (see results in Table 4.10). Age 41-50 years old years old had poor QOL in the psychological domain n=89 (80.8%) and on the level of education, those with no formal education had n=119 (76.8%) poor QOL in their physical health. It is reasonable to say that marital status significantly influenced the quality of life of persons on HAART-PN.

The fact that the management of persons on HAART-PN in Busia County, Comprehensive Care Clinics (CCCs) includes the provision of psychological support is

an added advantage to improve in this area. In a study conducted by Uwimana and Struthers (2007), 50% of the participants reported having received psychological support which is known to assist the individuals in accepting their illness. When people start accepting their disease, they take control over their lives and exercise self-determination and autonomy (Murphy & Melby 1999). This approach could result in high self-esteem and positive feelings about themselves.

5.3.3 Social domain

The social domain assesses the individual's personal relationships, social support and sexual activity (Skevington 2002). In the present study, there was a strong and positive relationship between social relationships and demographic characteristics as well as disability in core-activity domain (see Table 4.12). The fact that the participants reported that they were experiencing challenges in this area could be as a result of their communities' attitudes towards them. As a predictor of QoL, employment plays a key role and it also empowers individuals to participate in social activities (Worthington & Krentz 2005). Moreover, persons on HAART are still being stigmatized by the communities in which they live in (Herek, Capitano & Widaman, 2002).

In this current study, females had statistically lower in the social domain than men. The current study finding is in agreement with a previous study where women with HAART-PN had lower QoL scores as opposed to men despite having less-advanced disease; and were also more likely to face a chronic disabling condition (Hader, Smith, Moore & Holmberg, 2001; Nirmal, Divya, Dorairaj & Venkateswaran, 2008). Moreover, women often face more severe discrimination than men if they are known to be HIV positive, and are also more likely to sacrifice their own health for the welfare of their family and to postpone treatment. Disclosing their HIV status may also lead to physical abuse by their partners and to loss of economic stability if their partners were to leave them. The finding also agrees with a study done by Pandya, et al, (2005), which demonstrated that persons with HIV and with a neurological condition like PN recorded low QoL though the study did not classify this according to sex.

5.3.4 Environmental domain

In the current study the environmental domain assessed how QoL is influenced by factors such as financial resources, the work environment, accessibility to health and social care, freedom, security and opportunities for participation in leisure activities. The results indicated that there was a strong and positive (r=0.765, p-value=.000) relationship between environment and mobility. Likewise there was a strong and positive (r=0.707, p-value=.000) relationship between the environment and self-care (Table 4.14). From the analysis it can be argued that environment significantly influences the quality of life of persons on HAART-PN.

There was also a strong and positive relationship between environment and demographic characteristic as well as disability core-activity domain. The mean score of the participants in the environmental domain (Table 4.14) of QoL fell into the intermediate level, this is 13.67. This domain had the lowest mean score in the present study. This finding could have resulted from a number of factors, including the geographical setting of the study, the financial status of the participants and a lack of family support. Most of the participants were from rural area in Busia County where the condition of the roads hampers access to health facilities. Although the study sample included only those who attended CCCs, patients could find it difficult to access the clinic due to the condition of the roads. The financial situation of the participants could also have resulted in the low scores reported for this domain. The majority (86.5%) of the participants were farm workers who often do not receive large income from their activities. Uwimana and Struthers (2007) reported that financial support was one of the greatest needs that is similar to the current study findings amongst persons on HAART with PN. In addition, family support and occupation significantly affect the environmental domain of QoL in persons living with HIV (Wig *et al*. 2006). The family is usually the most important component of the immediate environment of the patient (Wig *et al*. 2006). A supportive family could then provide financial support and a sense of safety and security to persons living with HIV, resulting in a better and supportive home environment. Although this is the case, there is extreme poverty in Busia (67%) and it is therefore questionable whether the families who might need support themselves would be able to provide financial support to the family members who are on HAART.

