CHAPTER ONE

1.0. INTRODUCTION

Human Immunodeficiency Virus (HIV) is one of the world's most devastating epidemics. According to the UNAIDS (2011) analyses, the world now has an estimated 34 million HIV infected people —700,000 more than in 2010 (Cohen, 2011). The number of people infected with HIV in the United States, Western Europe and Oceania however represent only 4% of worldwide infections (Hemelaar et al. 2006). Most of the people infected or affected by HIV live in developing countries where cultural values, social influences, educational opportunities and access to other resources are clearly distinct from those in the West. Africa and the Middle East account for over 66% of worldwide infections, Asia for over 20%, Eastern Europe and Central Asia for approximately 4%, and Latin America and the Caribbean for around 6% (Hemelaar et al. 2006).

Sub-Sahara Africa remain the region most heavily affected by HIV worldwide, accounting for over two-thirds (67%) of all people living with HIV and for nearly three quarters (72%) of AIDS related deaths in 2008 (UNAIDS, 2009). Women and girls continue to be disproportionally affected by HIV in Sub-Sahara Africa. Throughout the region, women account for 59% of all people living with HIV infections (De Lay, 2011). With a prevalence rate of 14.3 percent, Zambia has one of the world's worst HIV and AIDS epidemics, with an estimated 1,027,626 people living with HIV and AIDS. Women represent the majority of the estimated 82 000 people infected annually in Zambia (UNAIDS, 2009). Although there was a reported drop in HIV incidence in Zambia between 2002 and 2007, some groups have remained vulnerable, most notably are young women and girls. Among young women aged 15-24, HIV prevalence is nearly four times that of men in this age category (UNAIDS/ WHO, 2004). This disproportionate high rate has been related due to factors such as physiological vulnerability, socio-economic disempowerment, and gender based violence.

HIV and neurocognitive functioning

HIV has been well documented to cause direct and indirect Central Nervous System (CNS) dysfunction which can be observed as a progressive decline in neuropsychological (NP) functioning in a large proportion of persons with HIV and AIDS (Brew et al.1988). HIV infection has been associated with CNS involvement and changes in neurobehavioral status, particularly in advanced stages of the illness. According to Heaton et al. (1995), neuroimaging and NP studies suggests initial preferential involvement of frontostriatal circuitries, reduction in white matter volumes and spotty pattern of mild NP impairments with increasingly structural abnormalities and NP impairment as HIV disease state advances.

Neuropsychological performance decline on individuals with HIV is characterized by cognitive and motor slowing, attentional deficits, executive dysfunction and memory impairment. HIV associated cognitive impairment is found across all disease stages, with increasing rates of impairment and escalating systemic stage of HIV disease. The area most often affected include attention/concentration, learning, executive, information processing speed, motor, and psychomotor speed; consistent with damage to sub cortical and frontostriatal systems

It is well established that neuropsychological compromise can occur secondary to HIV infection (Becker et al., 1997; Bornstein et al. 1993a; Heaton et al., 1995; and Von Giesen, Baecker, Hefter & Arendt, 2001). When present, HIV related neurocognitive impairment can range from subtle deficits of unknown clinical significance to frank dementia syndromes that profoundly disrupt an individual's functioning and activities of daily living. The neurocognitive deficits that typically associate with HIV-1 infection include decrements in motor and information-processing speed, divided attention, memory retrieval processes, and executive functioning. This pattern of cognitive deficits is consistent with the known sites of neuropathology in HIV and AIDS, which include the basal ganglia and deep white matter tracks (Aylward et al., 1993; Brew, Rosenblum & Price, 1988; Dal Pan et al., 1992; Grant & Martin, 1994; Navia, Cho, Petito & Price, 1986, in Steven et al. 2006). Etiologically, the psychiatric sequela of HIV represent both direct effects of the virus on frontostriatal function as well as indirect results of the psychosocial burdens

engendered by the illness. Castellon et al. (2000) have linked apathy, irritability and aspects of depression to neurocognitive dysfunction in HIV and suggested a common etiological basis. Psychosocial burdens such as medical stressors, economic issues, stigmatization and marginalization associated with HIV and AIDS may also independently drive the development of psychiatric symptoms.

HIV and Depression

Depression is a common mental disorder that presents with depressed mood, anhedonia (loss of interest or pleasure), feelings of guilt or low self-worth, disturbed sleep, disturbed appetite, low energy, and poor concentration. These problems can become chronic or recurrent and lead to substantial impairments in an individual's ability to take care of his or her everyday responsibilities (Sadock and Sadock 2007). Other signs and symptoms of mood disorders include change in activity level, cognitive abilities, speech, and vegetative functions (e.g., sleep, appetite, sexual activity, and other biological rhythms). These disorders virtually always result in impaired interpersonal, social, and occupational functioning. At its worst, depression can lead to suicide, a tragic fatality associated with the loss of lives. The lifetime prevalence of depression among patients infected with HIV has been estimated at 22-45% in the USA (Penzak, Reddy & Grimsley, 2000). There is growing evidence indicating that depression is associated with more rapid disease progression among HIV+ individuals. In a prospective study by Ickpvics, et al., (2001a), among 765 HIV+ women, HIV-related mortality and CD4 cell count slope declined over a period of up to seven years compared to women with limited or no depressive symptoms. This study found that women with chronic depressive symptoms were twice as likely to die as women with no or limited symptoms. Tross & Hirsch (1988) observes that notification of positive HIV serostatus is often accompanied by depression, suicidal ideation and attempts, anxiety, somatic complaints and other symptoms. Thus, there appears to be a relationship between early symptoms of depression and later health outcomes associated with HIV infection (Cheryl et al., 2006).

The association of depression and HIV can exacerbate the health outcomes, impacting on several dimensions that address the association of health, illness and disease to physical, mental and social functioning. Depressive symptoms have shown to impact on NP performance as such impacting on the psychological quality of life for those living with HIV. Cheryl et al. (2006) further alludes that depression has been associated with low quality of life in both men and women living with HIV. Further, depression was found to be the strongest predictor of low quality of life in men and women with advanced or late stage of HIV and AIDS.

Gender based violence

Gender refers to the socially determined differences between men and women. These differences encompass roles, responsibilities, opportunities, privileges, expectations, and limitations prescribed to males and to females in any culture. They are socially constructed, context based, and learned through socialization, and they determine many aspects of relationships between males and females as well as among females and among males (Hesse-Biber & Carger, 2000: 91). Although gendered roles and responsibilities can change over time within and across cultures, they are often deeply rooted in long-standing assumptions societies hold about women, men, boys, and girls. To the extent that gender roles are used to both preserve and maintain women‘s subordinate status in relation to men, gender has been identified as one of the most important underlying factors promoting violence against women: in fact, violence against women is often referred to as gender-based violence.

The World Report on Violence and Health (2002) defines violence as the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, which either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation. According to Bloom (2008: 14), Gender-based violence (GBV) is “the general term used to capture violence that occurs as a result of the normative role expectations associated with each gender, along with the unequal power relationships between the two genders, within the context of a specific society.

Nevertheless, links between gender-based violence against women and violence against boys is less direct, but no less significant. Whereas women and girls may be vulnerable to violence due to socially determined power differentials between males and females that increases their risk of violence and limits their options to overcome or address it, boys may be victims of violence based on widely shared expectations of masculinity.

Neuropsychological Assessment

Neuropsychology, a fairly new area of study in the general profession of psychology has been implored to assess the existing relationship between behaviour and brain functioning. The core of neuropsychological assessment (NPA) is depicting brain-behaviour relationships through comprehension, explanation, screening, evaluation, identification and determination of the nature of the problem, prediction of current as well as future abilities, limitations and suggestions. In the medical setup, the neuropsychologist determines the patient's level of functioning and explains ramifications that can then be used for detailing prognosis, management, treatment options and recommendations (Bengtson and Boll, 2001).

Assessment in neuropsychology guides the way in which neuropsychologists practice their field and test batteries are used in these assessments. This means that, in order to achieve the goals of assessment, the tools being used must fit the society in which they are being used. Most tests used in neuropsychology are made by neuropsychologists or psychometricians in various fields and are accompanied by detailed manuals providing the information to establish the reliability of the tests and normative information against which test results may be compared. This is the information that allows clinicians to compare their test candidates against the scores of a normal population of similar people (Kaplan and Saccuzzo, 2001).

This research will use an International Neurobehavioral Test Battery with Zambia norms to measure neuropsychological performance. The test battery consists of 14 tests split into 7 neuropsychological domains namely; The Visual Episodic Domain comprising the Brief Visual Memory Test Revised – Learning and delayed recall; The Verbal Episodic Domain comprising the Hopkins Verbal Learning Test Revised – learning and delayed recall; The Verbal Fluency Domain comprising the Controlled Word Association Test – FAS, Category Fluency Test (Animals and Actions) and the Stroop Word; Speed of Information Processing comprising Trail Making Test Part A, Colour Trails One, WAIS Digit Symbol, WAIS Symbol Search and Stroop Colour; The Executive Functioning Domain comprising the Colour Trails 2, Halstead Category Test, Wisconsin Card Sorting Test and Stroop Colour – Word; The Working Memory and Attention Domain comprising the Paced Auditory Serial Addition Test and the Spatial Span; and The Motor Dexterity Domain comprising the Grooved Pegboard Test, dominant and non-dominant hand.

Given the high prevalence of gender-based violence in Zambia, it is with this background that this study endeavours to assess the relationship between depressive symptoms and experience with gender-based violence among HIV+ individuals' NP wellbeing.

1.1. Statement of the problem

Gender based violence is being recognized as a global problem. At the global level, studies have demonstrated that gender-based violence is perpetrated more by husbands or male partners and that these husbands/partners or former partners force between 12% and 25% of women to have sexual intercourse with them (WHO 2002). WHO (2005) reported that in 48 surveys from around the world, 10-69% of women stated that they had been assaulted by intimate partners at some point in their life. These incidents are still being reported in spite of the fact that the United Nations General Assembly voted against this in 1979, the existence of the Convention on the Elimination of all Forms of Discrimination against Women that makes reference to the inalienable rights of women. Although, there is little empirical data on domestic violence against men in Zambia, studies in developed countries has shown that men are significantly affected.

Though many gender-based violence prevalence studies in relation to depression and neurobehavioral functioning have been conducted in Ethiopia (e.g. Gelaye et al. 2009) and other developing countries, little epidemiologic research has focused on the mental health effects of gender-based violence among Sub-Saharan countries. In Zambia, almost half (47% of 5,236) of women interviewed reported to have had experienced physical violence since they were 15 years old (CSO, 2003). Recent Zambia Police Service Annual Crime Returns of 2008, 2009, 2010 and 2011 shows a drastic increase in reported GBV cases of 8147, 8261, 8467 and 11980 respectively.

Despite such high prevalence of gender-based violence in Zambia as evidenced from Zambia Police Service Annual Crime Returns (2008-2011) and emerging literature documenting associations of increased mental health disorders among abused women and men, little epidemiological research has focused on the mental health effects of GBV. It was not clear yet, how the vice affected neurocognitive functioning and consequently impacted on the life style of its victims.

