

**EFFECTS OF COGNITIVE BEHAVIOURAL THERAPY ON POST STROKE
DEPRESSION PATIENTS: A CASE OF THE UNIVERSITY TEACHING
HOSPITAL, LUSAKA**

BY

CHILUFYA KAPUMPE

**A Dissertation Submitted to the University of Zambia in Partial Fulfilment of the
Requirement for the Award of the Degree of Master of Science in Clinical
Neuropsychology**

**THE UNIVERSITY OF ZAMBIA
LUSAKA**

NOVEMBER, 2017

COPYRIGHT

All rights reserved. No part of this dissertation may be reproduced or stored in any form or by any means without prior permission in writing from the author or the University of Zambia

DECLARATION

I, **Kapumpe Chilufya**, declare that this dissertation represents my own work; that it has not previously been submitted by any other person for a degree at the University of Zambia or any other University and it does not incorporate any published work or material from another dissertation.

Signed:

Date :

CERTIFICATE OF APPROVAL

This dissertation of **Kapumpe Chilufya** is approved as fulfilling the partial requirements for the award of the Degree of Master of Science in Clinical Neuropsychology by The University of Zambia.

Examiners:

Name SignatureDate

Name SignatureDate

NameSignatureDate.....

ABSTRACT

Post-stroke depression is one of the most serious neuropsychological consequences of stroke and it affects about 35-70 % of patients with stroke. However, Pharmacological treatment administered to post stroke depressed (PSD) patients, without an accompanying therapy, appears not be sustainable enough in treating depression, and this may continue threatening the lives of patients. The purpose of the study was to assess whether administering CBT to PSD patients would improve their depression levels. The main objective of this study was to determine the effects of Cognitive-Behavioural Therapy (CBT) on post-stroke depressed patients; specifically, the study sought to establish whether there was a statistically significant difference in overall depression scores between patients on CBT and those on non-CBT.

A randomised controlled trial was adopted for the study. Multi-stage sampling procedure was used to select the participants. First, Purposive sampling was used to select 60 patients with post-stroke depression. Then simple random sampling was used to assign equal number of participants to the treatment group and control group. Data was collected through the Beck Depression Inventory (BDI) score sheet ($\alpha = .76$) with eight weeks treatment. Patients in the experimental group were put on CBT whilst those in the control group continued receiving the norm treatment (pharmacotherapy).

Data was analysed through Multivariate Analysis of Variance (MANOVA) and Multiple Linear Regression analysis. A 2×2 MANOVA indicated a statistically significant difference in means depression scores between patients on CBT treatment and those on non-CBT. Patients on CBT had lower mean depression score than those on non-CBT. The first general regression was not statistically significant in both the CBT and the non-CBT data sets. The second general regression model was statistically significant in both data sets, with 21 variables altogether explaining about 99.7% and 99.5% of the respective depression variances. However, CBT had influence on more depressive symptoms than had non-CBT treatment.

The study established that there was a statistically significant difference in the overall depression scores between patients on CBT and those on non-CBT. Therefore, CBT was effective in treating post-stroke depression, and the study recommended it as an additional treatment therapy to the traditional pharmacological treatment.

Keywords: *Effectiveness, Cognitive-Behavioural Therapy, Post Stroke Depression.*

DEDICATION

This full dissertation is dedicated to all patients with post stroke depression. I wish them acceptance of their situation as they live with lasting impairments and disabilities.

Special dedication also goes to my father Mr Chilufya Joseph and my mother Mrs Chilufya Theresa Kapumpe who started this project with me and have been there for me up to the end. They have been praying for me, encouraging me and offering financial support. To you parents, may God continue blessing you abundantly.

ACKNOWLEDGEMENTS

I would like to render my appreciation to the University of Zambia for the privilege of studying at the institution. My special and sincere gratitude goes to my supervisors Dr Ravi Paul and Mrs. Ncheka, Joyce for the job well done. You provided me with your intellectual, emotional and corrective guidance and support during this long journey of me writing this thesis.

Am truly humbled by Dr E, Kuntashula's tireless support and contribution towards my work from the beginning to the very end. Am also very grateful to all post-stroke depressed patients at UTH who participated in this study. I also wish to acknowledge Dr Mandyata, J. for his critique at the initial stage of my research.

A special love and gratitude go to my lovely parents Mr and Mrs Chilufya as well as all my siblings for their spiritual, financial, moral and academic support during the time of my study. Heartfelt thanks also go to Mr Chirwa, M. for his critical and unique academic support towards my work. Mr Phiri G and Chanda Musonda deserve special mention for their immeasurable guidance and support. I further appreciate the vital contributions made by Mr Mukuka, whose depth of knowledge in research deserves mentioning. Am also grateful to my friends: Mr Banda, P, Mr Chungu, H, Royce Mulenga and Mr Kambela, L for their generous contribution and patience towards my work; reading through, critiquing and giving useful feedback. I am grateful to my wonderful niece Mambwe and nephews: Joseph, Musonda and Fredrick for their love and understanding during the time of my study.

I truly take great pleasure in expressing gratitude to the many other persons not mentioned whose contributions to this study, be it in the form of insight, love, friendship, or prayers have inspired, encouraged and corrected me at many points.

TABLE OF CONTENTS

COPYRIGHT	i
DECLARATION	ii
CERTIFICATE OF APPROVAL	iii
ABSTRACT	iv
DEDICATION	v
ACKNOWLEDGEMENTS	vi
LIST OF FIGURES	x
LIST OF TABLES	xi
LIST OF APPENDICES	xii
LIST OF ABBRIVIATIONS	xiii
CHAPTER ONE: INTRODUCTION	1
1.1 Overview.....	1
1.2 Background of the study.....	1
1.3 Statement of the problem.....	4
1.4 Purpose of the Study.	5
1.5 Study Question	5
1.6 Objectives	5
1.7 Null Hypothesis (HO).....	6
1.8 Alternative Hypothesis (H1).....	6
1.9 Limitations of the study	6
1.10 CONCEPTUAL FRAMEWORK.....	7
1.10.1 Overview.....	7
1.10.2 Narrative for Conceptual Framework	8
1.10.3 Conclusion	11
1.11 Definitions of terms	12

CHAPTER TWO: LITERATURE REVIEW	13
2.1 Overview	13
2.2 Depression	13
2.3 Cognitive Behavioural Therapy (CBT)	14
2.4 Effects of CBT on PSD	15
2.5 Demographic Variables Predicting the Reduction of Depression Levels	25
2.6 Conclusion	28
CHAPTER THREE: METHODOLOGY	29
3.1 Overview	29
3.2 Study Design.....	29
3.3 Study Setting.....	29
3.4 Target Population.	30
3.5 Sample size	30
3.6 Sampling Procedure.....	30
3.7 Data collection and tools	31
3.8 Data collection procedure	32
3.9 Data Analysis.....	33
3.10 Ethical Considerations	34
CHAPTER FOUR: RESULTS	35
4.1 Overview	35
4.2 Descriptive Statistics of Participants	35
4.3 Effects of CBT on post-stroke depression	37
4.3.1 Differences in the Depression Scores between the CBT and Non-CBT Group	37
4.3.2 Demographic Variables Predicting the Reduction of Depression Levels.....	38
4.3.3 Specific Depressive Variables Predicting the Reduction of Depression Levels	40

4.4	Interaction Effect of Stroke Severity on Depression Scores	42
4.5	Conclusion	44
CHAPTER FIVE: DISCUSSION.....		45
5.1	Overview	45
5.2	Effects of CBT on PSD	45
5.2.1	Differences in the Depression Scores between the CBT and Non-CBT Group	45
5.2.2	Demographic Variables Predicting the Reduction of Depression Levels.....	48
5.2.3	Specific Depressive Variables Predicting the Reduction of Depression Levels	50
5.3	Interaction Effect of Stroke Severity on Depression Scores	54
5.4	Conclusion	55
CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS		56
6.1	Overview	56
6.2	Conclusion	56
6.3	Recommendations	57
REFERENCES.....		59
APPENDICES.....		74

LIST OF FIGURES

Figure 1: Conceptual framework	7
Figure 2: Sex of Participants.....	35
Figure 3: Marital Status Participants.....	36
Figure 4: Residual Status of Participants	36
Figure 5: Employment Status of Participants	37
Figure 6: Educational Level of Participants.....	37

LIST OF TABLES

Table 1: MANOVA descriptive and inferential statistics for post test scores	38
Table 2: Multiple linear regression summary	39
Table 3: Multiple linear regression summary	42
Table 4: ANOVA descriptive statistics for pre and post test scores	43
Table 5: ANOVA inferential statistics for pre and post test scores	43

LIST OF APPENDICES

Appendix A: Questionnaire on demographic characteristics of participants.....	74
Appendix B: Becks Depression Inventory.....	75
Appendix C: Information sheet.....	78
Appendix D: Consent form.....	80

LIST OF ABBRIVIATIONS

ADLs	Activities for Daily Living
AD	Antidepressants
ANOVA	Analysis Of Variance
BDI	Becks Depression Inventory
CBT	Cognitive Behavioural Therapy
CSO	Central Statistics Office
ECT	Electroconvulsive Therapy
MANOVA	Multivariate Analysis Of Variance
MI	Motivational Interviewing
PSD	Post Stroke Depression
RCT	Randomized Controlled Trial
SMS	Senior Medical Superintendent
SPSS	Statistical Package for Social Sciences
UTH	University Teaching Hospital
WHO	World Health Organization

CHAPTER ONE: INTRODUCTION

1.1 Overview

This chapter highlights the introduction to the study on the effects of CBT on post stroke depression among patients at UTH. It looks at the: background of the study; statement of the problem; purpose of the study; significance of the study; hypothesis; research question; objectives and limitations of the study.

1.2 Background of the study

Stroke survivors are at high risk of Post-stroke depression (Knapp et al 2001; Backer-Collo 2007; Ferro et al 2009). Post stroke depression (PSD) is defined as depression that comes after stroke (Price et al., 2011). It has been recognized by psychiatrists for more than 100 years, but controlled systematic studies regarding PSD began in the 1970s (Bateman, 2017). It is important to note that PSD occurs in a significant number of patients and constitutes a complication of stroke which leads to greater disability and increased mortality (Srinivivasa, 2014).