5.4Limitations of the study

Though the current research sought to establish prevalence of peripheral neuropathy among persons on HAART; the commonest disability among persons on HAART-PN and the health-related Quality of life of persons on HAART-PN attending Comprehensive Care Clinics (CCCs) in Busia County, a number of limitations were encountered. Firstly, no medical laboratory investigations for identifying PN were used. The presence of PN was therefore based on self-report albeit using validated tools. Another limitation of this study was that neither the key pointers of the illness progression, such as the CD4 count, viral load, nor data on medication for tuberculosis were assessed. Hence, no association between the progression of the illness, manifestation and severity of PN could be established. Additionally, the study did not look into other risk factors of PN such as diabetes or poor nutrition. With regard to the environmental domain of health-related QoL, it is impossible to know how much of the environmental problems experienced were due to the clinical condition of the participants or due to living in an impoverished area. Lastly, there exist limited local studies on peripheral neuropathy and disability for the purpose of comparison.

5.5 Conclusion

In conclusion, peripheral neuropathy is prevalent amongst persons on HAART in the selected sub county CCCs. This is often characterized by pain, numbness, decreased ankle tendon reflexes and vibration sense of the big toe predominantly. In addition, mobility and self-care were commonest disabilities among persons on HAART with peripheral neuropathy. Regarding health-related quality of life among the participants with PN, physical and psychological domains scored lower than in those without. This implies that PN affects various domains that contribute to QoL.

5.6 Recommendations

The researcher therefore makes the following key recommendations

- Early screening and improvement of access and care in the selected public facilities' CCCs in Busia County to prevent PN among HIV patients on HAART.

- Interventions focused at minimalizing mobility and self-care disabling outcomes.
- Support services to optimize QoL should form part of care for HIV persons.
- Further research to generate baseline evidence on effects of a standard exercise program on clinical symptoms and complications of PN.

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APPENDICES

Appendix I:Information Sheet

Dear Participant,

I, am a postgraduate student doing a MSc degree in the department of Rehabilitative Sciences, School of Medicine at Jomo Kenyatta University of Agriculture and Technology.

*As part of the study I'm expected to conduct research. The title of my research is "*Prevalence of HIV-related Neuropathies, Disability, and the Quality of life of persons on HAART in Busia County, Kenya."Information gathered in this study will be important in planning a holistic approach to promoting access to support services by persons with HIV/AIDS that develop peripheral neuropathies and disabilities. This shall be helpful to persons with peripheral neuropathies/disabilities and their families in Busia county and the country at large.

If you agree to participate in this study I will consult with you to arrange a suitable time and day for the collection of the relevant information. Participation in the study will involve filling some questionnaires taking at least 30 minutes. The information you give will be treated with utmost respect and confidentiality.

This provides you with an opportunity to appreciate and contribute to scientific research that may provide information about peripheral neuropathy, disability experience and quality of life among Persons with HIV/AIDS that could be useful to healthcare workers and policy makers among others.

There is absolutely minimal risk to you for participating in this study. It is expected that you will experience minimal discomfort or stress from the questions asked in the interview. You don't have to respond to every question or provide information you do not want to provide and can withdraw from participating at any time without notice. Referral to a professional counselor in case you suffer unexpected negative experiences will be made.

All participants will be identified using codes and the information kept in secure filling cabinet or safe so as to safeguard their anonymity and all the individuals directly or indirectly referred to in the questionnaires. In the future, as the researcher i will destroy all code lists.

If you have any questions or concerns before or after the study, you may contact me through phone or email given hereunder.

DEPARTMENT OF REHABILITATION

JOMO KENYATTA UNIVERSITY OF AGRICULTURE & TECHNOLOGY

PO BOX *62000 – 00200*

JKUAT ETHICS REVIEW COMMITTEE SECRETARIAT

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Dr. Joseph Mwangi Matheri, PhD (Physiotherapy)

Dr. Daniel Nyamongo Sagwe, PhD (Epidemiology).

Dr. Nassib Tawa, PhD (Physiotherapy).

Appendix II: Consent Form

(Participant aged over 18 years)

I.....agree to participate in the study being conducted by Mr John Njeru Mukoma a post-graduate student doing a Masters degree in the rehabilitative department, School of Medicine, Jomo Kenyatta University of Agriculture and Technology, Kenya. He has informed me that this is a study for his Masters degree in Physiotherapy designed to gather information that will assist in the "The prevalence of peripheral neuropathy, disabibilty and quality of life among persons with HIV/AIDs."

I understand that:

Participation is voluntary and will involve interview taking at least 30 minutes mutually as agreed upon by me and the researcher.