1.2. **Study justification**

The choice of this research emerged from the statistical observation of rampant GBV cases as reported by the Zambia Police in the past three years (2008-2011). Therefore, the study purported to investigate the association between gender based violence, depression and neurocognitive functioning in HIV positive individuals. Given the rampant trends of violence in Zambia which include battery, sexual abuse and exploitation, sexual cleansing, assault and other forms of violence (GIDD, 2008), women and men to a less extent are prone to increasingly mental health problem such as depression. Depressive symptoms have shown to impact the psychological quality of life especially for those living with HIV. Investigations that have focused solely on samples of women expressing depressive symptoms have found that women evidenced deficit in psychomotor speed, attention and memory functioning.

Furthermore, several research documentations have suggested that cognitive impairment and depression frequently coexist in HIV (Campbell, 2002; Martinez, 2006; GIDD, 2008 & Gelaye et al. 2009). Depression can adversely influence performance on cognitive tests due to poor effort, slowed processing speed, psychomotor retardation, or a combination of these factors. Despite this, few neuropsychological studies of HIV- positive individuals in developing countries have included adequate measures of depression.

Therefore, it was of great necessity to know the Neuropsychological effect GBV victims are prone to as this was likely to affect their quality of life. To the knowledge of the researcher, this was to be the first study of its kind to evaluate the effects of depressive symptoms and GBV and its association on neurocognitive functioning among HIV positive individuals in Zambia. As such, it was hoped that this research would add new light to the critical need of focusing on prevention and harm reduction strategies that can be used to decrease the burden of not only the somatic but more so the psychological morbidities borne by victims of GBV in Zambia.

1.3. Research Questions

1. Does gender based violence affect neurocognitive functioning?
2. Does depressive symptoms have an influence on neurocognitive functioning?
3. Are there gender differences in GBV experiences and depressive symptoms on neurocognitive functioning?
4. Is there an association between gender based violence and depressive symptoms on neurocognitive functioning?

1.4. Objectives of the study

1.4.1. General Objective

To find out the relationship between Gender Based Violence, depressive symptoms and neurocognitive functioning in HIV positive individuals.

1.4.2. Specific Objectives

1. To determine the effects of gender based violence experiences on neurocognitive functioning.
2. To examine the effects of depressive symptoms on neurocognitive functioning.
3. To find out gender differences in GBV experiences and depressive symptoms on neurocognitive functioning.
4. To establish the extent to which gender based violence associate with depression on neurocognitive functioning.

1.5. Identification of Variables

1.5.1. Dependent Variable

Neurocognitive functioning (global deficit score) was analysed against independent variables.

1.5.2. Independent Variables

The independent variables included:

- Gender based violence
- Depression
- Gender

CHAPTER TWO

2.0. Literature review

This chapter reviews literature on the association of gender based violence and depression with neurocognitive functioning in HIV- positive individuals. The chapter begin by giving a brief background on the effects of HIV infection on the Central Nervous System (CNS). It thereafter examines various studies that have been done in regard to HIV, gender based violence (GBV) and depression and how they impact on neurocognitive functioning.

Globally, the treatment of HIV have dramatically improved survival rates over the past ten years (Woods et al., 2009), however, HIV-associated neurocognitive disorders (HAND) remain highly prevalent and continue to represent a significant public health problem. Although neurocognitive impairments are not universal among HIV infected persons, clinically obvious signs and symptoms of at least mild neurologic disease are found in approximately 30% of persons with asymptomatic HIV infection and about 50% of individuals with the acquired immunodeficiency syndrome (AIDS) (Heaton et al., 1995).

Considerable evidence suggests that HIV preferentially disrupts the fronto-striato-thalao-cortical loops. However, unlike some other neurodegenerative disorder where the pathology is endogenous and may have a genuine affinity for a specific brain region, HIV also affects the structure and function of the other white matter tracts and neural systems, including the temporal (e.g. hippocampus) and parietal cortices (Thompson et al., 2005).

According to Hult et al. (2008), one reason for the lack of regional specificity is that the virus infiltrates the CNS by crossing the blood-brain barrier within monocyte derived macrophages and/or monocytes via a “Trojan horse” mechanism. Although HIV does not necessarily infect neurons, once across the blood-brain barrier, the virus can produce synaptodentric injury through a host of different direct (e.g. viral protein) and indirect (e.g. neuroinflammatory) mechanism, which can result in damage to a variety of neural system. There is also significant evidence suggesting that HIV affects the frontal cortex. Frontal dysfunction has been interpreted as a consequence

of late stage HIV disease may be secondary to basal ganglia pathology (Rottenberg et al., 1987). Subsequent clinical pathologic studies have shown associations between cortical hemodegeneration and HIV associated global neurocognitive impairment (Everall et al. 1999: Masliah et al. 1997). Moore et al. (2006) confirmed a univariate association between frontal neurodegeneration and neurocognitive impairment.

2.1. HIV and depression

Cognitive impairment is one of the more common and feared complication among the HIV infected (Overman and Anderson, 2001). Although it has been noted in all stages of HIV infection, cognitive impairment usually appears during the later stages of the disease. The most common initial symptoms are decreased attention, decreased concentration, and difficulty in shifting cognitive tasks.

Several studies have found association between stress, depression, and alterations in immune response. This is because the virus can cause damage to sub cortical regions of the brain that are directly involved in the regulation of affect and mood.

For example, stress and depression can cause reductions in the number of natural killer cells and CD8+ T cells with CD4+ T helper cells being less affected (Burack et al., 1993). Depression may also affect the progression of HIV illness indirectly by altering patient adherence to medication regimens. Contributors to poor adherence as a consequence of depression include feelings of self neglect, apathy, and forgetfulness (Overman and Anderson, 2001). Although higher rates of depression occur in women, independent of HIV serostatus, it is still not certain whether HIV positive women have higher rates of depression occurrence than non infected women. Apparently, no conclusive research has been conducted investigating the mood effects of HIV medication. As Overman et al. (2001) cautions, it may be difficult to distinguish between the psychological impact of the initiation of antiretroviral therapy and the actual chemical effects of medication, therefore case reports may represent idiosyncratic rather than common mood effects. Further caution should be taken into consideration because diagnosis of depression in HIV infected patients is complicated by somatic symptoms that may include fatigue, weight loss, and insomnia. Diagnosis is further complicated because some HIV positive individuals develop neurocognitive impairment including slowed thinking, poor concentration, forgetfulness, and

executive dysfunction, thus can easily be misdiagnosed as depressed (Lawler et al 2009)

In the study conducted by Lawler et al. (2009), which examined incidence of depression in HIV positive individual in Botswana, 120 HIV-positive individuals were administered with a measure of daily activities and two measures of depression. The results indicated that 34%-38% were diagnosed with depression, suicidal ideation ranged from 9-12%. There was positive relationship between scores on the two depression measures consistent with prior studies. Consistent with previous African studies showing that HIV-positive women are at higher risk for depression, women had higher rates of depression on the Beck Depression Inventory-Fast Screen for medical Patients (BDI-FS). In another pilot study by Lawler et al. (2010), a cross-sectional study of 120 HIV positive individuals were randomly selected from an outpatient HIV clinic in Gaborone, Bostwana, to determine the performance of neurocognitive impairment among HIV- positive individuals using international HIV Dementia scale (IHDS). IHDS performance was compared on tests of verbal learning/memory and processing speed, and investigated the association between performance on the IHDS and variables such as depression, age, level of education and CD4 count. The results indicated significant association between neurocognitive impairment as measured by the IHDS and performance on the other two cognitive measures of verbal learning/memory and processing speed. Level of education significantly affected performance on all three cognitive measures, and age affected processing speed and performance on IHDS.

2.2. **Gender Based Violence (GBV)**

Domestic violence has emerged as one of the world's most pressing problems. The United Nations estimates that between 20% to 50% of all women worldwide have experienced physical violence at the hands of an intimate partner or family member (Kimmel, 2001). In the United States, more than one million cases of "intimate partner violence" are reported each year, according to the U.S. Department of Justice (Goldberg, 1999, A 16). Efforts to prevent domestic violence and to facilitate its successful prosecution have followed research and advocacy on behalf of its victims. In recent years, a serious debate has erupted among activists, partisan organizations

and individuals worldwide about the nature and direction of domestic violence. Feminist activists now confront a growing chorus of researchers and political activists who claim that women and men are victimized by domestic violence in roughly equal numbers. Despite perhaps several thousand studies that report the preponderance of domestic violence to be perpetuated by males against females, there are also nearly 100 empirical studies or reports that suggest that rates of domestic violence are equivalent (see, for example, Archer, 2000, and Fiebert, 1997). Domestic violence, they argue, exhibits gender symmetry – an equal number of women and men are its victims (Kimmel, 2001). While such activists draw our attention to the often-ignored problem of men as victims of domestic violence, their efforts are also often motivated by a desire to undermine or dismantle those laudable initiatives to administer to women victims.

In Zambian context, GBV result due to unequal power relations between men and women and a reflection of the low status and negative attitudes towards women. According to GIDD (2008) report, violence against women and children is linked strongly to the socio-economic situation of the households where such violence takes place, with a high correlation between GBV and poverty. The vice infringes upon the rights of women and girls and diminishes their abilities to protect themselves against HIV.

Violence against men and women is a global health problem, human rights and development issue that transcend geography, class, culture, age, race, and religion to touch every community in every corner of the globe. It has been estimated that at least one in every three women around the world has been beaten, coerced into sex, or otherwise abused in her lifetime (GIDD 2008). The public health implications of this violence are enormous.

According to the Beijing +10 Shadow Report produced by the Zambia Association for Research and Development and the Non-Governmental Organization Coordinating Council, violence against women and girls is rampant in Zambia, and includes battery [domestic violence], murder, sexual abuse and exploitation, rape, defilement, incest, forced prostitution, sexual harassment, sexual cleansing, assault, and other forms of violence (Gender in Development Division, 2008). Women and

girls in Zambia experience violence that comes in all forms and patterns. Physical and sexual violence are very common. The latest ZDHS (2001-2002), reported that 53% of women interviewed reported experiencing some form of battering and a quarter of them having experienced physical abuse within the 12 months preceding the survey. In fact, according to WHO (2005), Gender-based violence affects 10% to 69% of women in their lifetime.

Investigators have increasingly documented mental health consequences (e.g., posttraumatic stress syndrome, depression, anxiety, and low self-esteem) of gender based violence (Coker et al., 2002; Hegarty, Gunn, Chondros, & Small, 2004; Nicolaidis, Curry, McFarland, & Gerrity, 2004; Roberts, Lawrence, Williams, & Raphael, 1998; Woods, 2000; WHO, 2005; in Gelaye et al., 2009). Victims who are subjected to sexual and/or physical abuse have increased levels of anxiety (Gleason, 1993; Kemp, Green, Hovanitz, & Rawlings, 1995), depression (Avdibegovic & Sinanovic, 2006; Pico-Alfonso et al., 2006; Plichta & Weisman, 1995), low self-esteem, feelings of hopelessness, and symptoms of posttraumatic stress (Acierno, Resnick, Kilpatrick, Saunders, & Best, 1999). Notably, WHO (2005) now considers violence against women, whether by intimate partners or non-partners, as the most prevalent and emblematic gender-based cause of depression in women.

Research findings further suggest that women are approximately two-thirds more likely than men to be depressed in their life time (Kesler et al., 1994). HIV positive status among women only worsen the incidence risk of being depressed than it could with men.