According to Bhogal et al (2009), PSD is one of the most common neuropsychiatric consequences of stroke. It often sets in once the initial period of recovery is over, and the person becomes aware of how their lasting disability may affect their everyday life (Anson and Ponsford, 2009). For example, the stroke survivor may be deprived of certain activities that they used to perform independently (Ayerbe et al., 2013). Mostly, PSD is developed due to mental distress associated with physical disability of the victim (Anther, 2015; Lindley and Bernhardt, 2010). This mental distress is usually due to the failure by stroke survivors to come to terms with the traumatizing experience of having a serious illness such as a stroke, being in hospital and /or facing the reality of having to live with some lasting disabilities (Becker et al., 2005; Kouwenhoven et al., 2011). Because of such a traumatic experience, stroke survivors feel overwhelmed by the chronicity of stroke (Knapp et al., 2000). They can't meet their everyday needs like: physical needs; emotional needs; social needs; communication and cognition needs; financial and legal needs; re-enablement needs; and carer needs (Hackett et al., 2009).

With longer stays in hospital, increased physical impairment and handicap, and increased mortality, stroke patients feel diminished. This situation isolates them and makes them feel depressed because stroke constricts their lives to a small space (Donnellan et al., 2006). More over they feel powerless, vulnerable and afraid, because the independence they yearn for is

diminished, and this affects their financial and residential stability as they receive: personal care, meals on wheels, respite care, aids and adaptations (American Stroke Association, 2013). The person who has had stroke may have to come to terms with: the loss of many of their hopes and plans for the future, adapt to a changed role in the family, and possibly the loss of a career (Knapp et al., 2000). Annika et al (2017) postulates that, “As many of us as value ourselves through everyday activities, the impact of stroke can therefore result in loss of confidence and lowered feelings of self-worth which may result in PSD.

Bueno et al (2011) says, “The circumstances surrounding stroke survivors predisposes them to PSD”. Barker (2007) adds that this may further lead to challenges of participating in community activities (Barker, 2007). If not treated, depression in the first few months of post-stroke may be associated with increased long-term mortality from all causes (Dossa et al., 2011; Carrà et al., 2012; Bartoli et al., 2013; House et al., 2009) or psychosis (Clin, 2013).

Some studies by Donnellan et al (2010) and Cafarella et al (2012) on the menacing impacts of PSD in human societies say that, PSD has serious negative impacts on humanity, individuals, and households by retarding social and economic productivity. Therefore, PSD can deter development at the scale of the individual victim, household, and nation. This implies that if PSD remains unchecked, it can jeopardize social relations that contribute a great deal to the progress and development of any society. PSD also adversely influences stroke recovery to a significant degree (Hackett et al., 2009). Patients with PSD, compared to non-depressed post-stroke patients have: more functional dependence (Diaz and Norma, 2015); poorer cognitive status (Donnellan et al., 2010); and increased medical costs. They also have an impaired rehabilitation response (Feighn and Forouzanfar, 2010); delayed return to social function and delayed return to work (Willey et al., 2010). Furthermore, PSD is associated with: poorer rehabilitative outcomes (Bueno et al., 2011); longer inpatient rehabilitation stays; increased inpatient and outpatient medical utilization (Annika et al., 2017); and inefficient use of rehabilitation services.

Global Perspective on PSD

Worldwide, research has shown that depression after stroke compounds the disabling effects of a stroke, worsens cognitive decline, increases suicidality, and overall morbidity and mortality (Kouwenhoven et al., 2011). For an individual, the sequelae of stroke can be life-altering. A previously independent person may now require others to perform the most basic

of daily activities for them (Bueno et al., 2011). Others may find themselves unable to perform their jobs or participate in their usual social activities. This significant loss of function can result in profound and debilitating depression (Feighn et al., 2010).

According to the World Health Organization (2010), PSD is prevalent in 35-70% of stroke survivors. Price et al (2011) also shows that, about 40-70% of post stroke patients worldwide suffer depression either in their early or late stages after stroke. PSD has been reported to have a prevalence of 25–80%. This prevalence is dependent upon the study instrument used for screening (Loubinoux et al., 2012). In USA PSD occurs in 18-61% of chronic stroke survivors, depending upon patient selection and criteria used; and this prevalence is in the patients referred for rehabilitation (Srinivivasa, 2014). In other countries such as Brazil, there is a prevalence of as high as 40% of depressive symptoms in post stroke patients (Feigin and Forouzanfar, 2013). Despite this huge burden of PSD worldwide, there is still paucity of data especially on the treatment part of PSD.

Region perspective on PSD

While being associated with tremendous post stroke morbidity and mortality, PSD is frequently under-recognized and undertreated, especially in Sub-Sahara Africa (SSA) (Gainotti et al, 2014). Gainotti et al (2014) associate this to the relative limitedness of resources and underappreciated issues of mental health in the region. In the developing world (Africa), PSD is a major burden because the incidence of stroke is clearly increasing (Adeloye and Stefen, 2014). It is estimated that 5% of the 30 million stroke survivors live in Africa (Broomfield et al., 2014). The prevalence of PSD might even increase in future because of increase in stroke incidences (Mayowa, 2015). Africa also recorded 1.8 million stroke survivors among people aged 15 years and more in 2009 and 2.9 million in 2013 (Anthea, et al 2015). In Nigeria, 30% stroke survivors met the criteria for major depressive disorder (Ojagbemi et al., 2013).

Zambian perspective on PSD

Data on PSD is highly limited in Zambia, and yet, a lot of adults are living with stroke (Mapulanga, 2010; Ntanda, 2011). In fact, Zambia is ranked number 53 in terms of death rates from stroke in the world (World Health Organization, 2016). According to the latest World Health Organization's (2016) data, 5% of people in Zambia suffer stroke. Stroke is the number three adult killer disease apart from being the major cause of adult disability in the country (World Health Organization, 2016). The current trend analysis reveals an upward

trend in stroke incidence (World Health Organization, 2016) and this threatens the future of Zambia's economically productive population if no intervention made. Since PSD comes after stroke, the upward trend in stroke incidences means there is also an upward trend in PSD.

Despite these alarming statistics of stroke incidence and prevalence, there is very limited literature on the screening and treatment of PSD from the literature reviewed so far. Of the 9,826 people living with stroke in Zambia, 35 -70% are likely to suffer from depression and will need effective treatment Post stroke patients in Zambia generally receive care in primary healthcare settings from non-physician healthcare workers only, rather than receiving care also from psychiatrists/ neurologists and psychologists (Ntanda, 2011).

Treatment of PSD

In the world, Africa and Zambia, it is clear that PSD is of high clinical importance. According to Katherine et al (2013), the high social and economic burden of PSD calls for effective strategies for prevention, treatment, and rehabilitation. Recent meta-analyses of randomized controlled trials for the treatment of PSD have demonstrated the efficacy of antidepressant drugs for the treatment of PSD (Robinson et al, 2015). Similarly, randomized controlled trials for prevention of PSD have shown that antidepressant drugs significantly decrease the symptoms of PSD compared with placebo, although they have a high risk of side effects (Mozaffarian et al., 2015). Mozaffarian et al (2015) further says early antidepressant treatment of PSD appears to enhance both physical and cognitive recovery from stroke.

While this study by Mozaffarian and others proposed antidepressant drug treatment for deterioration of PSD, studies by Broomfield et al (2010), Ian and Kneebone (2013), Hackett et al (2011) have demonstrated the efficacy of cognitive behavioural therapy (CBT) for deterioration of PSD. These studies however were not done locally and had some limitations in their methodologies, which have been addressed by this study. This study will therefore build up on studies done on the evaluation of the effects of CBT to determine whether it can help Zambian PSD patients at the university teaching hospital (UTH) who have traditionally relied on pharmacotherapy as a norm treatment for PSD (Mbewe, 2016).

1.3 Statement of the problem

Depression is one of the most common and serious consequence of stroke and it is prevalent in about 35-70% of stroke survivors worldwide (Bruno 2016, Bromfield et al 2014, Giabion

2015) and in about 35-60% of stroke survivors at UTH (Mbewe, 2016). PSD has a considerable impact on the victims by mortality and psychosis (Clin, 2013; Dossa et al., 2011; Carrà et al., 2012., Bartoli et al, 2013) and on households socially and economically, by loss of productivity (Mayawa et al., 2015). This implies that if PSD is unchecked, victims and social relations could be affected, making the society unfit for any kind of progression or development. Since PSD: affects many stroke survivors; comes with several threats; and cannot be prevented due to the nature of its causes and risk factors, there is an urgent need for an effective and affordable treatment therapy. Much evidence on the administration of CBT to curb PSD can be obtained from reports in both publishable and unpublishable formats.

Although there is some secondary information on the administration of pharmacological treatment to curb PSD patients in Zambia (Ntanda, 2011; Neese, 2013; Mweshi et al., 2016), there is lack of documentation on the equally important CBT for patients with PSD. This could either mean that CBT for PSD patients is not dominant in the country and therefore there are no reports supporting the non-activity, or CBT being administered to PSD patients in the country is not being reported. Because of these unclear circumstances surrounding administration of CBT to PSD patients in Zambia, there is need to establish the effects of CBT on PSD Zambian UTH stroke survivors.

1.4 Purpose of the Study.

The purpose of this study was to investigate the effects of cognitive behavioural therapy on post stroke depression patients at UTH. Specifically, the study sought to assess whether administering CBT to PSD patients would improve their depression levels.

1.5 Study Question

Is Cognitive Behavioural Therapy effective in improving the symptoms of depression among post stroke depressed patients at UTH?

1.6 Objectives

The objectives of this study were to:

1. Establish whether there was a statistically significant difference in overall depression scores between patients on CBT and those on non-CBT
2. Determine demographic variables predicting the reduction of depression levels between patients on CBT and those on non-CBT

3. Assess depressive variables predicting the reduction of depression levels between patients on CBT and those on non-CBT.

1.7 Null Hypothesis (H₀)

There is no statistically significant difference in the depression scores between patients on CBT and those on non-CBT.

1.8 Alternative Hypothesis (H₁)

There is a statistically significant difference in the depression scores between patients on CBT and those on non-CBT.

1.9 Limitations of the study

The study only targeted UTH as the study site because it has the highest prevalence of stroke cases in Zambia 4% (Ntanda, 2011). This highest prevalence is because UTH is a referral hospital and receives patients from all over Zambia.

The design did not include patients with language difficulties (Aphasia); thus preventing the researcher from knowing how the depressed stroke survivors with aphasia would be helped. Despite these limitations, the study recommended nonverbal therapies like art therapy for such patients for further research.

The study had a small sample size among which did not necessarily represent the general population of work-aged stroke survivors the whole country this small sample was due to the individualizing of the sessions because of possible lower effect of the therapy. This may have implications on the generalizations of the effectiveness of CBT as seen in the study. Nevertheless, the findings are relevant for many work-aged stroke survivors, as they are consistent with and extend other qualitative studies.