The benefits I may expect from the study are; (a) an appreciation of scientific research and (b) an opportunity to contribute to scientific research that may provide information about peripheral neuropathy, disabilities and quality of life that could be useful to healthcare workers and policy makers among others.

The researcher does not foresee any risks to me participating in this study and it is expected that I will experience minimal discomfort or stress from the questions asked.

I do not have to respond to every question or provide information I do not want to provide and I can withdraw from participating at any time.

Codes identifying participants will be kept in secure filling cabinet or safe so as to safeguard the anonymity of myself and all the individuals directly or indirectly referred to in the questionnaire(s). I understand that in the future the researcher will destroy all code lists.

Only people associated with the study will see my responses. To protect privacy pseudonyms will be assigned for publications and presentations, unless written consent

is provided. My responses will not be associated with my name: instead my name will be converted to a code number when the researcher stores the data.

The researcher will answer any other questions about the research either before or after the research. If I have other questions or concerns I can address them to the researcher by email or phone.

DEPARTMENT OF REHABILITATION

JOMO KENYATTA UNIVERSITY OF AGRICULTURE & TECHNOLOGY

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JKUAT ETHICS REVIEW COMMITTEE SECRETARIAT

P. O. BOX 62000-00200 NAIROBI, KENYA TEL 0675870225 OR EXTN 3209.

CONTACT NUMBERS OF RESEARCHER: JOHN NJERU MUKOMA PHONE: +254 722 602 143; EMAIL: JMUKOSH@YAHOO.COM SIGNATURE: WITNESS:
I agree/decline; to participate in this study. During my participation in this study, i understand i may withdraw from participating at any time

Appendix III:Research tool EQ-5D Healthcare Questionnaire Tool

By placing a tick in one box in each group below, please indicate which statements best describe your own state of health TODAY.

Mobility

- I have no problems in walking about ❑
- I have some problems in walking about ❑
- I am confined to bed ❑

Self-Care

- I have no problems with self-care ❑
- I have some problems washing or dressing myself ❑
- I am unable to wash or dress myself ❑

Usual Activities *(e.g. work, study, housework, family or leisure activities)*

- I have no problems with performing my usual activities ❑
- I have some problems with performing my usual activities ❑
- I am unable to perform my usual activities ❑

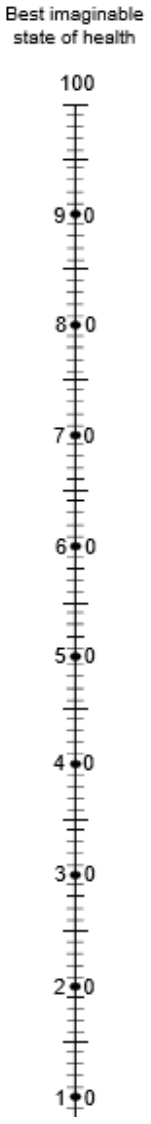
Pain / Discomfort

- I have no pain or discomfort ❑
- I have moderate pain or discomfort ❑

To help people say how good or bad their state of health is, we have drawn a scale (rather like a thermometer) on which the best state you can imagine is marked 100 and the worst state you can imagine is marked 0.

We would like you to indicate on this scale, in your opinion, how good or bad your own health is today. Please do this by drawing a line from the box below to whichever point on the scale indicates how good or bad your state of health is today.

Your own state of health today



Appendix IV: Washingtong group long Questionaire

I.D. number

ABOUT YOU

Before you begin we would like to ask you to answer a few general questions about yourself: by circling the correct answer or by filling in the space provided.

What is your **gender**? Male Female

What is you **date of birth**? _____ / _____ / _____

Day / Month / Year

What is the highest **education** you received?

None at all
Primary school
Secondary school
Tertiary

What is your **marital status**? Single Separated

Married Divorced

Living as married Widowed

Are you currently **ill**? Yes No

If something is wrong with your health what do you think it is?_____Illness / problem

Instructions

This assessment asks how you feel about your quality of life, health, or other areas of your life. **Please answer all the questions.** If you are unsure about which response to give to a question, **please choose the one** that appears most appropriate. This can often be your first response.

Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **in the last two weeks.** For example, thinking about the last two weeks, a question might ask:

	Do you get the kind of support from others that you need?	Not at all 1	Not much 2	Moderately 3	A great deal 4	Completely 5

You should circle the number that best fits how much support you got from others over the last two weeks. So you would circle the number 4 if you got a great deal of support from others as follows.