In a research by Spies et al (2012) in South Africa on “Neurocognitive deficits in HIV-infected women and victims of child trauma”, the findings provided evidence for neurocognitive dysfunction in memory and executive functions in HIV infected women and memory disturbances in trauma exposed women. The research involved eighty-three (83) HIV positive and forty-seven (47) matched HIV negative women who underwent neuromedical, neuropsychiatric and neurocognitive assessments. An analysis of co variance revealed significant HIV effects and memory disturbances in trauma exposed women for Hopkins Verbal Learning Test (HVLT), learning and

delay trails ($P < 0.01$). Although this study focused on trauma, GBV can be one of the primary sources of trauma.

The prevalence and frequency of intimate violence against men is highly disputed, with studies coming to many different conclusions for different nations and many countries simply not having much data. The true number of victims however, is likely to be greater than formal law enforcement related reporting statistics. Research by Tjaden & Thoennes (2000) surveying sixteen thousand Americans showed 7.4% of men reported being physically assaulted by a current or former spouse, cohabiting partner, boyfriend or girlfriend, or date in their lifetime. While both males and females can suffer from gender-based violence, studies show that women, young women and children of both sexes are most often the victims.

Although, there is little empirical data on domestic violence against men in Zambia, studies in developed countries has shown that men are significantly affected. For instance, The American Centres for Disease Control and Prevention (CDC) (2013) found that a large number of men reported being victimized by a partner. To be precise, about 37% of bisexual men and 29% of heterosexual men described being a domestic violence victim.

Further, in a study by Murray (2008), on "the dominance and symmetry in partner violence by male and female university students in 32 nations" instigated widely on the beliefs held that physical violence against partners (PV) in marital, cohabiting, and dating relationships is almost entirely perpetrated by men. The empirical data on these issues were provided by 13,601 university students in 32 nations. The results showed that almost one-third of the female as well as male students physically assaulted a dating partner in the previous 12 months, and the most frequent pattern was bidirectional, i.e., both were violent, followed by "female-only" violence. Violence by only the male partner was the least frequent pattern according to both male and female participants. Further, the results showed dominance by either the male or the female partner is associated with an increased probability of violence. These results, in combination with results from many other studies, call into question the assumption that PV is primarily a male crime and that, when women are violent, it is usually in self-defence. As such it is critical to consider GBV as a vice affecting

both males and females in our society and that both risk being affected by neuropsychological deficits.

2.3. Depression and Gender

Men and women share the same core set of depression symptoms; depressed mood, lack of motivation, loss of pleasure, changes in appetite, sleep disturbances, feelings of guilt and difficulty concentrating. However, studies suggest that there are some differences in the symptom patterns exhibited by men and women (WHO 2002).

A large number of studies provide strong evidence that gender based differences contribute significantly to the higher prevalence of depression and anxiety disorders in girls and women when compared to boys and men (WHO 2002). Data although fragmentary, indicate strong associations between GBV and mental health. Depression, anxiety and stress-related syndrome and suicide are mental health related problems associated with violence in women's lives. A population based study from Nicaragua, in Central America, found that women who had experienced severe abuse during the last years were ten times more likely to experience emotional distress than women who had never experienced abuse (WHO, 2001). As such women may face greater neuropsychological disability than men because of the higher prevalence of depressive and anxiety disorders.

Over many years now, gender differences in the prevalence of depression have been consistently documented with early prevalence data suggesting that depression in women is typically 50 to 100 percent greater than men (Nolen-Hoeksema, 1987). Later on, these findings were supported by the National Co morbidity Study (NCS) in that, women were approximately two-thirds more likely than men to be depressed in both yearly and lifetime estimates (Kesler et al., 1994). These findings were consistent with research by Kennedy et al. (1995), which was examining HIV-related psychological distress among heterosexual couples. In this research, gender was the single most significant predictor of distress for both HIV positive and HIV-negative, and women reported more distress than their male counter-parts. In a similar research among HIV-positive women by Evans et al (2002), the prevalence of depression was at least twice as high as their seropositive male counterparts.

In spite of the advancements in the study of men and their problems in the past two to three decades, it has been both puzzling and sobering to read the research on gender and mental disorders. Men are conspicuously underrepresented in the tally of most of the common psychiatric disorders, particularly the mood disorders and the anxiety disorders. On the other hand, many more men than women suffer from alcoholism, drug abuse and dependencies and a number of the more severe personality disorders (Cochran & Rabinowitz, 2000). Although data amply document these imbalances, findings of most large-scale epidemiological studies confirm that the frequency of all mental disorders is quite evenly distributed. Therefore, further research is necessary to ascertain the extent to which depression associate with gender on neurocognitive functioning among HIV-positive people in Zambia.

CHAPTER THREE

3.0. Methodology

3.1. Research design

The study used quantitative methods because it involved administration of the International Neurobehavioral test battery with Zambian norms to assess the neurocognitive functioning. A cross-sectional survey design was used to review the association of GBV and depressive symptoms on neurocognitive functioning among HIV positive women in Lusaka's selected urban ART clinics. This research design was chosen because it would provide with important information about the characteristics of the study population and how various groups within the population differed.

3.2. Study population

The study population comprised of HIV+ adults aged between 20 and 65 years with a minimum of 5years education level. A total of 263 participants were recruited, of which, 107 were males while 156 were females as indicated in the table below.

Table 1- Gender distribution of participants

		Frequency	Percent	Cumulative Percent
Valid	male	107	40.7	40.7
	female	156	59.3	100.0
	Total	263	100.0	

The above table shows the gender distribution of N=263, 40.7% male and 59.3% female.

FIGURE 1: Age, Mean and Standard Deviation

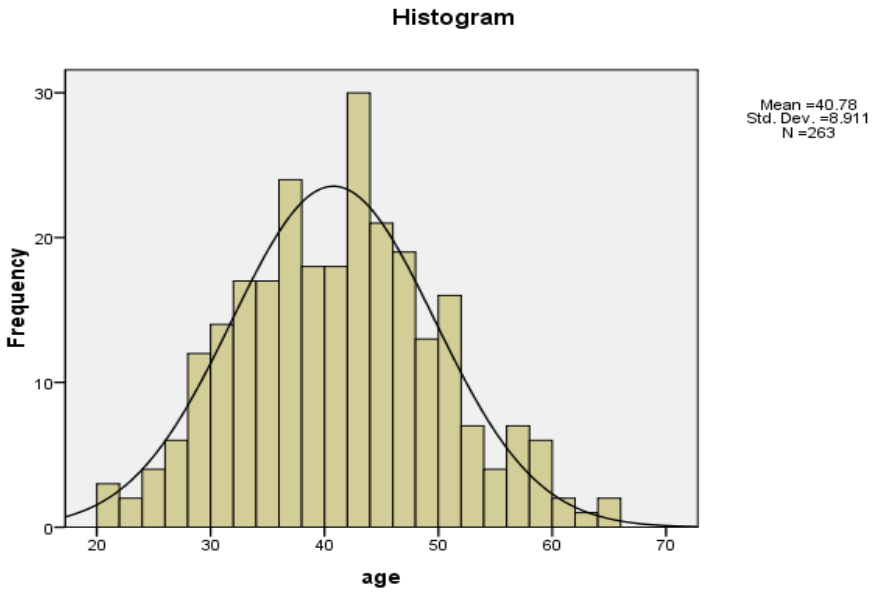


Figure 1 above shows the distribution of age as recorded in the study sample. The age was categorised into four groups (1 = 20-35yrs; 2 = 36-45; 3 = 46-55 and 4 = 56-65). Group 1 represented the youths; group 2, the early adulthood; group 3, adulthood and group 4, old age. The age range was 20 to 65 years with the mean age of 40.78 and a standard deviation of 8.911, the total number of participants was N=263.

FIGURE-2: Education, Mean and Standard Deviation

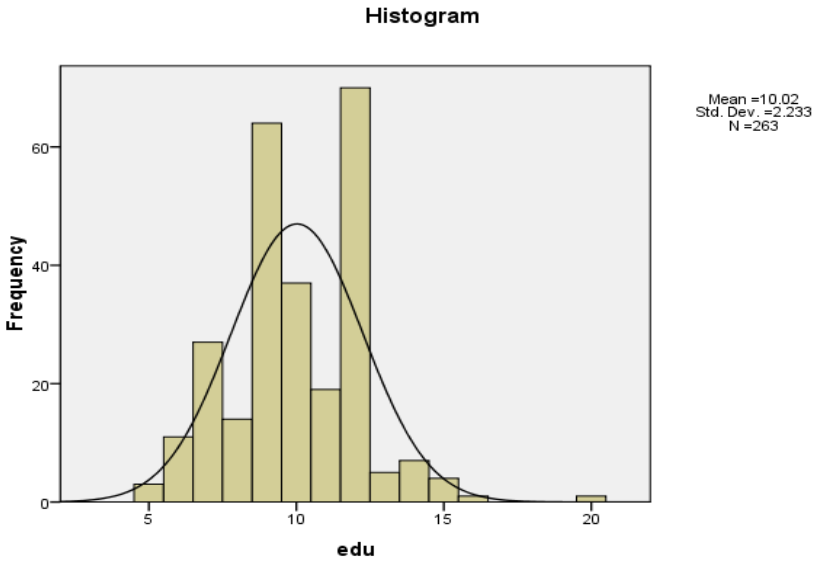


Figure 2 shows years of schooling which ranged from 5 years to 20 years of education. It was categorized in five groups of: 5-7yrs; 8-9yrs; 10-12yrs; 13-15yrs and 16-20yrs. The mean number of the years of schooling was 10.2 with a standard deviation of 2.23. The highest number of years of schooling was 12 years followed by 9 years of schooling.

3.3. Study sample

Convenience sampling was used to select 263 participants. These participants were recruited from six selected ART clinics in Lusaka namely; Matero Ref., Matero main, Kabwata, Chilenje, Kalingalinga and Chipata clinic between October and December 2012. Both male and female participants were recruited and efforts were made to ensure equal participation from both gender.

3.4. Sampling procedure

Two hundred and sixty three (N= 263) were recruited aged between 20-65 years with a minimum 5 years of education. This sample was used because the similar sample size of HIV negative adults was used to develop the Zambian norms for the International Neurobehavioral test battery. Thus, our sample size was statistically significant for generalization.

3.5. Inclusion – Exclusion Criteria

3.5.1. Inclusion

All participants (N= 263) were aged between 20 to 65 years. They must have been HIV+ and had the capacity and willingness to provide informed consent. They had a minimum of 5 years of education, and were able to read and understand English.

3.5.2. **Exclusion**

The principle source of exclusion was inability to provide informed consent, neurocognitive morbidity unrelated to HIV illness and severe psychiatric disorder, which might confound neurocognitive assessment. Specifically, excluded were patients:

a. Not able to provide consent;
b. Less than 5years of education
c. Neurological confounds such as baseline history of any CNS opportunistic infection, CNS neoplasm, neurosyphilis, lifetime history of severe head injury with loss of consciousness for greater than 30 minutes or resulting in neurologic complications; current seizure disorder, demyelinating disease, or other non-HIV neurological disorders;
d. Current psychiatric disorders involving psychosis (Schizophrenia, unipolar and bipolar disorder with psychosis), or other major mental disorders likely to affect participation in the study or confound interpretation of neurocognitive evaluation.
e. Significant ongoing substance use, including greater than three drinks of alcohol per day daily over the last month, or recreational drug use greater than one time per week during the last month.