The study also had potential confounders which may have compromised the results: it was possible that some patients may have been receiving some sort of counselling from home apart from CBT and others may have not been faithful to taking medications. Even if follow ups were made on patients' adherence to medications, it was possible that some were either not consistently taking or were not just taking at all. It was also possible that some patients in the control group may also have been exposed to counselling at their respective homes.

1.10 CONCEPTUAL FRAMEWORK

1.10.1 Overview

This section focuses on the conceptual framework that informed this study. It comprises the following major themes: PSD; Electroconvulsive Therapy; Pharmacotherapy; and CBT. PSD may lead to psychosis or mortality if not treated. But before it leads to mortality or psychosis, it can be treated through pharmacotherapy, electroconvulsive therapy (in extreme cases), or CBT. This study focussed on the treatment of PSD using CBT. CBT involves cognition (thoughts) and behaviour. When someone is depressed they have thought distortions that lead to depression. This may result in negative behaviour. In the same way, behaviour also influences thoughts. That's why CBT has to be offered in order to correct thought distortions which lead to negative behaviour in PSD patients. Therefore, the whole treatment for PSD is intended to bring out a positive change (reduction in mood) in order for the victims to be integrated into the society.

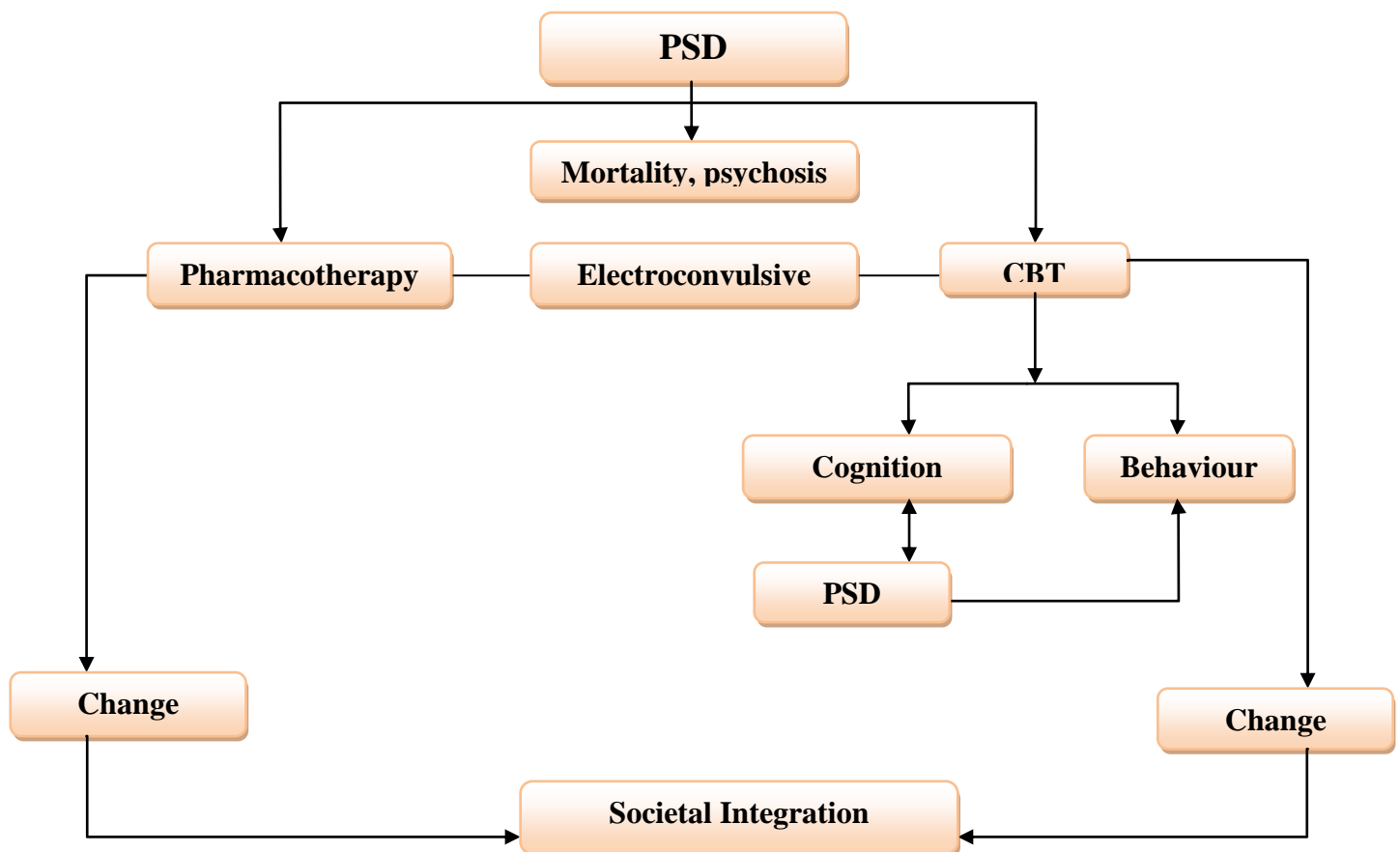


Figure 1: Conceptual framework

Source: modified from Kootker, (2014)

1.10.2 Narrative for Conceptual Framework

Post Stroke Depression

Emotional health is just as important as physical health and can promote or disrupt post-stroke recovery (Knapp and Hewison, 2014). PSD is typically defined simply as depression that develops after ischemic stroke. It is frequently described as a feeling of hopelessness that interferes with functioning and quality of life (Robinson et al., 2006).

PSD can set in weeks, months, or even years after stroke and can stop one's progress of recovery and rehabilitation, impacting on the quality of life (Souza et al., 2013). According to Schepers et al (2014) a combination of factors can lead to post-stroke depression, these include: the sudden nature of stroke can have a life-changing impact on an individual, brain damage after a stroke, genetics, and demographic factors (age, gender, marital status, social economic status, and education level).

Kouwenhoven et al (2011) emphasizes that if not treated and managed appropriately, PSD can slow down recovery and worsen a number of other common post-stroke conditions such as: malnutrition; incontinence; pain; fatigue; sleep issues and dementia (especially in adults). Post-stroke dementia (PSDem), which may present simultaneously with overlapping mood and cognitive symptoms, has a serious negative bearing on PSD patients (Clin, 2013). Apart from that, suffering from depression after stroke has a significant bearing on the chances of death (Dossa et al., 2011; Carrà et al., 2012).

Bartoli et al (2013) also discovered a significant relationship between PSD and mortality. PSD may affect prognosis and risk of mortality after stroke because stroke patients suffering from depression may be less compliant to treatment (Williams et al., 2007, Barth et al., 2006). Other studies by Robinson et al (2015), Ferro et al (2009) also demonstrated that patients with either major or minor depression-post stroke were 3.4 times more likely to die during 1-5-year follow-up, and this risk was even higher in those socially isolated (House et al., 2009).

More recently, data from a nationwide sample of veterans with ischemic stroke who survived at least 30 days post stroke showed that mortality increased by 25% in those with post stroke depression compared to those without depression (Barth et al., 2006). Because of these risk

factors, clinicians should regularly assess symptoms of depression in people who report a stroke in their clinical history and put up interventional measures as soon as possible.

Treatment of Post Stroke Depression

There are a variety of treatment options for post-stroke depression. The management of PSD includes pharmacotherapy, electroconvulsive therapy (ECT) - used especially in those with severe depressive illness and, psychotherapy.

Pharmacotherapy

Medications known as antidepressant drugs (ADs) are common treatments for PSD and may be prescribed by a psychiatrist, primary care doctor, or other physician. Antidepressant medications interact with chemicals in the brain called neurotransmitters to improve mood (Hackett et al., 2011).

ADs can be effective in most mild, moderate and severe depressive disorders but they are usually used in moderate to severe cases (King, 2008). Hackett et al (2011) reported that although ADs were able to reduce mood disorder symptoms, they had no clear effect on prevention or remission of depressive illness after stroke as well as prevention of relapse.

Chemerinski et al (2014) conducted a retrospective study on the efficacy and side effects of ADs by systematically reviewing hospital charts of 25 depressed stroke patients, who were treated with ADs. The result of this study suggested a high degree of efficacy (80% improvement of depressive symptom) and a relatively high incidence of side effects. Therefore although pharmacotherapy is the priority treatment of individuals with PSD, it has a risk of relapse and side effects.

Electroconvulsive therapy

Electroconvulsive therapy (ECT) is an older treatment for major depression that has traditionally been considered effective (Janicak et al., 2010). However, it is not recommended as a primary or maintenance therapy for PSD because chances of relapse are high (Harmandayan, 2011). It is used more often in older adults compared with any other age group. Its primary indication is severe depressive illness or when a disorder (or its symptoms) is considered potentially life threatening (American psychiatric association, 2013). A retrospective review of patients treated with ECT showed improvement in 95% of PSD (Tess,

2009); approximately 50% of patients had a pre-stroke history of major depression or alcoholism, and 85% already had received anti-depressive medications to which they did not respond or were intolerant. However, according to the results obtained from 2 small samples of 14 and 20 PSD patients (Janicak et al., 2010), approximately 40% of the patients had adverse effects such as cardiac complications, memory loss, and delirium. Therefore, there must be caution with the use of ECT for older PSD patients.

Cognitive Behavioural Therapy

Medication may be often combined with mental health therapy provided by a psychologist, psychiatrist, social worker, or counsellor. Cognitive behavioural therapy has been termed to be a good approach as its outcomes tend to be permanent as compared to pharmacotherapy (Hackett and Anderson, 2010).

Cognitive behavioural therapy as the name suggests deals with ones cognition (thoughts) and behaviour (winkle et al., 2009). The two (thoughts and behaviour) interact. The thoughts and grievances about the life and identity of the patient which are lost so suddenly and unexpectedly after stroke may trigger PSD. In the same way PSD may also trigger negative thoughts (Laidlaw et al., 2010). CBT therefore focuses on helping a patient to identify and deal with such negative thoughts and feelings that lead to undesirable behaviour, which is depression (Laidlaw et al., 2010).

The major goals of CBT include: reducing depressive symptoms; improving mood and quality of life; using health care resources appropriately; and reducing the risks of medical complications (Gallagher et al., 2009). CBT has a very strong and positive effect on patients with depression because it not only improves and builds confidence but also enhances the daily lifestyle of the patients through a range of CBT activities (Srivastava et al., 2010). By this method, CBT is designed to challenge dysfunctional thoughts or beliefs that are associated with low mood and to collaboratively establish more functional thoughts or beliefs (Joosten et al., 2012). However, patients with cognitive impairment and/or aphasia are not suited to this form of treatment (Lökk and Delbari, 2011).