	Do you get the kind of support from others that you need?	Not at all 1	Not much 2	Moderately 3	A great deal 4	Completely 5

You would circle number 1 if you did not get any of the support that you needed from others in the last two weeks.

Please read each question, assess your feelings, and circle the number on the scale for each question that gives the best answer for you.

		Very poor	Poor	Neither poor nor good	Good	Very good
1(G1)	How would you rate your quality of life?	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
2 (G4)	How satisfied are you with your health?	1	2	3	4	5

The following questions ask about **how much** you have experienced certain things in the last two weeks.

		Not at all	A little	A moderate amount	Very much	An extreme amount
3 (F1.4)	To what extent do you feel that physical pain prevents you from doing what you need to do?	1	2	3	4	5
4(F11.3)	How much do you need any medical treatment to function in your daily life?	1	2	3	4	5
5(F4.1)	How much do you enjoy life?	1	2	3	4	5
6(F24.2)	To what extent do you feel your life to be meaningful?	1	2	3	4	5

		Not at all	A little	A moderate amount	Very much	Extremely
7(F5.3)	How well are you able to concentrate?	1	2	3	4	5
8 (F16.1)	How safe do you feel in your daily life?	1	2	3	4	5
9 (F22.1)	How healthy is your physical environment?	1	2	3	4	5

The following questions ask about **how completely** you experience or were able to do certain things in the last two weeks.

		Not at all	A little	Moderately	Mostly	Completely
10 (F2.1)	Do you have enough energy for everyday life?	1	2	3	4	5
11 (F7.1)	Are you able to accept your bodily appearance?	1	2	3	4	5
12 (F18.1)	Have you enough money to meet your needs?	1	2	3	4	5
13 (F20.1)	How available to you is the information that you need in your day-to-day life?	1	2	3	4	5
14 (F21.1)	To what extent do you have the opportunity for leisure activities?	1	2	3	4	5

		Very poor	Poor	Neither	Good	Very good

				poor nor good		
15 (F9.1)	How well are you able to get around?	1	2	3	4	5

The following questions ask you to say how **good or satisfied** you have felt about various aspects of your life over the last two weeks.

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
16 (F3.3)	How satisfied are you with your sleep?	1	2	3	4	5
17 (F10.3)	How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
18(F12.4)	How satisfied are you with your capacity for work?	1	2	3	4	5
19 (F6.3)	How satisfied are you with yourself?	1	2	3	4	5
20(F13.3)	How satisfied are you with your personal relationships?	1	2	3	4	5
21(F15.3)	How satisfied are you with your sex life?	1	2	3	4	5
22(F14.4)	How satisfied are you with the support you get from your friends?	1	2	3	4	5
23(F17.3)	How satisfied are you with the conditions of your living place?	1	2	3	4	5
24(F19.3)	How satisfied are you with your access to health services?	1	2	3	4	5
25(F23.3)	How satisfied are you with your transport?	1	2	3	4	5

The following question refers to **how often** you have felt or experienced certain things in the last two weeks.

		Never	Seldom	Quite often	Very often	Always
26 (F8.1)	How often do you have negative feelings such as blue mood, despair, anxiety, depression?	1	2	3	4	5

Did someone help you to fill out this form?.....

How long did it take to fill this form out?.....

Do you have any comments about the assessment?

.....

.....

THANK YOU FOR YOUR HELP

Appendix V: The CHANT HIV-Associated Peripheral Neuropathy Diagnostic Tool

Does the patient have neuropathy?		
Subjective Measures (Interview)	Right	Left
Ask if the patient has foot pain 0 =nofootpain 1 =has footpain	A	B
Ask if the patient has foot numbness 0=no foot numbness 1 =has foot numbness	C	D
ObjectiveMeasures (Examination)	Right	Left
Vibration Test at Great Toe 0 =normal 1 =diminished/absent		
Ankle Reflex 0 =normal 1 =diminished/absent		
Total Scoreon Each Side	I=A+C+E +G	J=B+D+F+H
Total Score Both Sides	Total=I+J	
Please see Panel-I to for detailed instructions.		