3.6. **Instruments**

Several instruments were used in the process of data collection. A brief description of these items is outlined below.

3.6.1. **Beck Depression Inventory Version 2 (BDI -II)**

To measure depressive symptoms, Beck Depression Inventory-II (BDI-II) was administered as part of the Neurobehavioral test Battery. The BDI-II is a well known 21 item self ranking inventory that measures characteristic attitudes and depressive symptoms over the past two weeks. It takes about ten minutes to complete. There are four-point scales for each item raging from 0 to 3. On two items (16 and 18) there are seven options to indicate either an increase or decrease of appetite and sleep. A total score of 0 to 13 is considered minimal range, 14 to 19 mild, 20 – 28 moderate, and 29 – 63 severe. The BDI has been used for more than 35 years to identify and assess

depressive symptoms, and has been reported to be highly reliable regardless of the population. It has a high co – efficient alpha of .80, and its construct validity has been established and it is able to differentiate depressed from non-depressed patients (Beck et al. 1984).

3.6.2. **Demographic Information**

A self-administered questionnaire was used to collect information concerning social characteristics and demographic information (*see Appendix E*). To identify and screen for recent GBV victims, questions from the *WHO Multi-country Study of Violence against Women* were adapted for use in this study. The questionnaire used for the WHO study was developed and validated for use in Ethiopia, Namibia and eight other countries (WHO, 2000). Questions were formulated so that participants could report whether they have been physically and psychologically abused such as; slapped, punched, or beaten; kicked or dragged; and choked or burnt, or whether they had been sexually abused such as being forced in any way to have sexual acts with an intimate partner or any other person of opposite sex when they did not want to in their life time.

3.6.3. **Neuropsychological measurements**

The international neurobehavioral test battery with Zambian norms was used in this study (*See Appendix F*). This test battery assesses seven (7) cognitive domains. These domains are as follows:

a) *Abstraction/Executive functions:* include the Halstead Category Test, Wisconsin Card Sorting Test-64 (WCST-64), Stroop Colour and Word test and Colour Trails II. The WCST-64 is a measure of frontal lobe that was developed to assess problem solving and the ability to shift cognitive strategies in response to changing environmental contingencies. It is considered to test executive function because it requires the use of working memory, planning, attentional flexibility, and response inhibition to solve a novel problem.

The Halstead Category test is also a measure of frontal lobe function and includes seven (7) subtests: subtests I and II evaluate number counting and attention; subtests III and VI measure visual abstract reasoning and memory respectively; subtests IV and V measure visual perception and spatial orientation respectively, while subtest VII evaluates learning and retention of the concepts associated with other subtests (DeFilippis, 2002).

The Stroop Colour and Word Test equally measures executive function. It consists of names of colours printed in an incongruent ink colour. The client is given 45 seconds to name the colour while suppressing the automatic response to read the word.

b) *Speed of information processing tests:* this include the Wechsler Adult Intelligence Scale (WAIS)-III Digit Symbol and WAIS-III Symbol Search tests which produces measures of processing speed, visual perception, attention, concentration, visual-motor coordination, motor and mental speed. The Stroop Colour and Word tests measures cognitive processing and can provide valuable diagnostic information on brain dysfunction, cognition, mental speed and mental control. The Colour Trails and Trail Making Test produces measures of attention, visual searching, mental processing speed, and measure the ability to mentally control simultaneous stimulus pattern (Georgette et al., 2010).

c) *Memory learning and memory recall* tests*:* the Brief Visuospatial Memory Test-Revised (BVMT-R) measures visual learning and memory using a multiple-trial list learning paradigm while the Hopkins Verbal Learning Test-Revised (HVLT-R) assesses verbal learning and memory (Brandt and Benedict, 2001). Both BVMT-R and HVLT-R also assess recognition and recall.

d) *Verbal Fluency*: this domain is assessed using the Controlled Oral Word Association Test - (COWAT–FAS) whose purpose is to evaluate the spontaneous production of words within a limited amount of time (Straus, Sherman, Spreen, 2006).

e) *Attention/Working memory*: the Paced Auditory Serial Addition Test (PASAT)-50 is a measure of cognitive function that specifically assesses the

processing speed of auditory information, concentration, flexibility, mental calculation and mental tracking abilities.

The Wechsler Memory Scale-Third edition (WMS-III) Spatial Span provides an estimate of general memory functioning and is sensitive to memory impairments associated with various clinical conditions (Georgette et al., 2010).

f) *Motor function*: the Grooved Pegboard test (dominant and non-dominant hand) measures performance speed and requires complex visual-motor coordination, it allows for inferences to be drawn regarding possible lateral brain damage (Swiercinsky, 2001).

3.7. **Data collection procedure**

The data was collected by 10 student researchers pursuing Msc. in Clinical Neuropsychology as an umbrella study. A total number of participants (n=263) was equally divided among 10 student researchers, each gathering necessary information for other researchers. This study was reviewed and approved by the Biomedical Ethics Committee and the Ministry of Health (*see Appendix A & B*). Data collection began in October 2012 and proceeded till mid December 2012. Six health centres were selected with permission and directives from the District Health Management Boards (DHMB) in Lusaka province. Once permission was obtained from DHMB and health centres identified, potential participants were identified from ART clinics with the help of health practitioners. After identification of potential participants, the researcher explained what the research was all about. Those that were committed to other tasks were asked to make an appointment to a later date. Participant's consent was obtained through the consent form, which was read and ensured that they understood (*see Appendix C*). Those that consented by signing underwent laboratory investigations as a screening procedure to verify with their CD4 count and viral load. Given the fact that Zambia is in a resource constrained setting, WHO clinical staging system was used to establish the stage of the illness. The clinical stages are categorized from stage 1 through stage 4, reflecting progression from primary HIV infection to advanced HIV/AIDS. The WHO disease staging system for HIV Infection was first produced in 1990 and updated in September 2005 (WHO, 2005). Each stage is defined by specific clinical conditions or symptoms: in Stage 1, HIV

disease is asymptomatic and not categorized as AIDS. In Stage 2, minor mucocutaneous manifestations and recurrent upper respiratory tract infections are included. In Stage 3, unexplained chronic diarrhoea (longer than a month), and severe bacterial infections and pulmonary tuberculosis are included. In stage 4, diseases used as indicators of AIDS (brain toxoplasmosis, candidiasis of the oesophagus, trachea, bronchi or lungs, and Kaposi's sarcoma) are included.

Thereafter, participants were required to complete screening instruments such as a socio-demographic data form with questions regarding their age, gender, levels of education and experiences of gender-based violence; Beck Depression Inventory-II; Patient's Assessment of Own Functioning; Chinese Substance Use History; Substance Use; Activities of Daily Living, Neurobehavioral Medical Screen and Zambia Achievement Test (ZAT) to assess the ability to read and understand (*see Appendix D*). Participants that met the inclusion criteria were enrolled in the study.
After participants were recruited, the researcher administered the Neurobehavioral battery test and data was collected in the time length of three to four hours. Considering the HIV+ status for the participants and the time length (3 – 4hrs) involved in administering of the Test battery, K20, 000 (old currency) was provided as refreshment allowance while K30, 000 was given for reimbursement of their transport.

3.8. **Data Analysis**

The following statistical analyses were performed with the assistance of Statistical Package for Social Sciences version 16 (SPSS-v16).

1. Descriptive statistics was used for independent and dependent variables to obtain means and standard deviations.
2. To check for the relationship between the GVB (psychological and sexual abuse) and Global Deficit Score (GDS) a scatter plot was used.
3. In order to determine whether GVB was a predictor of poor performance on NP tests, Pearson product-moment correlation coefficient was used. To ascertain the extent to which GBV experiences influenced the NP performance, a two-way analysis of variance (ANOVA) was used. The

student's t-test was used for comparison of GBV scores and Global Deficit Score means on gender, age and education.

4. To determine whether depressive symptoms would have been a predictor of poor performance on NP tests, ANOVA was used. To investigate on the effects size of BDI-II categories (minimal, mild, moderate and severe) on NP tests, a one-way between-groups multivariate analysis of variance (MANOVA) was used.
5. To establish gender effects on the NP tests, t-test was use to compare means
6. MANOVA was used to find out whether GBV and depressive symptoms affected women and men differently.
7. To determine the association of GBV and Depressive symptoms on NP tests, MANOVA was used.

3.9. Ethical consideration

This research in its proposal form was submitted to the University of Zambia Biomedical Ethics Committee for ethical approval. The Biomedical Ethics Committee together with the Ministry of Health reviewed and approved all the research procedures. A standard consent form with an information sheet regarding the research was given to all participants. A written consent was obtained from the participants before their participation. At any time in the course of the testing procedure, participants were free to indicate if they needed to take a break. All personal identifying information was kept confidential and the data sheets were kept in secured lockers. All participants were reimbursed transport allowance of K30, 000 (old currency), while K20, 000 was provided for refreshments during the course of administering the test battery.

CHAPTER FOUR

4.0. Presentation of findings

This chapter outlines the results that were obtained in the study. It shows the various analyses that were carried out in the study. The research responses are thematically organised according to the research objectives:

1) Effects of Gender Based Violence on Neurocognitive functioning.
2) Effects of Depressive symptoms on Neurocognitive functioning.
3) Gender differences on GBV experiences and Depressive symptoms on Neurocognitive functioning.
4) Association of Gender Based Violence with Depression.

However, before presenting the findings, outlined hereunder is the demographic characteristics of the study population.

4.1 – Section one: Descriptive statistics

Table: 2 – Participants' marital status.

marital status					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	single	43	16.3	16.3	16.3
	married	141	53.6	53.6	70.0
	widowed	51	19.4	19.4	89.4
	divorced	27	10.3	10.3	99.6
	L/opp. sex	1	.4	.4	100.0
	Total	263	100.0	100.0	

The above figure shows the marital status of the 263 participants. This confounding variable is very important to determine which category of participants was more susceptible to GBV experiences, depressive symptoms and consequently to neurocognitive impairment. The married had the highest frequency of 141 representing 53.6%. The widowed represented 19.4%; the singles had 16.3% and the divorced 10.3%.while only 0.4% reported having been living with the opposite sex.