CBT is aimed at giving insights towards psycho education, collaborative empiricism, active problem solving, assessing the nature and quality of supports, and improvement of the adaptation to the new lifestyle after stroke (Sam et al., 2016). Patients will find out how their thoughts may contribute to affective symptoms and feelings and how they can transform those (Kootker et al., 2012).

In all circumstances, it is recommended that the treating clinician supervises a person presenting with depression at least weekly for the first 4-6 weeks to evaluate: mood changes, suicidal thinking; physical safety; the person's social life; and adverse effects of any drugs that have been prescribed (Hackett and Anderson, 2010). For individuals diagnosed with a range of chronic disabling physical conditions, such as stroke and PSD, an 8-week course of CBT, as advised and conducted by Kemp et al (2010) and Scheffer et al (2011) proved to be effective. In general, approximately 6–8 regular sessions should be provided to patients over a period of 6-10 weeks, with most people experiencing an improvement in mood and/or a reduction in symptoms after 2 months of therapy.

Response to therapy should however be reviewed after 6 sessions (Scott and Freeman 2010) and a therapy extension period of 12 weeks is considered necessary for a person who has multiple issues or severe co-morbidity (Hackett and Anderson, 2010).

1.10.3 Conclusion

Having established the interaction between thoughts and behaviour, CBT is proposed to be a treatment strategy basically aimed at changing the thought processes of individuals with PSD from negative to more rational and positive ones so that; despite their stroke, they can still be integrated back into the society, and once again become productive.

1.11 DEFINITIONS OF TERMS

Cognitive behavioural therapy: Psychotherapeutic approach that focuses on helping one identify and deal with such negative thoughts and feelings that lead to undesirable behaviour.

Post stroke depression: Depression that follows stroke, with disability being the major psychological stressor.

Demographics: statistical data about the characteristics of a population, such as the age, gender and income of the people within the population. When the census assembles data about people's ages and genders, social economic status, and employment, this is an example of assembling information about demographics.

Depressive variables: These are symptoms that contribute to the low or depressed mood of an individual. For example: feeling sad and pessimistic. In this study, depression was diagnosed using 21 depressive variables.

Pharmacotherapy: The treatment of disease, especially mental illness with drugs.

CHAPTER TWO: LITERATURE REVIEW

2.1 Overview

The chapter presents literature review on the effects of CBT on PSD. It focuses on reviewing studies across selected parts of the globe except in Zambia where there is still scarcity of such studies. For each study, the purpose, methodology, findings and critique are provided. Thus, the chapter is structured in such a manner that it contains the following sections: the first section describes PSD; the second section discusses CBT; the third section gives empirical evidence from various studies on the effects of CBT on PSD patients; the fourth section is on critiquing the studies on the effects of CBT on PSD; the fifth section critically analyzes studies on demographic variables predicting the reduction of depression; and the final section contains the conclusion of the chapter.

2.2 Depression

Sadness and depression are common feelings after a stroke, but they should not be considered a “normal” part of recovery (Robert et al., 2015). Depression is a serious sequelae of strokes of all types and is very evident in individuals with stroke. Thirty (30) to 70% of post stroke patients develop depression, either in their early or late stages after stroke (Stefano, 2009; Bruno, 2016; Giabion, 2015; Broomfield et al., 2014; Hackett et al., 2014).

The Diagnostic and Statistical Manual (DSM-V, 2013) criteria views depression to involve: “feeling sad; blue or down in the dumps (depressed mood); a loss of interest in pleasurable activities; significant weight loss or weight gain (decrease or increase in appetite); insomnia or hypersomnia nearly every day; psychomotor agitation or retardation nearly every day; feelings of worthlessness, hopelessness or despair; diminished ability to think, concentrate or difficulty making decisions; anxiety or worry; fatigue or loss of energy; suicidal feelings or thoughts; low self esteem and feelings of guilt. Five of these symptoms must be present during the same two-week period and present a change from previous functioning and last for anything from a few months to more than a year; and at least one of the symptoms should be depressed mood or loss of interest in pleasurable activities.” Depressed individuals also tend to begin to worry less about their appearance and view their surroundings with indifference (Hackett et al 2009).

According to the DSM IV, PSD is categorized as a “mood disorder due to a general medical condition (i.e., stroke)” with the specifiers of depressive features, major depressive-like episodes, maniac features, or mixed features (American Psychiatric Association, 2013). Persistent depression does not only increase the disease deterioration, but also causes social function defects, and increases the risk of suicide. Moreover this condition can have an adverse effect on cognitive function, functional recovery and survival.

PSD is one of the unresolved issues in recovery and rehabilitation of the stroke patients and it has been considered the most common neuropsychiatric consequence of stroke (Hackett et al., 2011). According to Fróes et al (2014) PSD may either directly or indirectly lead to more significant impairments in daily activities, which require more careful services and institutionalization of stroke patients. The risk of fatality is higher in stroke patients with depression compared with non depressed stroke patients (Souza et al., 2013). Other consequences of PSD include higher health care costs, diminished social abilities, and an increased risk of vascular-related events and death (Price et al., 2011).

2.3 Cognitive Behavioural Therapy (CBT)

CBT is defined as a psychotherapeutic treatment strategy that entails recognizing, registering and altering negative thoughts or thought-distortions so that mood and emotional symptoms are improved (winkle et al., 2009). According to Joosten et al (2012), CBT offers a chance for an individual to recover and/or adapt to their situation following stroke. CBT is a psychotherapeutic approach, that is, a talking therapy that aims at solving problems concerning dysfunctional emotions, behaviours and cognitions through a goal-oriented, systematic procedure. The title is used in diverse ways to designate behaviour therapy, cognitive therapy, and a combination of the two (Lökk and Delbari, 2011).

Moreover, “CBT is aimed at treating a variety of problems including: mood; anxiety; eating; substance abuse; and personality disorders by changing irrational cognitions and negative thoughts. It is considered to have a stronger effect on preventing relapse of depressive symptoms than pharmacotherapy” (Lai et al., 2009; Anson et al., 2010; Linden et al., 2011). In a study done by Sembi et al (2010) that dealt with treatment of PSD, CBT was found to be designed to challenge dysfunctional thoughts or beliefs that are associated with low mood and to collaboratively establish more functional thoughts or beliefs. Laidlaw et al (2010) however, states that, patients with psychotic impairment and/or aphasia are not suited to this form of treatment.

CBT is also based on giving insights towards psycho education, collaborative empiricism, active problem solving, assessing the nature and quality of supports, and improvement of the adaptation to the new lifestyle after a stroke (Gallagher et al., 2009). Patients will find out how their thoughts may contribute to affective symptoms and feelings and how they can transform them.

2.4 Effects of CBT on PSD

Hackett et al (2011) says, “Experiencing a stroke and its aftermath (depression) can be devastating for patients and their families. This devastation may be due to physical, social, and psychological consequences.” While the medical and physical effects of stroke are necessarily treated first, psychological and social injuries need treatment too. Some studies concluded that CBT would help patients with PSD (Ian and Kneebone, 2012; Hackett et al., 2014). CBT is important because it empowers both survivors and their families to manage PSD and it also stimulates essential drives for recovery such as: determination to live and thrive; and desire to connect with others (Buttle et al., 2011; Hofmann et al., 2013). However, according to the reviewed literature, no study has been done in Zambia to assess the effectiveness of CBT on post stroke depressed patients.

2.4.1 Empirical Evidence

Empirical evidence suggests that CBT has long-term consequences for physiological, emotional and psychosocial well-being. It also plays an important role during a patient’s recovery from stroke (Ian and Kneebone, 2012; Hackett et al., 2014; Buttle et al., 2011; Hofmann et al., 2013).

For individuals who are diagnosed with a range of chronic disabling neuropsychiatric conditions, such as PSD, an 8-week course of CBT, as advised and conducted by Kemp et al (2010) proved effective. According to Lökk and Delbari (2011) approximately 6–8 regular sessions should be provided to patients over a period of 6-8 weeks, with most people experiencing an improvement in mood and/or a reduction in symptoms after 2 months of therapy. Hackett and Anderson (2010) state that, “For a person who has depression due to multiple post stroke issues or severe co-morbidity, response to therapy should be reviewed after 8 sessions. However, a therapy extension period of 6 months is considered necessary.” Australian and Depression (2009) add that, “CBT may be combined with antidepressant drugs (Ads) to reduce residual symptoms and the risk of relapse in patients with severe depression.”

Kootker et al (2012) also reported that patients with PSD who were treated with augmented CBT tailored to their needs, showed a larger decrease in BDI scores than the controls. Moreover, this study established that augmented CBT leads to better outcomes in societal participation, goal attainment and coping strategies of the participants. According to Lökk and Delbari (2011) CBT has a very strong and positive effect on PSD patients because it not only improves and builds confidence but also enhances the daily lifestyle of the patients through a range of activities. In addition, the treatment requires qualified health professionals to constantly evaluate the participants, making it easier to satisfy the diverse needs of the individuals.

According to Weinberger et al (2009) CBT can help to deal with PSD and promote functional independence and quality of life, for example, it can help a person with PSD to overcome grief over situations like the loss of mobility as a result of paralysis and difficulty or inability to perform Activities for Daily Living (ADLs) in the manner they used to perform. CBT may also enhance self-confidence and self-efficacy by encouraging the stroke survivor (Kirkevold et al., 2014).

In the study by Renee et al (2013), 60 Participants with PSD underwent a structured CBT for 12 sessions. There was a significant decline in the level of depressive symptoms over the course of CBT. This was because according to the methodology of this study, CBT techniques were applied and patients learnt how to manage their thoughts, feelings and behaviour. Other studies also found CBT to be effective in improving mood (Rossello and Jimenez-Chafey 2006; Lustman et al., 2009, Kootker et al., 2012, Kootker et al., 2014). Findings from these studies showed that, in comparison with the rate of depression before the CBT intervention, the rate of depression in patients who underwent CBT had a considerable decrease after the intervention. Therefore CBT was recommended as a better treatment modality for PSD.

2.4.2 Critique

Jacquiline et al (2006) looked at unmet needs as stressors for PSD patients and recommended that they should be subjected to psychological treatments. However, this study did not recommend a specific type of therapy suitable for individuals to overcome those stressors. Ian and Kneebone (2009) on the other hand identified CBT in particular for treatment of post stroke depression as worthy of further investigation for its effectiveness. Ian and Kneebone only ended at suggesting CBT without carrying out an experiment to test its effectiveness.