The CHANT peripheral neuropathy diagnostic tool.A combination of four selected highly performingclinicalitemsi.e.twointerview-based and two objective tests of neurological examination as effect indicators rendered the CHANT to have high diagnostic accuracy yield. The tool was designed to be user-friendly and easy to score into dichotomous scores of either ‘0’or‘1’.Detailed instructions on how to use this tool is provided inPanel I.Easy-to-use rubric for cutoff scores are explained.

Appendix VI: KaratasiYaHabari

Kwa mhusika,

Mimi ni mwanafunzi wa Shahada ya uzamili katika idara ya ukarabati wa kisayansi, shule ya dawa za kisasa, katika chuo cha Jomo Kenyatta University of Agriculture and Technology.

Kama sehemu ya masomo yangu natarajiwa kufanya utafiti. Kichwa cha utafiti wangu ni“Asilimia ya watu walio na shinda za mishipa za fahamu, ulemavu, na Kiwango cha maisha ya watu wanaotumia madawa ya kupunguza makali ya ukimwi katika kauti ya Busia, Kenya”. Habari nitayopata katika utafiti huu itakuwa ya maana kikamilifu katika upangaji wa jinsi watu walio na virusi vya ukimwi walio na shinda na misuli ya fahamu na ulemavu watapata huduma. Hii huduma itakuwa ya manufaa kwa watu walio na shinda za misuli ya fahamu na ulemavu na pia familia zao katika kaunti ya Busia.

Ikiwa utakubali kuhusika katika utafiti huu nitakushirikishirisha katika siku na wakati unaofaa ili kupata habari inayotakikana. Kuhusika katika utafiti huu utahusu kujasa fomu za maswali na tutachukua kama dakika thelathini.Habari utakayopeana itawekwa kwanjia ya heshima na siri kuu.

Kazi hii itakupa nafasi ya kupenda na kushiriki katika utafiti wa kisayansi ambayo itatoa habari juu ya shinda za mishipa za fahamu, ulemavu na hali ya kimaisha ya watu walio na virusi na ukimwi ambayo itakuwa ya maana kwa wafanyi kazi wa idara ya afya, waunda sera kati yaw engine.

Kuna hatari ndogo sana katika wewe kushiriki katika utafiti huu. Inatarajiwa kwamba unaweza kujihisi mchovu kutokana na maswali yatakayoulizwa. Kumbuka sio lazima ujibu kila swali ama upeane habari ambayo haki kupena, na pia unaweza kutoka katika kuhusika katika utafiti huu wakati wowote na bila kupeana notisi. Ikiwa utapata kujihisi vibaya kutokana na wakati wa kujibu maswali, tutakutuma kwa mshauri ambaye atakusaidia.

Wahusika wote watatambulishwa na nambali maalumu na habari yote itakayopeanwa itawekwa na kufungiwa kwa kabati ili kuweka siri ya wahusika wa moja kwa moja ama

kwa njia nyingine. Baadaye, mimi kama mtafiti nitaharibu nambari maalumu na habari zote.

Ikiwa una swali lolote au jambo linguine kabla ya utafiti huu unaweza kuwasiliana na kupitia nambali ya simu au barua pepe iliyo hapa chini.

DEPARTMENT OF REHABILITATION

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Appendix VII.:Fomu ya Idhini (Mhusika wa miaka kumi na nane na zaidi)

Mimi kwa uhuru na kwa hiari nakubali kuhusika katika utafiti huu unaofanywa na Bwana John Njeru Mukoma mwanafunzi wa shahada ya uzamili katika idara ya ukarabati wa kisayansi, shule ya dawa za kisasa, Jomo Kenyatta University of Agriculture and Technology, Kenya. Amenieleza kwamba utafiti huu wa shahada ya uzamili ya Physiotherapy imetengenezwa kuchukua habari ambayo itasaidia katika, "Asilimia ya watu walio na shinda za mishipa za fahamu, ulemavu, na Kiwango cha maisha ya watu wanaotumia madawa ya kupunguza makali ya ukimwi".

Ninaelewa kwamba:

Kuhusika ni jambo la kujitolea na litahusiza muda wa dakika thelathini kulingana na vile tumeelewana na mwenye kufanya utafiti.