Table: 3 – Depressive symptoms as indicated by BDI-II

BDI-II					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	minimal	195	74.1	74.1	74.1
	Mild	38	14.4	14.4	88.6
	moderate	20	7.6	7.6	96.2
	Severe	10	3.8	3.8	100.0
	Total	263	100.0	100.0	

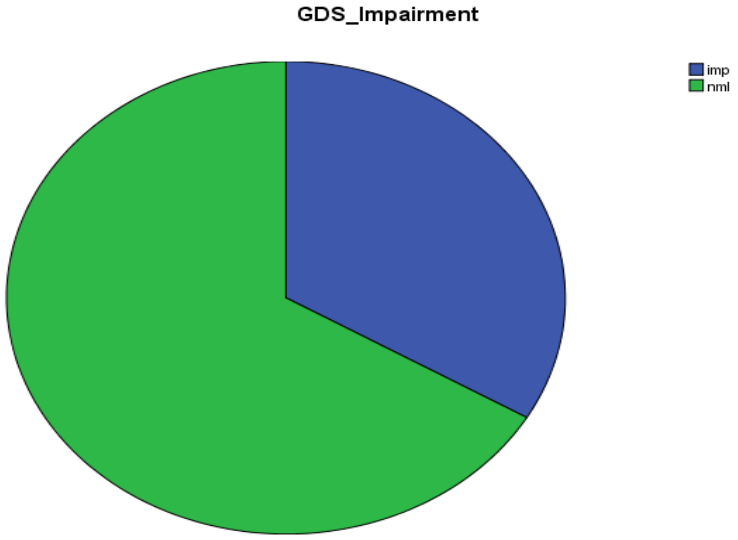
The Beck Depression Inventory (BDI), a 21 item self-report scale was used to measure depression on N=263. The findings show that of the total N=263, 10 participants representing 3.8% reported severe depressive symptoms; while 20 (7.6%) reported moderate depressive symptoms and 38 participants representing 14.4% reported mild depressive symptoms. Those who reported minimal depressive symptoms had the highest representation of 195 (74.1%).

Table: 4 – Reported Gender Based Violence experiences.

Statistics			
		psychological abuse	sexual abuse
N	Valid	263	263
	Missing	0	0
Mean		5.35	.77
Std. Deviation		6.867	1.658
Range		38	9

Gender Based Violence experience was categorized in psychological and sexual abuse. It was measured as a continuous variable; the higher the number, the more the respondent was exposed to GBV. Psychological abuse had a wide range of 38; (N = 263; M = 5.35, SD= 6.87). Sexual abuse had narrow range of 9; (N = 263; M = .77, SD = 1.66).

Figure: 3 – Neurocognitive impairment on Global Deficit Score



The above figure shows the neurocognitive impairment results for 263 participants as indicated by the Global Deficit Score (GDS). N=175 participants (66.5%) scored below 0.5 representing normal cognitive functioning. While N=88 participants representing 33.5% had their GDS above 0.5, meaning they had an impaired cognitive functioning.

4.2. Section two: Neurocognitive Impaired participants.

Table – 5: Age distribution of impaired participants

	Age				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-45	35	39.8	39.8	39.8
	36-45	31	35.2	35.2	75.0
	46-55	15	17.0	17.0	92.0
	56-65	7	8.0	8.0	100.0
	Total	88	100.0	100.0	

The above table shows the age distribution of neurocognitive impaired respondents N=88, M = 1.93, SD = 1.93.

Table – 6: Years of education for impaired participants

		Frequency	Percent	Cumulative Percent
Valid	5-7yrs	16	18.2	18.2
	8-9yrs	31	35.2	53.4
	10-12	36	40.9	94.3
	13-15yrs	4	4.5	98.9
	16-20yrs	1	1.1	100.0
	Total	88	100.0	

The education levels of neurocognitive impaired participants ranged from 5 to 20 years of schooling, categorized into five: 5-7yrs (primary) with 18.2%; 8-9yrs (junior sec.) with 35.2%; 10-12yrs (high sch.) with 40.9%; 13-15 (diploma) with 4.5%;and 16-20 (degree & post graduate) with 1.1%. N = 88; M = 2.35, SD = .87.

Table – 7: Gender distribution of impaired participants

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	35	39.8	39.8	39.8
	female	53	60.2	60.2	100.0
	Total	88	100.0	100.0	

The above table shows the gender of the 88 impaired respondents. 35 (39.8%) impaired participants were males while 53 (60.2%) were females. M = 1.60, SD = .49.

Table – 8: Marital status for impaired participants

Marital Status				
		Frequency	Percent	Cumulative Percent
Valid	single	19	21.6	21.6
	married	41	46.6	68.2
	widowed	16	18.2	86.4
	divorced	12	13.6	100.0
	Total	88	100.0	

The neurocognitive impaired respondents had the following marital status distribution: married with the highest of 46.6%, seconded by the singles with 21.6%, followed by the widowed with 18.2% and lastly divorced with 13.6%.

Table- 9: Reported GBV experiences for impaired participants

Statistics			
		Psychological abuse	Sexual abuse
N	Valid	88	88
	Missing	0	0
Mean		6.78	1.16
Std. Deviation		7.588	2.106
Variance		57.574	4.434
Range		38	9

Gender Based Violence experiences were grouped as psychological abuse and sexual abuse. As indicated in the table above, psychological abuse M = 6.78, SD = 7.59 with a range of 38. Sexual abuse M = 1.16, SD = 2.11 with a range of 9.

Table – 10: BDI-II scores categories for impaired participants.

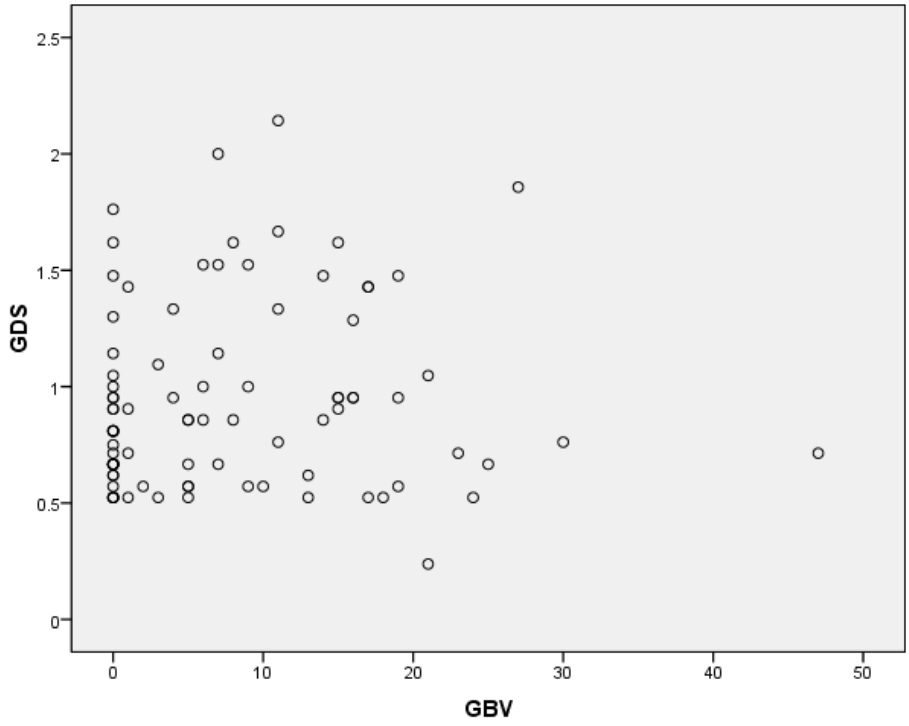
BDI-II					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	minimal	65	73.9	73.9	73.9
	mild	7	8.0	8.0	81.8
	moderate	11	12.5	12.5	94.3
	severe	5	5.7	5.7	100.0
	Total	88	100.0	100.0	

Out of the total N= 88 (M= 1.50, SD = 0.92), 5.7% reported to have severe depressive symptoms, 8.0% had mild depressive symptoms, 12.5% with moderate and 73.9% had minimal depressive symptoms.

4.3. Section three

4.3.1. Objective 1: Effects of GBV on Neurocognitive functioning.

Figure 4: Distribution of GBV and GDS on a scatter plot.



To check for the distribution of the two variables (GDS and GBV) a scatter plot was used. Generally, the scatter plot above indicate weak relationship between two variables as the points are not in a vague cigar shape like, without definite clumping of scores around an imaginary straight line.

Table – 11: Correlation of GBV and performance on 7 cognitive domains

Correlations				
		global mean_T	Psych. abuse	Sexual abuse
exec mean_T	Pearson Correlation	.755**	-.111	-.100
	Sig. (2-tailed)	.000	.071	.105
	N	263	263	263
fluency mean_T	Pearson Correlation	.758**	-.119	-.065
	Sig. (2-tailed)	.000	.053	.293
	N	263	263	263
wrk mem mean_T	Pearson Correlation	.637**	-.192**	-.164**
	Sig. (2-tailed)	.000	.002	.008
	N	263	263	263
learn mean_T	Pearson Correlation	.730**	-.146*	-.169**
	Sig. (2-tailed)	.000	.018	.006
	N	263	263	263
recall mean_T	Pearson Correlation	.656**	-.078	-.124*
	Sig. (2-tailed)	.000	.207	.044
	N	263	263	263
motor mean_T	Pearson Correlation	.540**	.026	-.008
	Sig. (2-tailed)	.000	.677	.893
	N	263	263	263
sip mean_T	Pearson Correlation	.863**	-.093	-.119
	Sig. (2-tailed)	.000	.133	.054
	N	263	263	263
**. Correlation is significant at the 0.01 level (2-tailed).				
***. Correlation is significant at the 0.05 level (2-tailed).**				

The relationship between GBV (psychological and sexual abuse) and performance on neuropsychological test as determined by GDS was investigated using Pearson product-moment correlation coefficient. The results indicated significant negative correlation between psychological abuse and sexual abuse on working memory r (263) = -. 19, p = .002; r (263) = -.16, p = .008; learning memory r (263) = -.15, p = .018; r (263) = -.17, p = .006. On recall memory only sexual abuse indicated significant negative correlation, r = -.12, n = 263, p = .044. Those who reported high experiences on psychological and sexual abuse performed poorly indicating impairment on cognitive tests for working memory and learning memory. However, only those who reported sexual abuse performed poorly on recall memory.

Table – 12: Effect size of GBV on Neurocognitive Functioning.

Tests of Between-Subjects Effects						
Source	Dependent Variable	df	Mean Square	F	Sig.	Partial Eta Squared
Psychabu	wrk mem mean_T	26	89.268	1.359	.125	.155
	learn mean_T	26	56.456	.859	.666	.104
	recall mean_T	26	45.918	.694	.864	.086
Sexuabu	wrk mem mean_T	9	83.329	1.269	.256	.056
	learn mean_T	9	40.997	.624	.776	.028
	recall mean_T	9	26.063	.394	.937	.018
psychabu * sexuabu	wrk mem mean_T	34	48.640	.741	.850	.115
	learn mean_T	34	80.048	1.218	.205	.177
	recall mean_T	34	78.459	1.187	.235	.173
Error	wrk mem mean_T	193	65.668			
	learn mean_T	193	65.734			
	recall mean_T	193	66.118			
a. R Squared = .286 (Adjusted R Squared = .031)						
b. R Squared = .269 (Adjusted R Squared = .008)						
c. R Squared = .249 (Adjusted R Squared = -.020)						

To ascertain the extent to which GBV experiences influenced the cognitive deficit on working memory, learning and recall memory a two-way ANOVA was run. The results indicate a small size effect on working memory F (34,193) = .741, p = .850, ηp2 = .115; learning F (34, 193) = 1.22, ηp2 = .177; and recall F (34, 193) = 1.19, p = .235, ηp2 = .173. Although GBV (psychological and sexual abuse) experiences had a significant impact on neurocognitive functioning, it did not have clinical effect on NP tests.