Unlike Ian and Kneebone (2009) who did not carry out an experiment, this study has carried out an experiment and used it to study the effects of CBT by subjecting PSD patients to CBT and assessed its effectiveness.

Studies done to suggest that CBT can positively affect the recovery of functional skills in post stroke patients are few. This is because measuring the specific effects that CBT can have on functional outcome following a stroke is difficult in practice (Bozikas et al., 2012; Lieberman et al., 2010; Kohen et al., 2015). However, among the few studies, some seem to have successfully identified the positive effects of CBT on functional and emotional recovery in depressed stroke survivors.

Glass et al (2005) only looked at performance in both mobility and ADLs. They proposed that ADLs are to be a demonstrative indicator of recovery and they found that patients on CBT improved more extensively than those without. However, they only concentrated on ADLs and not how CBT impacts on the symptoms of depression in stroke survivors.

Mainly (2011) also found CBT to be efficacious in individuals with PSD. In his findings, he used a sample which consisted only of moderately depressed patients. He proposed that in future research patients with mild PSD should also be captured. This he proposed because stroke survivors with milder depression are the most vulnerable because hospital staff, friends and family may underestimate their need for social support and this leads to a weaker recovery. This study therefore captured PSD patients from mild clinical depression to severe; also taking into consideration those with major and minor strokes.

Cicerone et al (2012) found that CBT does not only improve the extent of recovery but also the speed at which recovery takes place. He further said that, higher levels of CBT are predictive of a more rapid rate of recovery, even among patients with severe PSD. Cicerone, et al (2012) however carried out the study among the young age group of 18- 30 years only and did not consider the middle-aged and the aged groups. It seems clear therefore that whilst there are some studies investigating the effects of CBT on emotional recovery from stroke, further research would complement the already existing literature in this area.

Since many patients suffer from emotional problems following stroke -most common among them being depression, Knapp and Hewison (2014) found a significant relationship between availability of CBT and emotions. They also established that this was consistent with the buffering theory, which postulates that, psychosocial support affects well-being by reducing

or removing the impact of stressors. However, the study relied on secondary data collection from the medical personnel. Therefore, this study will experiment on the actual PSD patients.

Åström et al (2011) suggested that CBT may not be immediately associated with post-stroke depression, but rather its influence manifests at a relatively later stages. This insinuates a later shift towards the need to provide CBT when patients have been discharged from hospital and are adapting to life after their stroke. The study by Astrom et al (2011) did not consider that in-patients may also be prone to PSD but it only captured out-patients. This study will therefore capture both in and out patients as long as they meet the inclusion criteria.

Ian and Kneebone (2016) also viewed CBT to be efficacious in people with depression after stroke. However, their sample consisted of older patients of 70 years and above. On the contrary, the sample of this study consisted of participants within the most productive age group of 35-65 (Central Statistics Office, 2016).

Other studies have supported the use of CBT for PSD since it proved efficient when used on patients with the following: a range of acquired brain injuries (Sheikholeslami , 2010; Thim and Antosen, 2014); those with other neurological conditions such as multiple sclerosis (Hind et al., 2014); and Parkinson's disease (Williams et al., 2014; Winkle et al., 2009). These studies generalized their conclusion based on other acquired brain injuries and not actual stroke. Therefore, while there is some evidence that CBT is effective for PSD, more research is required because the conclusion of the effectiveness of CBT on PSD was based on patients with similar conditions to stroke and not the actual stroke.

Other findings by Rossello and Jimenez-Chafey (2006) showed that CBT was effective in reducing signs of depression in diabetic patients. The study was done on individuals with diabetes and not stroke. Apart from that, findings by Lustman et al (2009) showed that the reduction in depression signs and the percentage of patients who were relieved from depression were both higher in the group which participated in CBT than that which did not. Moreover, Kootker et al (2012) also reported that patients with PSD treated with augmented CBT tailored to their needs, showed a larger decrease in BDI scores than the controls. Therefore, according to Kootker et al (2014) CBT also yielded positive results in the group exposed to CBT as compared to the one which was not exposed to CBT.

Uher and Pavlova (2016) did a study to determine the long term effects of PSD treatment. In the CoBaIT trial, 469 primary care patients with depressive symptoms of at least moderate

severity and who also adhered to antidepressant treatment were included in the study. These patients were randomly allocated to be offered a course of 12 to 18 sessions of individual CBT or to continue their usual care that included antidepressants. Most participants had chronic and severe depression with co-morbid anxiety disorders. The study established that those who were offered the adjunctive CBT had fewer depressive symptoms and were more likely to fulfill criteria for response at 6 and 12-month follow-up. That suggested that the effects of CBT for depression can last for years. Uher and Pavlova (2016) further said that, although antidepressant drugs and brain stimulation treatments are effective only as when treatment is continued, CBT provides long-term benefits without continued treatment or booster sessions. This is probably because the participants learn skills that they continue practicing even after the treatment stops.

The study by Uher and Pavlova (2016) encompassed critical areas around CBT for PSD. It addressed the long-term effects of CBT; however, it treated depression with anxiety at the same time instead of separating the two and addressed the two using different CBT techniques for each; besides, the period of study was very long which presents a possibility of losing participants.

Broomfield et al (2010) confirm in their study that there is sufficient reason to believe that CBT offered by a trained psychologist can be effective in PSD treatment when adapted and tailored to the specific needs of patients with stroke. However, Broomfield's (2010) study was retrospective; it also relied on secondary data from medical personnel. However, this study will experiment with the actual PSD patients.

Kemp et al (2010) investigated the effects of brief cognitive behavioural group psychotherapy for depression on 41 older adults with and without disabling illness. Eighteen (18) older adults with disabling illness who were selected included some people who had a stroke. Results indicated substantial decreases in depression, but the study was a quasi-experiment. It did not include a control group and the potential confounders were not put into consideration.

Renee et al (2013) performed a study on 22 patients to assess the effect of CBT on post-stroke patients suffering from depression. In their study, BDI was used before and immediately after the intervention. The findings of this study showed that in comparison to the rate of depression before the intervention, the rate of depression in these patients had a considerable

decrease after the intervention ($p \leq 0.0001$). Renee did not have a control group for this study and potential confounders were not put in place.

Bateman et al, (2017) also carried out a study to find ways to provide psychological interventions for people living with the consequences of stroke. Particularly, this was to help people overcome anxiety and depression after stroke through the use of computerized CBT. The main objective was to test the acceptability and effectiveness of the approach in such a group of patients. Evaluation of outcomes was carefully monitored using self-administered questionnaires. Results for the project were consistent with expectations that, computerized CBT was found to be helpful in reduction of depression. Although this study found positive results after the intervention, it may not be applicable to Zambian PSD patients because most of them are computer illiterate; besides that, PSD patients have an impaired use of hands which may be difficult for them to operate computers.

Fotowwat (2012) also did a study to evaluate the effectiveness of Cognitive behavior Therapy (CBT) on depressive symptoms among 50 female stroke patients of mean age of 21 in Karachi -a cosmopolitan city in Pakistan. Counselors who were used in the intervention were qualified clinical psychologists (trained in cognitive behavioral therapeutic interventions). Patients who consented to participate and fulfilled suitability criteria for Cognitive Behavioral Therapy (CBT) were assessed at baseline and at end of therapy sessions. Individual, face to face therapy was offered to participants by using a structured manual of CBT prepared by Naeem and Kingdom (2010). The program comprised of 12 sessions these sessions were offered over the 12 weeks period. Apart from married females being excluded from the study, also patients with history of chronic or severe physical and mental illness and females with history of drug abuse were also excluded. Scientific observation and analysis of the data provided evidence that computerized cognitive behavior interventions are effective in alleviating depressive symptoms of young females. Thus the alternative hypothesis (H1) for this study was supported by the data indicating a high level of significance at $p < 0.05$.

However, Fotowwat (2012) was not clear as to why the married participants were excluded from the sample. Also, the study did not state why they had to consider only female patients and not the male patients as participants. The study was only carried out among middle-aged adult patients. However, the study considered most of the demographic and socioeconomic characteristics of PSD patients as opposed to the study done by Bateman et al (2017).

Nakagawa et al (2015) also conducted a study to compare the effectiveness of CBT as an augmentation strategy to treatment with antidepressants). The study was a: 16-week; assessor-blinded; randomised; parallel-groups superiority trial, with a 12-months follow-up at an outpatient clinic being part of usual depression care. Post stroke Patients aged 20–65 years with major Depressive Disorder who had experienced at least one failed trial of antidepressants, were randomly assigned to receive CBT plus treatment as usual (antidepressant drugs), or treatment as usual alone. Results were significant at $p < 0.05$; meaning CBT was effective in helping patients with PSD.

Nakagawa's study had some merits; it considered a wide age range, was a randomized controlled trial and in its inclusion criteria also considered patients who have experienced one failed trial of antidepressant drugs. However, it had not stated clearly why they had to exclude patients with suicidal ideation in the sample. Meanwhile, suicidal ideation being a threat to depressed patients may need to be addressed quickly in patients suffering from any kind of depression; thus, the current study addressed suicidal ideation as part of the depressive variables.

Unwin et al (2016) did a study with a total of 265 participants with PSD who were included across the 11 trials (range: 5–70; $n = 30$ in studies on anxiety; $n = 156$ in studies on depression; $n = 79$ in studies on mixed clinical presentations).

The review located 11 trials that reported on the effectiveness of CBT for anxiety or depression. These trials reported varying results with some reporting no overall treatment effect while other studies reported significant treatment effects that were maintained at 3-month follow-up. These discrepancies may be due to methodological differences. For example, there could have been a challenge in monitoring all the studies that took place at the same time. These trials would have been conducted at different times in order to have a good number of participants attending CBT sessions. The trials also included a group of psychotic patients; which inclusion might have caused a limitation and may have led to the negative or distortion of findings. The study also mixed up patients with depression and anxiety, making it difficult to know where exactly the patients improved and did not improve.

There have been mixed findings globally on the efficacy of CBT on PSD patients. A study was conducted by Lyvia et al (2008) on patients who scored 10 on the Beck Depression Inventory (BDI) or > 18 on the Wakefield Depression Inventory (WDI). The CBT was

offered for up to 18 sessions. There was no mood outcome difference between the groups. The explanation that could be given for this may be treatment participation. Treatment participation might have been poor because of the length of treatment. Since post stroke patients are physically disabled, response to treatment reduces with time as they need to come to the hospital for treatment frequently. This may become costly for them and they may withdraw at a certain point. Finding of Lyvia et al (2008) study supports the view that treatment of depression after stroke demands a modified approach.