Mafanikio ninayotarajia kutoka kwa utafiti huu ni; (a) Kupendezwa na utafiti wa kisayansi na (b) nafasi ya kuchangia utafiti wa kisayansi ambayo itatoa habari kuhusu "Asilimia ya watu walio na shinda za mishipa za fahamu, ulemavu, na Kiwango cha maisha ya watu wanaotumia madawa ya kupunguza makali ya ukimwi" itakayokuwa ya maana kwa wafanyi kazi wa idara ya afya, waunda sera kati ya wengine.

Mwenye kufanya utafiti haoni uwezekano wa hatari yoyote katika kuhusika na utafitu huu na inatarajiwa kwamba naweza kupata madhara madogo kama uchovu kutokana na mswali.

Sihitaji kujibu mswali yote au kupeana habari ambayo sitaki kupeanana pia kwamba ninaweza kutoka katika kuhusika wakati wowote.

Nambari maalum za siri zinazotumbulisha wahusika zitawekwa vizuri kwa kabati iliyofungwaili kuficha kujulikana kwa wahusika au watu wengine waliohuzishwa kwa maswali ya utafiti huu. Ninaelewa kuwa baadaye mutafiti ataharibu nambari hizi maalum za siri zote.

Watu pekee wanaohusika na utafiti huu wataruhusiwa kuona majibu yangu kwa maswali nitakayojibu. Kuficha siri majina bandia yatatumika hasa wakati wa kuchapisha ama

kuwakilisha ripoti hii, isipokuwa kwa ruhusa ya moja kwa moja kutoka wahusika. Majibu yangu hayatahuzishwa na jina langu, lakini jina langu litabandilishwa kama nambari maalumu ya siri wakati mtafiti anapohifadhi ripoti ya utafiti.

Mtafiti atajibu maswali yoyote kabla au baada ya utafiti.Ikiwa mhusika anayo maswali yoyote, pia naweza kuyajibu kupitia simu au barua pepe iliyonakiliwa hapa chini.

Jina la mshiriki ..... Sahihi ya mshiriki.....

Shahidi ....." Tarehe .....

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Appendix VIII: Research tool EQ – 5D Healthcare Questionnaire Tool

Kwa kuweka alamaya mkwaju kwenye mabano uliyopewa katika kila kikundi hapo chini, tafadhali onyesha ni maelezo yapi bora yanayoashiria hali yako ya kiafya LEO

Kutembea

Sina shida na kutembea hapa na pale [ ]

Nina shida na kutembea hapa na pale [ ]

Nimekwama kitandani [ ]

Kujitunza

Sina shida na kujitunza [ ]

Nina shida na kuosha au kuvaa nguo [ ]

Siwezi kuosha au kuvaa nguo [ ]

Shughulizakawaida (k.m kazi, masomo, kazi ya nyumba, familia au shughuli za kujivinjari)

Sina shida na kutekeleza shughuli zangu za kawaida [ ]

Nina shida na kutekeleza shughuli zangu za kawaida [ ]

Siwezi kutekeleza shughuli zangu za kawaida [ ]

Uchungu au kutojihisivizuri

Sina uchungu wala kutojihisi vizuri [ ]

Nina uchungu kiasi na kutojihisi vizuri [ ]

Kuwasaidia watu kusema iwapo hali yao ya afya iko katika hali njema au mbaya

Hali bora sana ya kiafya tumechora mzani (katika mfano wa kipimajoto)

ambapo hali njema zaidi unayoweza kuwazia kuwa imeandikwa 100 na hali mbaya Zaidi unayoweza kuwazia imeandikwa 0

Tungependa uweze kuonyesha kwenye huu mzani, katika maoni yako, afya yako iko katika hali gani leo, ni bora au mbaya kiasi gani.tafadhali fanya hivi kwa kuchora mstari kutoka kwenye jedwali lililopo hapo chini kuelekea kwenye kipimajoto kuonyesha ubora au ubovu wa afya yako.