Table: 13a – Means of Gender and GBV

Group Statistics					
	Gender	N	Mean	Std. Deviation	Std. Error Mean
psychological abuse	male	107	5.08	6.510	.629
	female	156	5.54	7.116	.570
sexual abuse	male	107	.53	1.383	.134
	female	156	.94	1.809	.145

Table: 13b – Gender effects on reported GBV experiences.

Independent Samples Test								
		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
psychological abuse	Equal variances assumed	-.526	261	.599	-.454	.863	-2.154	1.245
	Equal variances not assumed	-.535	240.480	.593	-.454	.849	-2.127	1.218
sexual abuse	Equal variances assumed	-1.947	261	.053	-.403	.207	-.811	.004
	Equal variances not assumed	-2.046	257.910	.042	-.403	.197	-.791	-.015

An independent-samples t-test was conducted to compare the GBV score mean for males and females in tables 13a and 13b above. Psychological abuse had no significant difference in the scores for males (N = 107, M=5.08, SD=6.51) and females (N = 156, M=5.54, SD=7.12); t (261) = -.53, p = .60 (two-tailed). This means it did not matter whether one was male or female regarding their experiences with psychological abuse. On the other hand sexual abuse had statistical mean scores difference for males (N = 107, M = .53, SD = 1.38) and females (N = 156, M = .94, SD = 1.81); t (261) = -2.05, p = .04 (two tailed). This indicates that females reported to have been more sexually abused as compared to males. However, to establish the magnitude of the differences between males and females on sexual abuse, the effect size was calculated using the formula for eta squared. Using the guidelines for interpreting eta squared value proposed by Cohen (1988, pp. 284-7), the magnitude of the differences in the means was very small (eta squared = .016).

Table 14: Effects of Gender on impaired domains.

Independent Samples Test

Group Statistics

	Gender	N	Mean	Std. Deviation
wrk mem mean_T	Male	107	43.584644463E1	8.20709150125E0
	Female	156	45.347217914E1	8.19715332997E0
learn mean_T	Male	107	44.58336041E1	8.5150208454E0
	Female	156	44.14623208E1	7.8950985908E0
recall mean_T	Male	107	45.607649222E1	8.36655253246E0
	Female	156	44.864813723E1	7.84047257933E0

To ascertain the effect of Gender difference on the impaired cognitive domains (working memory, learning and recall memory), an independent-samples t-test was conducted to compare the GDS means. Working memory for males (N = 107, M = 43.58, SD = 8.21) and females (N = 156, M = 45.35, SD = 8.19); t (261) = -1.71, p = .09 (two-tailed); learning memory for males (N = 107, M = 45.61, SD = 8.51) and females (N = 156, M = 44.86, SD = 7.89); t (261) = .43, p = .67 (two tailed) and Recall memory for males (N = 107, M = 4.56, SD = 8.09) and females (N = 156, M = 4.49, SD = 7.84); t (261) = .73, p = .46 (two-tailed). There was no significant gender difference in the scores for the three cognitive domains.

Table: 15 – Effects of Confounding variables on impaired domains

Tests of Between-Subjects Effects					
Source	Dependent Variable	df	Mean Square	F	Sig.
Age	wrk mem mean_T	3	166.883	2.572	.055
	learn mean_T	3	83.482	1.443	.231
	recall mean_T	3	93.998	1.653	.178
Edu	wrk mem mean_T	4	26.419	.407	.803
	learn mean_T	4	85.757	1.483	.209
	recall mean_T	4	17.359	.305	.874
Maritalstatus	wrk mem mean_T	4	138.365	2.133	.078
	learn mean_T	4	21.703	.375	.826
	recall mean_T	4	37.419	.658	.622
age * edu * maritalstatus	wrk mem mean_T	14	52.485	.809	.659
	learn mean_T	14	76.121	1.316	.200
	recall mean_T	14	57.391	1.009	.446
Error	wrk mem mean_T	210	64.874		
	learn mean_T	210	57.840		
	recall mean_T	210	56.882		
a. R Squared = .233 (Adjusted R Squared = .043)					
b. R Squared = .300 (Adjusted R Squared = .127)					
c. R Squared = .297 (Adjusted R Squared = .122)					

A further scrutiny was made to explore the possible effects of age, education and marital status as cofounding variables on working memory, learning and recall memory using two-way group analysis of variance. The interaction effect of age, education and marital status was not statistically significant with working memory F (14, 210) = .809, p = .659; learning F (14, 210) = 1.316, p = .200 and recall F (14, 210) = 1.009, p = .446.

4.4. Objective 2: Effects of depressive symptoms on neurocognitive functioning.

Table: 16 – Effects of depressive symptoms on the seven cognitive domains.

	df	F	Sig.
exec mean_T	3	1.507	.213
	259		
	262		
fluency mean_T	3	2.553	.056
	259		
	262		
wrk mem mean_T	3	3.107	.027
	259		
	262		
learn mean_T	3	2.596	.053
	259		
	262		
recall mean_T	3	4.293	.006
	259		
	262		
motor mean_T	3	2.886	.036
	259		
	262		
sip mean_T	3	1.377	.250
	259		
	262		

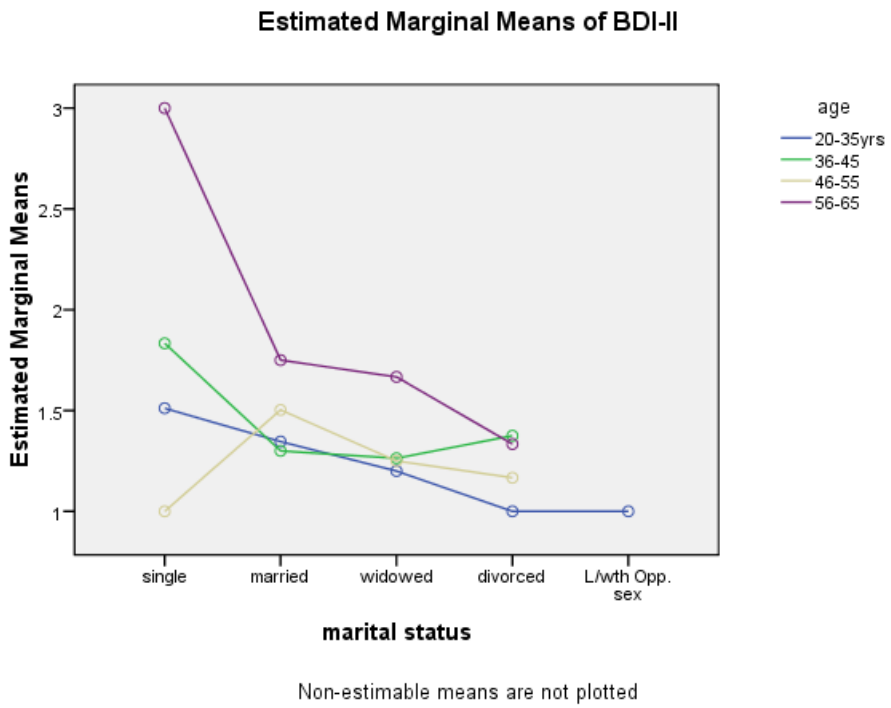
A one-way between groups analysis of variance was conducted to explore the effect of BDI-II scores of depressive symptoms on the seven cognitive domains, as measured by neuropsychological test battery with Zambian norms. The BDI-II is divided into four categories according to their scores (0-13 as minimal; 14-19 as mild; 20-28 as moderate, and 29-63 as severe). Working memory $F(3, 259) = 3.11$, $p = .027$; recall memory $F(3, 259) = 4.29$, $p = .006$ and motor function $F(3, 259) = 2.87$, $p = .036$, were statistically significant at $p = < .05$.

Table: 17 – Depressive symptoms differences as measured by BDI-II scores on the impaired cognitive domains.

Source	Dependent Variable	df	F	Sig.	Partial Eta Squared
Intercept	wrk mem mean_T	1	2574.981	.000	.909
	recall mean_T	1	2804.820	.000	.915
	motor mean_T	1	2055.804	.000	.888
Becktotal	wrk mem mean_T	3	3.107	.027	.035
	recall mean_T	3	4.293	.006	.047
	motor mean_T	3	2.886	.036	.032

A one-way between-groups multivariate analysis of variance was performed to investigate depressive symptoms differences as measured by BDI-II scores on the three impaired cognitive domains. The impaired cognitive domains (working memory, recall memory and motor functioning) were used as dependant variables. The independent variable was beck total (BDI-II scores). Preliminary assumption testing was conducted to check for normality, linearity, univariate outliers, homogeneity of variance-covariance matrices, and multicollinearity, with no serious violation noted. Working memory [F (3, 259) = 3.11, p = .027, ηp2 .035]; recall memory [F (3, 259) = 4.29, p = .006, ηp2 = .047] and motor functioning [F (3,259) = 2.89, p = 036, ηp2 = .032] had significant differences on the BDI-II categories (0-13 as minimal; 14-19 as mild; 20-28 as moderate, and 29-63 as severe). An inspection of the mean scores indicated that respondents with minimal and moderate BDI-II scores, performed quiet poor on the three cognitive domains. However, using the guidelines as suggested by Cohen (1988, pp. 284-7), the effect size among the BDI-II categories was small.

Figure: 4 – Effects on age, gender and marital status on BDI-II.



The plot above shows the interaction of age and marital status on BDI-II scores with no significant relationship.

Table: 18 - Effect of gender, age and marital status on the BDI-II scores

Tests of Between-Subjects Effects

Dependent Variable:BDI-II

Source	df	Mean Square	F	Sig.
Gender	1	1.859	2.930	.088
Age	3	1.592	2.509	.060
maritalstatus * gender	3	.186	.293	.831
maritalstatus * age	9	.448	.706	.704
gender * age	3	.104	.164	.921
maritalstatus * gender * age	7	.098	.154	.993
Error	232	.635		

a. R Squared = .100 (Adjusted R Squared = -.016)

To ascertain possible effect of gender, age and marital status on the BDI-II scores, a two-way between groups analysis of variance was conducted. The subjects were

divided into five groups according to their marital status (group 1: single; group 2: married; group 3: widowed; group 4: divorced and group 5: living with opposite sex). Respondents were further categorized into four age groups; 20-35 years (youths), 36-45 years (middle adults), 46-55 years (adults) and 56-65 years (old age). The gender, age and marital status interaction effect on depressive symptoms as measured by BDI-II scores was not statistically significant, F (7, 232) = .154, p = .99.

4.5. Objective 3: Gender differences on GBV experiences and Depressive symptoms on neurocognitive functioning.

Table: 19 – Gender differences on NP test performance

Independent Samples Test

		t-test for Equality of Means		
		T	Df	Sig. (2-tailed)
exec mean_T	Equal variances assumed	.215	261	.830
	Equal variances not assumed	.214	221.336	.831
fluency mean_T	Equal variances assumed	-.784	261	.434
	Equal variances not assumed	-.797	240.380	.426
wrk mem mean_T	Equal variances assumed	-1.712	261	.088
	Equal variances not assumed	-1.712	227.762	.088
learn mean_T	Equal variances assumed	.427	261	.670
	Equal variances not assumed	.421	216.407	.674
recall mean_T	Equal variances assumed	.734	261	.463
	Equal variances not assumed	.726	218.053	.469
motor mean_T	Equal variances assumed	.489	261	.625
	Equal variances not assumed	.492	232.877	.623
sip mean_T	Equal variances assumed	-.024	261	.981
	Equal variances not assumed	-.024	230.847	.981

To find out whether there was a significant gender difference on NP tests performance, an independent T-test was used in table 19 above. There was no

gender significance on all the seven cognitive domains. Executive t (261) = .215, p = .83; Fluency t (261) = .214, p = .431; Working memory t (261) = -1.71, p = 088; Learning t (261) = .427, p = 670; Recall t (261) = .734, p = .463; Motor t (261) = .489, p = .625; and Speed and Information Processing (SIP) t (261) = -.024, p = .981.