In order to focus on evidence of CBT's efficacy for PSD, there are some studies to note. For example, a small pilot study by Lincoln et al (1997), where treatment was delivered to 19 participants out of a possible 155 identified were diagnosed with major depression. Each participant acted as their own control during baseline. All participants were assessed using the BDI, the Hospital Anxiety and Depression scale, and clinical interview. In this study, CBT involved a combination of distraction methods, cognitive restructuring, behavioural activation and psycho education. A 4-week baseline was offered, with the number of treatment sessions determined by therapist and participant, up to a maximum of 10 sessions. The primary outcome variable was weekly BDI scores. As a group, participants showed significantly reduced BDI scores over time. Four participants showing consistent benefit of CBT, six showed some benefits and nine showed no benefits at all. This indicated improvement in their condition before CBT was administered.

Overall, while there are some merits of this study by Lincoln et al (1997), there are a number of limitations such as the small number of participants receiving CBT out of those identified (19 out of 155). Also, there was a lack of experience in the delivery of CBT and it is unclear as to whether the treatment was provided according to a specific CBT manual and whether individual therapists were receiving supervision and support from experienced CBT practitioners. Lincoln et al (1997) concluded that CBT for PSD may be effective for some patients, and argued for larger scale evaluation.

Similar to Lincoln et al (1997), Rasquin et al (2009) administered CBT to five first-episode depressed stroke survivors using a single-subject quasi-experimental AB design. Following a 4-week baseline, participants completed eight (weekly, 1-hour) treatment sessions of CBT for PSD with a psychologist. Patients received an intervention book adapted for stroke patients. Structure was clear with easy-to-understand information, accounting for participants' cognitive difficulties. Initial treatment sessions covered mood monitoring and relaxation

which were in sessions two, three, and four, then cognitive restructuring in sessions five and six and activity planning (sessions seven, eight). Homework exercises were frequent. Results were mixed, consistent with Lincoln et al. (1997). Not all participants showed consistent improvements and some continued to complain of depressogenic symptoms. Rasquin et al (2009) conclude that CBT may have had impact, but that larger scale, including a control group will be required in order to clarify how efficacious this intervention can be.

Lincoln and Flannaghan (2003) followed-up the earlier work by Lincoln et al (1997) and carried out a randomized controlled trial (RCT) of CBT for PSD. In this pioneering study, participants were randomly allocated to receive one of three options which were: 10 sessions of CBT; 10 sessions of attention control interviews with no therapeutic intervention; or usual care (no treatment). In this trial, attention placebo comprised supportive discussions regarding the physical effects of stroke. In total, 123 participants who had experienced stroke after 1, 3 and 6 months were recruited into this study. Participants were assessed as depressed on the BDI and the WDI and Scheduled for Clinical Assessment of Neuropsychiatry clinical interview. Only 60 participants met diagnostic criteria for depression. Manualized CBT was consistent with that provided by Lincoln et al. (1997). Outcomes were assessed by an Assistant Psychologist at 3 and 6 months. According to the results there were no differences between the three conditions.

Despite the lack of a clear benefit of CBT for PSD, the study by Lincoln and Flannaghan (2003) should not be dismissed entirely. The study, being first of its kind to examine CBT for PSD using randomized controlled methods, was both pioneering and well conducted. Such treatment research involving brain-injured populations is always difficult to organize and deliver which likely accounts for the lack of previous attempts.

Several methodological limitations may account for the null effect. Potential participants were not referred to by a third party, but were selected from the stroke register, based on BDI, WDS and SCAN data. Thus, no a prior judgments were made by referrers regarding patient suitability and motivation for change. Since patient suitability for CBT was not assessed ahead of inclusion, no detailed assessment of cognitive deficits was made. Moreover, patients were recruited early in the pathway, that is, at just 1 month post stroke. Arguably, this may have increased the likelihood of spontaneous recovery effects (Eams et al., 2003).

Furthermore, the one trial therapist used was not only inexperienced (a research nurse, not a CBT therapist), but also delivered both active conditions (CBT and attention placebo). It seems somewhat questionable whether any one individual within the context of a research trial could switch from delivering CBT to delivering supportive discussion, without error or at the very least contamination between treatment modes. Thus, while the neutral outcomes observed by Lincoln and Flannaghan (2003) are disappointing, it is arguable that a definitive trial has not been conducted to measure the impact of CBT on PSD.

Also, another randomized controlled trial by Lincoln and Flannaghan (2010) showed that CBT in the treatment of PSD was not effective, and they suggested that further evaluation is needed to more clearly assess the role of CBT in PSD. In addition, in a Cochrane review by Hackett et al (2011) for CBT after stroke, it was shown that psychotherapeutic intervention for PSD has failed to provide evidence for effectiveness.

Another study was carried out which showed no deference in mood among the PSD patients after the CBT intervention (Spalletta et al., 2012). The lack of differences in mood observed may have been due to the short duration and low intensity of CBT. Previous studies have identified gains from courses of 4 to 8 sessions (Thompson, 2009) and a review of 7 empirical studies of cognitive therapy in elderly people with depression found the average length of treatment to be 6-8 weeks (Scott et al., 2010). This suggests that the study done by Spalletta et al (2012) may not have offered sufficient treatment. However, the pilot study had suggested an improvement in mood with an average of 6.4 sessions per patient (Scheffer et al., 2011). This shows a mix in the findings on the CBT intervention summons a demand further research.

Literature on effects of CBT on PSD patients is highly limited in Zambia as the reviewed studies in rehabilitation have put more emphasis on the following aspects: physical therapy, occupational therapy, speech therapy, recreational therapy and group activities and not CBT (Mwanza 2015, Masharip 2012). Apparently, according to the reviewed literature, there is hardly any study that has looked at the effects of CBT on PSD patients.

According to the literature reviewed in this study so far, there has been no literature to determine specific depressive variables predicting the depression levels, studies on this one are very scarce, not only in Zambia but in Africa and across the globe. Most of the studies in this area considered depression reduction as a whole and not which specific symptoms predict reduction of depression more than the others. This is important and yet, it has been

overlooked. It is important because it clearly states which areas CBT works more so that suggestions could be made on how CBT strategies could be employed on patients to improve in areas where CBT seems not to be yielding positive results. Further research is therefore needed in this area.

2.5 Demographic Variables Predicting the Reduction of Depression Levels

Demographic variables such as age, gender, marital status, educational level, residential status and employment status may be suspected to be predictors or moderators for reducing depression in PSD patients. There has been mixed findings on demographic factors associated with reduction of PSD levels. While some studies found demographic factors to predict reduction of depression, (Schepers et al., 2014) found men to be more likely to recover much quicker from depression following a stroke than women; other studies found no statistical association between the two (Kouwenhoven, 2013).

Thimm and Antosen (2014) did a study to assess the effect of CBT on PSD. The study had 143 participants who were exposed to 10 CBT sessions. The BDI was used as an outcome measure. CBT yielded positive results. However, there were no significant differences on the demographic variables (age, sex, partner status, education, social economic status and working) examined between treatment responders and non-responders. Despite having a good sample and a reasonable period for CBT sessions, the study was also a quasi experiment and potential confounders were not taken into account.

Cohen et al (2015) also carried out a study to analyse whether key variables associated with prevalence of post stroke depression also predicted treatment response. He used Hamilton's Rating Scale for Depression Response to measure a brief psychosocial/behavioural intervention on posts stroke depression. Initial depression severity, hemispheric location, level of social support, age, gender, and antidepressant adherence did not interact with the treatment in accordance with percent change in Hamilton Rating Scale for Depression.

This study was done on patients who were depressed due to Parkinson's disease. Even though the findings claim that they can be generalized to PSD, individuals with Parkinson's disease have a slight cognitive impairment which may affect the findings, and it's not clear whether they were excluded from the study; however, this study excluded individuals with cognitive problems as they may not have benefited from CBT.

Another similar study was done by Sonnenberg et al (2010) on patients depressed due to physical disabilities and it included some individuals with stroke. There were no statistically significant differences between the groups in any of the clinical or socio demographic variables, except for mean education years (CBT > Control group, $P = 0.040$). The findings showed that the number of years of education contributed positively to the treatment outcomes.

However, some studies report positive association between old age group and PSD treatment response (Mshelia et al., 2014) while others suggest positive relation between treatment response and young age group (Eriksson et al., 2004; Verdelho et al., 2004) The former say that older patients have tendency to accept their deficiencies more easily as compared to the young ones and that young patients may respond negatively to the deficit occurred and feel unjustly deprived from a portion of healthy life. Others have reported on middle age group (Norma, 2015; Srinivasa et al., 2014). They say that 50% stroke survivors within 37–46 years recovered faster from PSD. In these studies, 60% of the stroke survivors that were aged between 47 and 56 years recovered faster; however, only 11% older adults aged 57–66 years stroke survivors recovered (Ibeneme et al., 2016). This mixture of findings calls for further research to establish whether at all age predicts treatment outcomes for PSD.

Similar to the findings of this study, a study by Cuijpers et al (2014) examined the extent to which gender moderates or predicts outcome, in PSD patients using the Hamilton Rating Scale for Depression-17-item (HAM-D-17), with mixed effects models. Despite the high statistical power, there was no indication that gender moderates treatment outcome (i.e., no indication that either men or women respond better or worse to CBT than to pharmacotherapy or vice versa). This study concluded that, the lack of predictive relations in this good sized sample suggests that gender neither predicts nor moderates differential response to CBT versus medication treatment.

Other studies also suggest no relation between gender and post stroke depression in terms of response to treatment (Mshelia et al, 2014; Norma, 2015). One study however found the importance of time factor in association to gender classification and post stroke depression recovery. During the first year after stroke no association between gender and post stroke depression was observed but after 18 months post stroke, males responded negatively to treatment as compared to females (Chollet et al., 2011). Although it is not clearly stated how exactly patients were treated for this period, this study was longitudinal in nature observing

patients for a long time. And the period for sustenance and relapse (which was not clearly stated) was probably not taken into account which is why there is mention of 18 months. This study has a weakness because the period was too long for post stroke patients. This could result in loss of patients due to different natural circumstances.

However, in other studies, positive response to CBT was found higher among women than men (srinivasa et al., 2014; Zhang et al., 2013; Ibeneme et al., 2016). It was assumed that women responded positively than men because they naturally express themselves easily as compared to their counterparts. CBT being a talking therapy therefore worked well with women than men according to this study in that 45% of females recovered faster as compared to 35% of males. However, this figure is not clear due to exclusion of patients with impaired communication, such as patients with aphasia or patients with dementia (Fiske et al., 2010). Apart from that, the sample of this study only consisted of 25% of stroke patients while the rest were patients with acquired brain injuries. It was therefore not clear whether the positive response to CBT for females was coming from patients with other acquired brain injuries or specifically from those with stroke. This study however experimented only on PSD patients

As for educational level, a study by Kim et al (2010) was done to determine demographic and social economic factors predicting depression among patients with depression. The interaction effect showed that individuals with high levels of education as compared to individuals with medium or lower levels benefitted less from treatment in the CBT group than in the controls.