Hali yako yakiafya leo

Appendix IX: Washingtong group long Questionarre

Nambari ya kitambulisho

KUKUHUSU

Kabla uanze, tungependa kukuuliza ujibu maswali machache ya kijumla kukuhusu wewe mwenyewe: kwa kuzungusha mduara kwenye jibu sahihi au kwa kujaza kwenye nafasi uliyopewa

Jinsiayakonigani	kiume [ ]	kike [ ]
Tarehe yako yakuzaliwa	_____ /_____ / _____	
	Siku	mwezi mwaka
Kiwango cha juu cha masomo ulichofikia	sikusoma	
	Shule ya msingi	
	Shule ya upili	
	Chuo kikuu/ chuo anuwai	
Hali yako ya ndoa	sijaolewa	tuliwachana
	Nimeolewa	nilitaliki
	Naishi kama mwana ndoa	mjane
Je wewe ni mgonjwa hivi sasa?	Ndiyo [ ]	la [ ]

Iwapo unashida na hali yako ya kiafya, unadhani tatizo lako ni lipi? _____ ugonjwa/shida

MAAGIZO

Haya maswali ni ya kutaka kujua jinsi unavyohisi kuhusu ubora wa maisha yako, afya yako na sehemu nyingine za maisha yako. Tafadhali jibu maswali yote. Iwapo huna uhakika wa jibu la kupeana, tafadhali chagua jibu ambalo linaonekana bora zaidi. Mara nyingi jibu lako la kwanza ndilo huchukuliwa kama jibu bora Zaidi.

Tafadhali zingatia viwango vyako, matumaini, yale unayopenda na unayojihusisha nayo, tunakusihi uwazie kuhusu maisha yako katika majuma mawili yaliyopita. Kwa mfano, ukiwazia kuhusu majuma mawili yaliyopita, waweza kuulizwa hivi:

	Je unapata aina ya usaidizi unaohitaji kutoka kwa wengine?	Sipati kabisa 1	Sipati sana 2	Napata kiasi 3	Napata sana 4	Napata kikamilifu 5

Ni lazima uzungushe mduara nambari inayoonyesha kiwango cha usaidizi uliopokea kutoka kwa wengine kwa muda wa majuma mawili yaliyopita. Hivyo basi ungezungusha mduara kwenye nambari 4 iwapo ulipata usaidizi sana kutoka kwa wengine kama ifuatavyo

	Je unapata aina ya usaidizi unaohitaji kutoka kwa wengine?	Sipati kabisa 1	Sipati sana 2	Napata kiasi 3	Napata sana 4	Napata kikamilifu 5

Ungezungusha mduara kwenye nambari 1 iwapo hukupata usaidizi wowote uliohitaji kutoka kwa wengine kwa majuma mawili yaliyopita

Tafadhali soma kilaswali, ujitathmini hisia zako kisha uzungushe mduara kwenye nambari katika vipimo kwa kila swali linalokupa jibu bora Zaidi

		Mabaya sana	mabaya	Siyo mabaya wala mazuri	mazuri	Mazuri sana
1(G1)	Unaonaje ubora wa maisha yako?	1	2	3	4	5

		Sijaridhika kabisa	Sijaridhika	Siyo mbaya wala nzuri	nimeridhika	Nimeridhika sana
2(G4)	Umeridhika kwa kiwango kipi na afya yako?	1	2	3	4	5

Maswali yafuatayo yanauliza ni kwa kiwango kipi hali au baadhi ya vitu ulivyopitia kwa muda wa majuma mawili yaliyopita

		Hapana kabisa	Kidogo sana	kwa Kiwango kidogo	sana	Kwa kiwango kikubwa
3(F1.4)	Kwa kiwango kipi unahisi ya kwamba uchungu wa mwili hukuzuia kufanya unachotaka kufanya	1	2	3	4	5
4(F11.3)	Unahitaji matibabu	1	2	3	4	5

	kiasi gani ili uweze kufanya kazi sawasawa katika maisha yako ya kila siku					
5(F4.1)	Unafurahia maisha kiasi gani?	1	2	3	4	5
6(F24.2)	Kwa kiwango kipi unahisi ya kuwa maisha yako yana umuhimu mkubwa?	1	2	3	4	5
		Hapana kabisa	Kidogo sana	Kwa kiwango kidogo	sana	Kwa kiwango kikubwa
7(F5.3)	Unaweza kumakinika kwa kiwango kipi?	1	2	3	4	5
8(F16.1)	Unajihisi salama kiasi gani katika maisha yako ya kila siku?	1	2	3	4	5
9(F22.1)	Mazingira yako ni safi kiasi gani?	1	2	3	4	5