Table 20: Effects of gender on GBV experiences and depressive symptoms (BDI-II scores)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	GBV-total	39.955[a]	1	39.955	.660	.417
	BDI-II	.993[b]	1	.993	1.594	.208
Intercept	GBV-total	9180.640	1	9180.640	151.664	.000
	BDI-II	496.871	1	496.871	797.281	.000
Gender	GBV-total	39.955	1	39.955	.660	.417
	BDI-II	.993	1	.993	1.594	.208
Error	GBV-total	15799.033	261	60.533		
	BDI-II	162.657	261	.623		

a. R Squared = .003 (Adjusted R Squared = -.001)
b. R Squared = .006 (Adjusted R Squared = .002)

A further scrutiny was done using MANOVA to investigate gender differences on GBV-total (both psychological and sexual abuse) experiences and Depressive symptoms as measured by BDI-II scores. Two dependent variables were used; GBV-total and Depressive symptoms. The independent variable was gender. There was no statistical significant difference between males and females on GBV experiences F (1, 261) = 39.95, p = .417 and depressive symptoms F (1, 261) = .99, p = .208.

4.6 Objective 4: Association of GBV and Depressive symptoms on neurocognitive functioning.

Table – 21: Association of GBV and Depressive symptoms on neurocognitive functioning

Multivariate Tests[c]						
Effect		F	Hypothesis df	Error df	Sig.	Partial Eta Squared
GBVtotal	Pillai's Trace	1.053	203.000	1400.000	.301	.133
	Wilks' Lambda	1.052	203.000	1335.834	.307	.135
	Hotelling's Trace	1.050	203.000	1346.000	.312	.137
	Roy's Largest Root	2.242[b]	29.000	200.000	.001	.245
Becktotal	Pillai's Trace	1.249	21.000	588.000	.204	.043
	Wilks' Lambda	1.247	21.000	557.613	.205	.043
	Hotelling's Trace	1.245	21.000	578.000	.207	.043
	Roy's Largest Root	2.290[b]	7.000	196.000	.029	.076
GBVtotal * becktotal	Pillai's Trace	1.109	210.000	1400.000	.153	.143
	Wilks' Lambda	1.117	210.000	1338.102	.137	.146
	Hotelling's Trace	1.125	210.000	1346.000	.123	.149
	Roy's Largest Root	2.498[b]	30.000	200.000	.000	.273
a. Exact statistic						
b. The statistic is an upper bound on F that yields a lower bound on the significance level.						
c. Design: Intercept + GBVtotal + becktotal + GBVtotal * becktotal						

A one way between-groups multivariate analysis of variance (MANOVA) was performed to investigate the extent to which GBV associate with depressive symptoms (BDI-II scores) on neurocognitive functioning as measured by the GDS on the International Neurobehavioral Test Battery (INTB) with Zambian norms. The GDS as a dependent variable comprised of seven cognitive domains namely, executive, fluency, working memory, learning, recall, motor and speed information processing. Interaction of GBV and BDI-II scores revealed no significant effect on the GDS variable, F (210, 1338) = 1.12, p = .137.

Table: 22 – Effects of association of GBV and BDI-II Scores on NP tests performance.

Tests of Between-Subjects Effects							
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
GBVtotal * becktotal	exec mean_T	1330.995	30	44.366	1.132	.301	.145
	fluency mean_T	1161.798	30	38.727	.695	.882	.094
	wrk mem mean_T	1884.074	30	62.802	.981	.500	.128
	learn mean_T	1566.243	30	52.208	.767	.804	.103
	recall mean_T	2220.965	30	74.032	1.192	.238	.152
	motor mean_T	3484.332	30	116.144	1.055	.396	.137
	sip mean_T	1343.564	30	44.785	.857	.683	.114

A further investigation was done to ascertain whether GBV association with BDI-II score had an effect on the individual seven cognitive domains as indicated in a summarised table above at traditional p = .05, all the seven domains indicated no statistical significance.

CHAPTER FIVE

5.0. Discussion of findings

This chapter labours to discuss the results presented in chapter four. The chapter begins by presenting general overview of the findings. Thereafter, a more detailed account of findings will be discussed in relation to available literature.

In general, results obtained indicated that respondents who experienced gender based violence had neurocognitive deficits in working memory, verbal learning and recall. Those who reported depressive symptoms had impairment in working memory, recall and motor functioning. Although respondents in different BDI-II categories performed differently on working memory and recall, the magnitude differences on these categories had a small effect size. Gender differences had no notable influences on the NP tests performance of respondents who experienced GBV and depressive symptoms. Further, this study found no significant association of GBV and depressive symptoms on neurocognitive tests.

Investigating as to whether age, marital status and education level confounding variables had an influence on neurocognitive outcome, the results indicated no significant effect.

The implication of the findings in this study is that GBV and Depressive symptoms are independent predictors of poor performance on the NP tests. In general, the findings of this study are similar to previous studies to some extent. However, this study has unearthed notable findings regarding GBV victims and the cognitive domains that are likely to be affected. This knowledge on the NP tests helps elucidate on the impact GBV has on neurocognitive functioning among the HIV+ adults in Zambia.

5.1. The effects of GBV on neurocognitive functioning.

GBV was categorized as psychological and sexual abuse experienced by respondents from intimate partners. Both psychological and sexual abuse was measured as a continuous variable.

On determining GBV's effects on neurocognitive functioning, the results showed a negative correlation on both psychological and sexual abuse on working memory and verbal learning. On recall memory tests, only sexually abused respondents indicated a significant negative correlation. These findings imply that the higher the exposure of GBV to the respondent, the poor their performance on the NP tests on working memory and verbal learning. In this study, those who reported high experiences on psychological and sexual abuse performed poorly on working memory and verbal learning, indicating impairment on their neurocognitive functioning in the two domains. However, only those who reported to have been sexually abused by intimate partners performed poorly on recall memory.

In a research by Spies et al. (2012) in South Africa, revealed memory disturbances in trauma exposed women on Hopkins Verbal learning, and delay trails. Such findings are similar to the findings of the present study. Although the former study focussed on trauma in general, the latter study focused on GBV which is one of the primary sources of trauma. The findings of the present study suggest that GBV experiences in specific are a predictor of deficit NP performance on working memory, learning and recall memory.

In another study conducted by Bücker et al (2012) entitled "Cognitive impairment in school aged children with early trauma." The research comprised of 30 recruited medication-naive children between 5 and 12 years of age with history of early severe trauma from a foster care home, along with 30 age- and gender-matched controls. The NP test battery was tailored to assess broad cognitive domains such as learning/working memory, executive function, attention, verbal/premorbid intellectual functioning, and impulsivity. The study showed higher prevalence of subsyndromal symptoms in children with a history of childhood trauma. The finding of this research suggested no major changes expected to occur in adulthood. Therefore, such predictions seem consistent with our findings. Those who

experienced higher prevalence of GBV performed poorly on NP tests with neurocognitive deficits in working memory, learning and recall.

Given the rampant trends of GBV cases against women as recorded by The Zambia Police Service (ZP, 2011) it is likely that most HIV positive women have deficits in neurocognitive functioning, not to their knowledge. It is also likely that more HIV positive women will be affected as compared to their male counterparts. This would be because more women are victims of GBV especially sexual abuse according to Zambia Police statistics and our findings. Though previous research and this present study reveals that different neurocognitive domains are affected by GBV, the possible explanation could be due to different characteristics of the population sample such as culture and socioeconomic status. A follow up study taking into consideration culture and socioeconomic status as cofounding variables of GBV and their effects on NP tests performance would be important to bridge the information gap especially in our Zambian society. However, as far as the present study shows, it can be generalised that GBV victims are prone to neuropsychological deficit.

5.2. Effects of Depressive Symptoms on Neurocognitive Functioning

Depressive symptoms was measured using BDI-II, a 21 item self-report scale divided into four categories; minimal, mild, moderate and severe. Respondents who reported depressive symptoms indicated cognitive deficit in working memory $F(3, 259) = 3.11$, $p = .027$; Recall $F(3, 259) = 4.29$, $p = .006$ and motor function $F(3,259) = 2.87$, $p = .036$. To investigate depressive symptom differences as measured by BDI-II scores on the three cognitive domains, MANOVA was used. Working memory, recall memory and motor functioning were used as dependent variables. The results indicated significant differences on the BDI-II categories. Respondents with minimal and moderate BDI-II scores performed poorly on three cognitive domains as compared to respondents who reported mild and severe depressive symptoms. As noted by Pallant (2007), with large samples even very small differences between groups can become statistically significant. This does not mean that the difference has any practical or theoretical significance. In our study, the effect size of BDI-II

categories on working memory ηp2 = .035, recall ηp2 = .047 and motor ηp2 = .032 though statistically significant was very small with no practical significance. These findings had no major differences from past studies that have been conducted on HIV seropositive individuals. For instance, studies have described an association between depression and procedural memory (Kalechstein et al., 1998), and between apathy and working memory deficits among HIV positive individuals (Castellon et al., 1998).

However, minor differences from past studies were observed on the findings of the present study. For instance, in a pilot study by Lawler et al. (2010) depression and current CD4 count did not affect performance on any of the cognitive measures. Inconsistent with these findings, the present study indicated that depressive symptoms had a significant effect on three cognitive measures of working memory, recall and motor functioning. Such different outcomes could be attributed to different population samples the study used, probable varying timing on the introduction of antiretroviral therapy to the study participants and varying CD4 count from individual participants.

According to Baldewicz et al. (2004), HIV-1 infection is frequently accompanied by cognitive impairment, particularly as the disease progresses. The spectrum of presentation of cognitive impairment ranges from neuropsychological impairment without disorder to minor cognitive motor disorder (MCMD) to HIV-1 associated dementia (HAD). Although estimates of the prevalence of HIV-1 related cognitive impairment have decreased somewhat since the introduction of highly active antiretroviral therapy (HAART; Ferrando et al., 1998), these numbers nevertheless remain substantial.

The literature describing the stages of HIV- 1 infection and the association area of cognitive impairment has yielded some contradictory findings. Some researchers have found that there are observable abnormalities in global functioning as well as in the specific areas of psychomotor and memory tasks in individuals in the asymptomatic stage of HIV-1 infection (White et al., 1995). However, others have reported that persons in the asymptomatic stage do not perform significantly different

from HIV-1 seronegative control participants in general (Damos et al., 1997) or on the specific measures of attention, memory, psychomotor speed (Miller et al., 1990) or spatial working memory (Grassi et al., 1999). Although the variation in these findings among individuals in the earlier stages of HIV-1 disease are somewhat difficult to reconcile, there is more consensus that patients with AIDS defining illness do perform significantly poorer on global neuropsychological testing than HIV-1 seropositive individuals in the asymptomatic and symptomatic stages (Basso and Bornstein, 2000; Heaton et al., 1995). In a study, Stern et al. (2001) assessed HIV-1 seropositive participants with low CD4 cell counts over a 2.5 years period and found numerous risk factors for the development of HIV-1 associated dementia, including cognitive impairment in the domains of psychomotor functioning, attention and memory and executive functioning, as well as the presence of depression.