Høifødt et al (2015) did a study to investigate marital predicting depression levels. Results indicated substantial evidence that being married or cohabiting predicted a more positive treatment response. Except for marital status, there was substantial evidence that several variables were unrelated to treatment response, including gender, age, educational level and pre-treatment symptoms of depression. The study however was done among the general depressed population and the psychological stressors for the general depression are different from the stressors for PSD. Therefore this may not be generalised also to account for PSD.

Fournier et al (2010) did another study to determine if demographic variables predicted depression levels. All the variables emerged from this domain: age, marital status, employment status, and the number of life events presented a statistically significantly result in predicting the effect of treatment outcomes for the depressed stroke patients.

Studies by Thorn et al (2011) and Campbell (2011) also found that low literacy and other demographic variables still posed potential barriers to participation and positive outcomes of CBT for patients with stroke and other acquired brain injuries. Their findings stipulated that individuals with lower education and reading levels were less likely to begin treatment, and participants with lower education and income were less likely to complete treatment. Campbell, (2011) advised that further research is needed to develop and test strategies for improving CBT participation and efficacy for individuals with low literacy or education.

According to these studies, written homework, common in CBT may have posed challenges for some individuals, even when adapted for lower literacy; this was probably why individuals with low literacy levels responded poorly to CBT. This study however did not encounter that as a challenge because it incorporated oral and art homework for the patients with low educational levels. This was ideal not only because of low literacy levels but also because most individuals with stroke could not use the hands effectively; they rather responded more orally.

Of all these studies, there was none which was done in Zambia to establish whether the demographic factors have an effect on the outcomes of CBT treatment for individuals with PSD. According to the reviewed literature, this was the first study ever to take into account such factors. However, further research needs to be done with a larger sample and more than one different study sites for clear findings.

2.6 Conclusion

The reviewed literature has shown that most studies have found CBT for PSD to have benefits. However, these studies are generic, largely descriptive and non-experimental in nature. Their major weaknesses are that, while some have mainly focused on the pre-post test experiments, which are at the risk of confounders, others have focused on data from secondary sources, that is, medical personnel. However, the studies that have included a control group tend to have other limitations in the methodology. Much of the literature does not necessarily depict how the strategy of the use of CBT affects patients with PSD by experimenting on the actual patients to establish whether it may curb depression or not. Therefore, this study has differentiated reduction of depression between patients on CBT and those on the traditional pharmacological treatment.

CHAPTER THREE: METHODOLOGY

3.1 Overview

The chapter explains in detail the: study design; study setting; study population; study sample and the sampling technique; research instrument used for data collection and data collection procedures. The chapter further describes the procedure on how data was analyzed and finally ends with the ethical considerations.

3.2 Study Design

This study adopted a randomized controlled trial (RCT). According to Christie et al (2011), A RCT is a type of scientific (often medical) experiment which aims at reducing bias when testing a new treatment. The participants in the trial were randomly allocated to either the group receiving the treatment under investigation or to a group receiving standard treatment as the control. Randomization minimises selection bias and the different comparison groups allow the researchers to determine any effects of the treatment when compared with the no treatment (control) group, while other variables are kept constant (Bradley, 1977). According to Christie et al (2011), a RCT is a type of experiment that provides insight into cause-and-effect by demonstrating what outcome occurs when a particular factor is manipulated. This study design was adopted because it deliberately imposes a treatment on a group of objects or subjects in the interest of observing the response (Bradley, 1977). Further, it also provides a unique example of real people in real situations, enabling readers to understand ideas more clearly than simply by presenting them with abstract theories or principles.

The study implored quantitative approaches to understand effects of CBT on PSD patients. Mills et al (2010) noted that the use of quantitative research methods was adopted in order to ensure validity, reliability and objectivity to a study (Adair et al., 2008). The advantage of the quantitative approach is that it results in a more comprehensive, well validated and substantiated set of data (Cribbie et al., 2015).

3.3 Study Setting.

The proposed study setting was the University Teaching Hospital (UTH) clinic five- Lusaka, Zambia. UTH is targeted because it is the main hospital with most of the facilities as compared to other hospitals. It has the highest percentage of stroke patients (4%) in the district and Zambia as a whole.

3.4 Target Population.

According to Malliari and Togia, (2016) a study population can be described as a set of cases, objects or events of interest to the researcher; from which he or she wants to draw a sample. Whyte (2003) defined a population as the universe of units from which the sample is to be selected. Therefore the target population of this study comprised of 171 patients with PSD within the age group of 35 to 65 years from UTH, seeking treatment for stroke attack, from the period of March to June, 2017. The patients were either in or out patients, within the period of one month and more- post stroke and medically stable, (judged by their physician/stroke team). This age group was selected as it is the most productive age (CSO 2016).

3.5 Sample size

According to Whyte (2003), a sample is a subset or group of subjects selected from the larger population and whose characteristics can be generalized to the entire population. For Dilevko (2011), a sample comprises elements of the population considered for actual inclusion in the study, or a subset of measurements drawn from a population in which researchers are interested. The sample for this study was therefore calculated using the formula below:

$$n = \frac{z^2 \times p \times (1-p)}{d^2}$$

Where n is sample size, z is standard normal variate (1.96), d is confidence limit or level of significance (0.05), P is the prevalence of patients with PSD at 3.5% (Ntanda, 2014).

$$n = \frac{1.96^2 \times 0.035(1-0.035)}{0.05^2}$$

$$n = 60 \text{ patients with PSD.}$$

3.6 Sampling Procedure

The research used multi-stage sampling procedure. Stage one: purposive sampling procedure Stage two: simple random sampling procedure- in-out technique. Purposive sampling is a procedure where the researcher picks on the people who have the characteristics of what s/he wants find out (Dilevko, 2011). Purposive sampling is based on the assumption that the researcher wishes to discover, understand, and gain insight, and therefore must select a sample from which the most can be learnt (Elfil and Negida 2017). The study adopted

purposive sampling procedure as this only allowed patients who had suffered a stroke in the past one month, medically stable, judged by their physician/stroke team, interested in participating, with adequate cognitive functioning (judged by stroke team) to possibly benefit from the CBT. Those participants presented PSD upon assessment. Simple random sampling procedure then followed to determine which participants would go either to treatment group or control group. In and out technique was used during the randomization whereby there were 60 pieces of paper on which 30 were written in and 30 were written out. Those pieces of papers were folded and put in a box for participants to select. Participant who selected a paper written “in” went to the treatment group while those who selected “out” went to the control group.

3.6.1 Inclusion Criteria

The inclusion criteria involved: PSD patients between ages 35-65 who scored 17- over 40 on the Beck’s Depression Inventory; Patients who consented to take part in the study; and those who were one month old, post-stroke.

3.6.2 Exclusion Criteria

PSD patients who had: psychotic conditions (post stroke dementia); aphasia; and reduced level of consciousness did not take part in the study. Other exclusion criteria included: other physical or medical problems interfering with the patient’s ability to complete the assessments; patients who could not understand the contents of the BDI and Patients who had other stressors apart from those coming from stroke; for example HIV/AIDS were also excluded from the study.

3.7 Data collection and tools

Data collection tools are instruments, equipment and materials used for the collection of the information from the field and laboratories for social and science studies (Elfil and Negida 2017).

3.7.1 Questionnaire

A questionnaire is described as a measurement procedure that usually contains questions aimed at getting specific information on a variety of topics. Two questionnaires were used. One to capture the demographic characteristics of patients and the other one was the BDI score sheet (Beck, 1979). The BDI-II consists of 21 items that are scored on a four-point scale from 0 (“not at all”) to 3 (“most of the time”). The items assess symptoms of depression such as sadness, loss of interest, and hopelessness during the last two weeks. Item scores are

summated with a maximum score of 63. A BDI-II score of ≥ 17 indicates borderline clinical depression and that was where the selection of participants for this study was beginning from. The reliability of the BDI-II was good in the current study (range $\alpha = 0.76$). This instrument was chosen because it permit the collection of reliable and reasonably valid data, relative, simply, cheaply and in a short space of time (Anderson, 2006).

3.7.2 Cognitive Behavioural Therapy

CBT was used as an intervention measure to test its effects on patients with PSD. The CBT intervention was based on CBT principles of: recognizing, registering and altering negative thoughts so that mood and emotional symptoms are improved (winkle et al 2003).

3.8 Data collection procedure

The Nurse in Charge from UTH clinic five assigned post stroke depressed patients to neuropsychologists for assessment of depression using BDI score sheet. The assessment was done by neuropsychologists from clinic 6 for each patient and scores for each patient were added and recorded. Patients were recruited as they came until the sample size (60) was arrived at. After screening, each patient picked a paper written 'in' or 'out' and started treatment immediately. 30 patients underwent individualized CBT up to a maximum of 8 sessions each of 45-60 minutes length over a period of 8 weeks while the other 30 patients not treated with CBT acted as control group. However, follow-ups were made to the control group to just monitor them and ensure that they were stable on the traditional pharmacological treatment.

Individual CBT meetings for each patient in treatment group were held based on the CBT protocol by Rector (2010). The core elements of CBT for depression, such as psycho-education, behavioural activation, and cognitive restructuring, were central to all treatments. In each session, a participant was free to ask questions and clarifications were given. And at the end of every session, they were given some homework which had to be completed by the next session.

In the first session after introductions: the advantages and benefits of the sessions were discussed and rules were set; assessment and formulation was done; followed by explanations on depression and symptoms; the relationship between behaviour and thoughts was discussed; and the difference between a depressed and non depressed mind was also clarified.

In the second session, various aspects of thought and cognitive errors or distortions were explained through various examples. In the third session, initially, the patients improvement process was evaluated by assessing their daily attitude scale as well as thought list and feedback was given to them. Then a short overview of depression and its symptoms (which had been presented in the first session) was given. Afterwards, the methods of increasing healthy thoughts were explained through examples.

In the fourth session, the relationship between activity and depression was discussed. In the fifth session, there was patient-therapist discussion on methods of regulating goals for overcoming depression, time management, and stress. In the sixth session, the previously discussed topics were reviewed with the patient's help. Then some points were mentioned on the healthy management of reality. Apart from that, Benson's relaxation method was performed for the patients as a method of reducing stress for some patients.