Maswali yafuatayo yanahusu jinsi ulivyoweza kupitia au kutenda vitu Fulani kikamilifu katika muda wa majuma mawili yaliyopita

		hapana kabisa	Kidogo sana	kiasi	Mara nyingi	Kikamilifu
10(F2.1)	Je, unazo nguvu za kutosha kwa maisha ya kila siku?	1	2	3	4	5

11(F7.1)	Unaweza kukubali umbo la mwili wako?	1	2	3	4	5
12(F18.1)	Una pesa za kutosha kukidhi mahitaji yako?	1	2	3	4	5
13(F20.1)	Je Wewe hupokea habari unazozihitaji katika maisha yako ya kila siku?	1	2	3	4	5
14(F21.1)	Je wewe hupata fursa za kujivinjari kwa kiwango kipi?	1	2	3	4	5

		Mbaya sana	mbaya	Siyo mbaya wala mzuri	mzuri	Mzuri sana
15(F9.1)	Uwezo wako wa kutembea kutoka sehemu moja hadi nyingine ni upi?	1	2	3	4	5

Maswali yafuatayo ni ya kutaka kujua ni jinsi gani ulivyoridhika au kujihisi vyema kutokana na matukio fulani katika maisha yako kwa muda wa majuma mawlil yaliyopita

		Sijaridhika kabisa	sijaridhika	Siyo mbaya wala nzuri	nimeridhika	Nimeridhika sana
16(F3.3)	Umeridhika vipi na usingizi wako?	1	2	3	4	5

17(F10.3)	Umeridhika vipi na uwezo wako wa kufanya shughuli zako za kila siku za maisha?	1	2	3	4	5
18(F12.4)	Umeridhika kwa kiasi kipi na uwezo wako kwa ajili ya kazi yako?	1	2	3	4	5
19(F6.3)	Umeridhika kiasi gani na jinsi ulivyo?	1	2	3	4	5
20(F13.3)	Umeridhika kiasi kipi na uhusiano wako binafsi?	1	2	3	4	5
21(F15.3)	Umeridhika kiasi gani na maisha yako ya ngono?	1	2	3	4	5
22(F14.4)	Umeridhika kiasi kipi na usaidizi unaopata kutoka kwa marafiki?	1	2	3	4	5
23(F17.3)	Umeridhika namna gani na hali ya mahali unapoishi?	1	2	3	4	5
24(F19.3)	Umeridhika namna gani na huduma za afya zilizopo?	1	2	3	4	5
25(F23.3)	Umeridhika namna gani na hali yako ya uchukuzi	1	2	3	4	5

Maswali yafuatayo yanalenga ni mara ngapi umejihisi au kupitia hali fulani katika majuma mawili yaliyopita

		Sijawahi	Si mara nyingi	Mara nyingi	Kila wakati	Siku zote
26(F8.1)	Ni mara ngapi wewe huwa na hisia za kinyume kama vile kutahayari,kusononeka, mashaka au mdororo wa mawazo?	1	2	3	4	5

Je kunayemtu aliyekusaidia kujaza hii fomu? .....

Ilikuchukua muda gani kujaza hii fomu? .....

JE UNA MAONI YOYOTE KUHUSU MASWALI HAYA?

……
……

……
……..

ASANTE KWA MSAADA WAKO

Appendix X: Kifaa cha kikliniki cha kufanyiauchunguziwanyuropathiainayohusiananavirusivya ukimwi (CHANT)

Je mgonjwa ananyuropathia?		
Vipimo kwa watu binafsi(mahojiano)	Kulia	Kushoto
Uliza iwapo mgonjwa anahisi maumivu mguuni 0 = hana maumivu ya mguu 1 = anahisi maumivu ya mguu	A	B
Uliza iwapo mgonjwa anahisi kuganda miguu 0 = hana kuganda mguu 1 = anahisi kuganda mguu	C	D
Vipimo vya malengo (Uchunguzi)	Kulia	Kushoto
Kipimo cha mtetemo wa kidole gumba cha mguu 0 = kawaida 1 = imepungua / haipo	E	F
Mshituko wa kifundo cha mguu 0 = kawaida 1 = imepungua / haipo	G	H
Alama zote kwa jumla kila upande	I = A + C + E + G	J = B + D + F + H
Jumla ya alama pande zote mbili	Jumla = I + J	