In a study by Baldewicz et al. (2004), found deficits in specific areas of neuropsychological functioning with HIV-1 disease progression over time, specifically in the domains of fine motor speed and speed of information processing. Depressive symptoms were associated with diminished performance on measures of attention, executive functioning and speed of information processing suggesting that patients with greater depressive symptoms may have had poorer abilities to concentrate in general, and that this affected their performance on the more complex tasks.

Thus far it not yet clear as to which specific cognitive domains are affected by depressive symptoms among HIV positive adults. However, such variations in study findings could be attributed to many factor such as respondents being on HAART and poor adherence to ART. It is well known that ART helps to deter cognitive deterioration. As reviewed by literature, the high prevalence of depressive symptomatology is of clinical relevance, given that depressive symptoms have been associated with HIV disease progression to AIDS as well as with CD4 cell count decline and increased mortality rate especially amongst women (Ickovics et al., 2001). The results of the present study indicating neurocognitive deficit in working memory, recall and motor functioning has an impact on the lives of the respondents on how they respond to complex tasks. Though home responsibilities are shared between men and women in the Zambian society, women take a bigger part.

Therefore, neurocognitive deficits in working memory, recall memory and motor functioning has a potential to change their life styles.

5.3. Gender Differences on GBV Experiences and Depressive Symptoms on Neurocognitive Functioning.

Gender had no significant effect on both GBV experiences ($p = .055$) and depression ($p = .088$) on the NP tests performance. However at the separate investigation of psychological and sexual abuse on GBV, females reported to be more prone to sexual abuses ($p = .044$) as compared to males. Consistent with literature and past studies on violence against women, women and girls are more prone to psychological and sexual abuses (WHO, 2005; Gender in Development Divisions, 2008). Those who reported to have been sexually abuse by intimate partners performed poorly on recall memory. The study results in table – 19 shows no significant effect of gender on the seven domains of neurocognitive functioning. Further scrutiny was made in table – 20 on the effects of gender on GBV experiences and depressive symptoms (BDI-II scores). The finding indicated no significant difference between males and females on experiences of GBV and Depressive symptoms.

Although there is little empirical data on domestic violence against men in Zambia, studies in developed countries has shown that men are significantly affected (CDC, 2013). For instance, the study by Murray (2008) indicated that almost one-third of the female as well as male students had physically assaulted a dating partner in the previous 12 months. At length, such findings are consistent with the present study in that there was no gender differences on experiences of GBV. This imply that both men and women experienced GBV evenly in all forms and both are affected on their neurocognitive functioning.

Inconsistent with previous studies indicating that there are some differences in the symptom patterns exhibited by men and women (WHO, 2002). Our research findings shows no gender difference on depressive symptoms and neurocognitive functioning. Men and women share the same core set of depressive symptoms. However, as observed by Cochran and Rabinowitz, 2000), men are conspicuously under represented in the tally of most of the common psychiatric disorders. Consistent with

our findings, large-scale epidemiological studies confirm that the frequency of all mental disorders is evenly distributed.

The findings in the present study are consistent with previous studies. Given the high incidence of GBV in sexual abuse form, HIV positive women are prone to neurocognitive deficits. The implications of these findings are so vast, since there is a likelihood of child maltreatment by affected mothers, children growing under the custodian of such parent also risk spilling over the vice to their children. Therefore, if the vice is not seriously checked, it has a great potential of affecting the wellbeing of our society. The NP changes that come about resulting from GBV experiences impact on the daily living of the affected women.

However, these results that more women are sexually abused than males should be interpreted with care and caution. Culture could have influenced the response especially for male participants. Most men do not disclose how their partners abuse them be it psychologically or sexually. This could be a probable reason why it was only sexual abuse that indicated gender significant differences between males and females. Therefore, the findings of this study suggest that GBV experiences whether, psychological or sexual abuse affects the cognitive deficits and consequently affects the quality of life of its victims. Since there was no statistical significance difference between males and females on NP performance in general as measured by INTB, it can be well generalised that GBV and depression are stronger predictors of NP deficits on HIV positive adults in Zambia. To some extent, the observed gender insignificant differences could be due to consecrated efforts by the government and NGOs in curbing the GBV vice.

5.4. Association of Gender Based Violence with Depression on Neurocognitive Functioning.

To ascertain the association of gender based violence and depression on neurocognitive functioning as measured by GDS on INTB with Zambian norms, MANOVA was used. The results indicated no significant effect, F (210, 1338) = 1.12, p = .137. A further investigation on using MANOVA was performed on seven cognitive domains, as indicated in table 22, the results showed no statistical significance. The lack of association between GBV and depressive symptoms on neurocognitive function was contrary to our expectations. The fact that GBV (psychological and sexual abuse) and Depressive symptoms independently affected neurocognitive functioning on some cognitive domains, it was expected that the association of the two variables would have a significant effect on NP performance. In the study by Durvasula et al. (2001), psychological distress as indexed by measures of depression and anxiety was generally not associated with neuropsychological performance. Little literature has examined the association of GBV and depressive symptoms. However, our findings indicate that GBV and Depression are independent predictors of deficit NP performance on HIV positive individuals in Zambia.

5.5. Age, Marital status and Years of Education as Confounding Variables on NP tests.

The age groups of 20-35 years and 36-45 had performed quiet poorly as compared to the older age groups. These findings are contrary to our expectation and previous research findings. For instance, a study by Kalugwana (2011) on "The influence of age and education on neuropsychological tests with the Zambia Achievement Test (ZAT) as a measure of educational attainment", the results showed that age had a negative effect on all the neuropsychological test domains. It also appeared to have a high effect on tests of Visual Episodic Memory, Speed of Information processing and executive functioning. However, one attributed reason to these results could have been due to the poor adherence observed in the affected age group of the present study. Further, it is important to note that the magnitude difference effect size of 20-23; 36-45 and 46-55; 56-65 years age groups was very small ($\eta p2 = .08$).

Thus, this statistical difference noted on age had no clinical or practical significance on neurocognitive functioning.

Marital status was postulated to be a confounding variable on NP test performance. It was important to consider it so as to establish which category of women was more susceptible to GBV experiences, depressive symptoms and consequently neurocognitive impairment. Five (5) categories came out of our participants namely; single (16.3%), married (53.6%), widowed (19.4%), divorced (10.3%) and living with opposite sex (.4%). Contrary to our expectations that the widowed and divorced would report to have more depressive symptoms and perform poorly on NP tests, marital status [$F(4,232) = 1.37$, $p = .24$] indicated no significant effect on depression and NP tests. Thus, it is not clear yet whether marital status has an influence on GBV experiences and depressive symptoms. A longitudinal research on the participants would bring to light the effects of marital status on GBV experiences, depressive symptoms and performance on NP tests.

Contrary to our expectations and previous studies, education had no significant effects on NP tests performance. In the previous study by Walubita (2011) on "The relationship between literacy and cognitive performance", in Zambia among (324) HIV negative adults, the study found that there was significant differences in cognitive test performance among individuals with primary, basic, high and tertiary education. Those who were more educated performed better than their less educated counterparts. In our study however, it did not matter the levels of education respondents had attained to perform better on the NP tests. Education [$F(4,232) = 2.35$, $p = .055$, was not statistically significant on the GDS index on NP tests. One probable reason for these findings could be that all respondents were screened with The Zambia Achievement Test (ZAT) as inclusion criteria and only those who were able to read were selected to participate in the research. This inclusion criterion might have bridged up the gap required for employing education skills in the INTB. However, a further research and follow up on the effects of education on NP tests among HIV positive adults on HAART would be necessary to validate our research findings.

CHAPTER SIX

6.0. Conclusions

The results obtained in this study indicated that respondents who reported to have had experienced GBV showed cognitive deficits in working memory, verbal learning and recall memory.

Those who reported with depressive symptoms showed neurocognitive deficit in working memory, recall, and motor functioning. However, at the examination of the association of GBV and depressive symptoms on neurocognitive tests, the results indicated no significant association.

Overall, the implication of the findings in the present study are that GBV experiences and depressive symptoms are predictors of poor performance on neurocognitive functioning. As alluded to by literature, neurocognitive deficits affect on the daily living activity. It is clear that past and current studies suggest that GBV and depressive symptoms have a significant effect on the HIV positive individual's neuropsychological functioning. Hence this calls for a joint effort by the government through Zambia Police Service's Victim Support Unit and NGOs to fight against the GBV vice.

On the non-significant effects of the association between depressive symptoms and GBV experiences, the results suggest that the two variables are independent predictors of neurocognitive deficits.

Gender disparities were reflected indicating more females experiencing GBV especially sexual abuse. This entails that the alarming GBV statistics recorded by the Zambia Police in the past three years (2008-2011) has a far reaching effect on the victims' neuropsychological wellbeing. Therefore, the police through VSU, NGOs and other stakeholders should intensify on encouraging and educating of girls, women and men to report all forms of GBV offences to relevant authorities despite it being cultural rooted. Further, it is imperative that studies of this nature are taken seriously as they shed light on neurocognitive effects of GBV. Such knowledge will complement the social and physical effects that are highly emphasizes in the effort of curbing the vice.

In conclusion, the unique contribution of this study to the field of neuropsychology lays in its findings that GBV experiences and Depressive symptoms among HIV positive individuals contribute to poor neurocognitive wellbeing. The study has shown that GBV experiences and depressive symptoms are independent predictors of neurocognitive deficit. While gender indicated no significant effects on NP tests performance.

6.1. Study Limitation

This study like any other had few limitations.

1. The study limited itself to six selected clinics in Lusaka urban. As such, demographic characteristics of the participants may not be representative enough to be generalized for the whole country.

2. Due to high unemployment and poverty levels in Lusaka's peri-urban areas, transport reimbursement of K30, 000 (old currency) and refreshment allowance of K20, 000 seem to have influenced participation. In most cases local volunteers from the involved clinics participated first then they invited their family members and friends.

3. The tools used to gather demographic information including gender based violence experience and depression were self reported. Most participants seem to have been harbouring sensitive information in accordance to culture where 'bedroom issues' should not be disclosed anyhow.

4. Most participants were not familiar with the computer; hence their encounter on the two computerized tests was not easy and may not have reflected their real neuropsychological well being. Though this challenge was cushioned by making the participant familiar with basics of computer necessary for the test.

6.2. Recommendations

- Gender Based Violence affected performance on the three domains (working memory, verbal learning and recall memory) of neuropsychological tests. Therefore, further research is necessary to establish the effects GBV has on adults who experienced child abuse.
- Little studies have endeavoured to investigate effects of marital status on HIV positive individuals on neuropsychological performance. The non-significant effects of education, age and marital status in this research, requires that a follow up study is conducted to validate the findings of this research.
- Similar study should be conducted among the illiterate adults as they could be more prone to GBV experiences and depression.

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APPENDICES