In the seventh session, the relationships of patients and their effects on mood were discussed. In addition, some examples were presented by patients as they talked about the relationship between depression and the mentioned relationships. Finally, the patients were asked to record and write down, draw or talk about the relationships they had during the week.

In the last session, assertiveness was discussed. Then each participant was reassessed using the BDI score sheet by other neuropsychologist and feedback was given about the progression and improvement of their illness. On the other hand, arrangements were made to reassess the non CBT group and feedback was also given.

3.9 Data Analysis

Shorten and Moorley (2014) describe data analysis as the procedure that is categorizing, structuring and putting meaning to the mass of collected data. Data on demographic characteristics was coded according to variables; scores from the BDI were added up to find the total score. Data was then analysed using: a two-way ANOVA, 2×2 MANOVA, and multiple linear regressions in SPSS version 23. The two-way ANOVA was used in the preliminary findings to establish the interaction effect of stroke severity and reduction of depression. The 2×2 MANOVA was used for the first objective which was: to determine if there was a difference in the overall depression levels between patients on CBT and those on non- CBT group. Multiple linear regressions on the other hand were used for the second and third objectives which were: to establish demographic variables predicting the reduction of depression levels between patients on CBT and those on non-CBT; and assess the specific

depressive variables predicting the reduction of depression levels between patients on CBT and those on non-CBT. In all the three cases the decision rule was that if the calculated p-value was less than 0.05 then there was a statistical significance in the results.

3.10 Ethical Considerations

Permission to conduct the study was sought from ERES Converge IRB. After ethical approval, permission was also obtained from the senior medical superintendent (SMS) at UTH. The participants were requested to read the information sheet and sign an informed consent form before participating in the study.

Anonymity and confidentiality were ensured by the researcher through identification of the participants using codes and there was no obvious risk involved in participating in the study; instead, patients were benefiting as they were receiving treatment. If at any point a participant wished to withdraw from the study for any reason, the researcher was ready to grant them opportunity without hurt feeling. The patients from the control group whose depression levels did not go down were referred to clinic 6 for CBT. Data collected was kept confidential by the researcher for a long time.

CHAPTER FOUR: RESULTS

4.1 Overview

This chapter presents the findings of the study on effects of CBT on PSD patients. The findings are presented according to the objectives of the study with the main objective being to Investigate the effects of CBT on PSD patients while the specific objectives were to: 1) establish whether there was a statistically significant difference in overall depression scores between patients on CBT and those on non-CBT; 2) establish demographic variables predicting the reduction of depression levels between patients on CBT and those on non-CBT; and 3) assess specific depressive variables predicting the reduction of depression levels between patients on CBT and those on non-CBT.

This section firstly presents descriptive statistics to describe the characteristics of the study sample, then presents the actual findings according to the outlined objectives and finally the section also presents the preliminary findings on interaction effect of stroke severity and reduction of depression.

4.2 Descriptive Statistics of Participants

This study consisted of 60 post stroke depressed patients aged between 30-65 years who were divided into the treatment (CBT) and the control (non-CBT) groups. 30 participants belonged to the treatment group while the other 30 belonged to the control group.

4.2.1 Sex of Participants

Figure 2 displays the sex of participants. The study sample consisted of 65% males and 35% females. The CBT group consisted of 66.7% males and 33.3% females while the non-CBT group consisted of 63.3% males and 36.7% females.

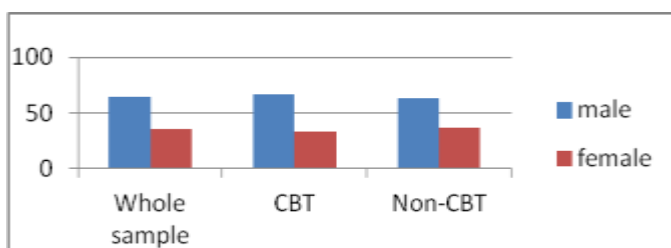


Figure 2: Sex of Participants

4.2.2 Marital Status of Participants

In figure 3, about eight percent (8.3%) of all participants were single, 35% married, 15% divorced and 41% widowed. For the CBT group, 10% were single, 40% were married, 13.3% were divorced and 36.7% were widowed. As for the non-CBT group, 6.6% were single, 30% married, 16.7% divorced and 46.7% widowed.

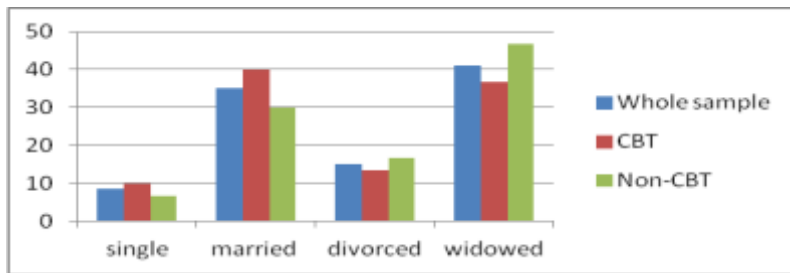


Figure 3: Marital Status Participants

4.2.3 Residential Status

Figure 4 shows the residential status of participants. About fifty six percent (56.7%) of all participants came from high density (rural) areas while 43.3% came from low density (urban) areas. In both the CBT and non-CBT groups, 56.7% were from rural areas while 43.3% were from urban areas.

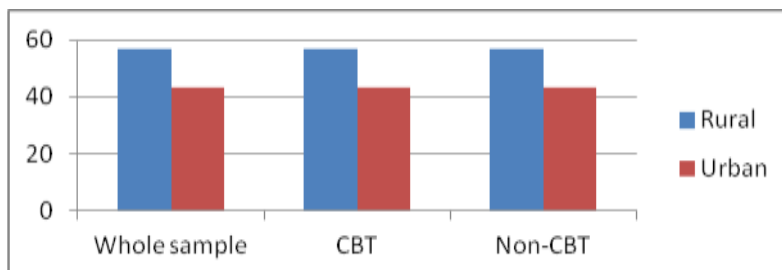


Figure 4: Residential Status of Participants

4.2.4 Employment Status of Participants

As illustrated in figure 5, 48.3% of participants in the whole sample were employed while 51.7% were unemployed. In the CBT group, 50% were employed while 50% were an employed. In the non-CBT group, 46.7% were employed while 53.3% were unemployed.

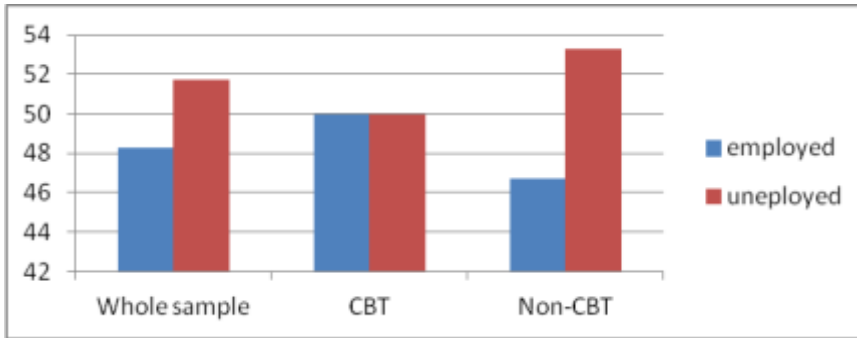


Figure 5: Employment Status of Participants

4.2.5 Educational Level

The educational level of the participants is shown in Figure 6. Fifteen percent of the whole sample attained no level of formal education, 16.7% reached primary level, 30% secondary and 38.3% tertiary level. In the CBT group, 10% attained no level of formal education, 16.7% reached primary level, 30% reached secondary level and 43% reached tertiary level. For the non-CBT group, 20% attained no level of education, 16.7% reached primary level, 30% reached secondary and 33.3 reached tertiary level.

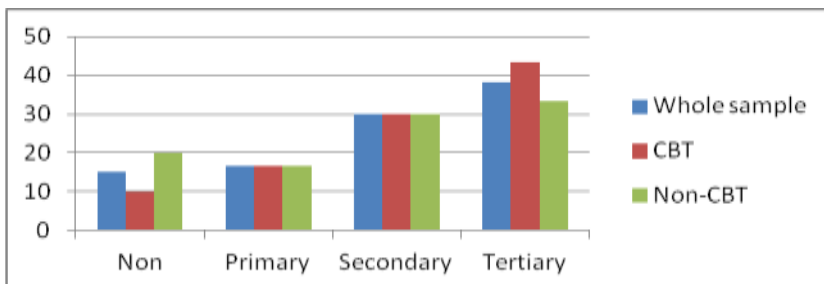


Figure 6: Educational Level of Participants

4.3 Effects of CBT on post-stroke depression

The main objective of the study was to investigate the effects of CBT on PSD. It has been split into three objectives presented below.

4.3.1 Differences in the Depression Scores between the CBT and Non-CBT Group

The first objective of the study was to determine whether there was a statistically significant difference in overall depression scores between patients on CBT treatment and those on non-CBT treatment. A 2×2 MANOVA was run to statistically evaluate the magnitude of groups' differences in the pre-test and post-test depression scores simultaneously. The analysis yielded both descriptive and inferential statistics for the CBT and non-CBT data sets.

Table 1 which shows descriptive and inferential statistics in form of means and standard deviations and inferential statistics for the pre-test and post-test depression results between the two groups. Whereas pre-test results revealed equivalent mean depression scores between the two groups, post-test results revealed a lower depression mean score for patients on CBT treatment than those on non-CBT treatment. The mean difference in pre-test depression scores between the two groups was 0.03 whereas in post-test it was 10.07. The mean difference between pre-test and post-test depression scores within the group on CBT treatment was 17.37 and within the group on non-CBT treatment it was 7.27.

A 2×2 MANOVA to determine mean difference in depression scores between the groups was not statistically significant in the pre-test data, $F(1,58) = .001, p > .05, n_p^2 = 0.001$, but was statistically significant in the post-test data, $F(1,58) = 50.07, p < .01, n_p^2 = 0.46$. The results implied that the alternative hypothesis that there was a statistically significant difference in depression scores between patients on CBT and those on non-CBT treatment was not supported by pre-test results, but was supported by post-test results. Therefore, both descriptive and inferential statistics illustrated that CBT treatment had more reduction effect on post-stroke depression than non-CBT treatment.

Table 1: Descriptive and inferential statistics results for differences in the depression scores between the CBT and non-CBT treatment groups

Test	Patients on CBT Treatment		Patients on non-CBT Treatment		$F(1,58)$	p	n_p^2
	M	SD	M	SD			
Pre-test	26.2	7.25	26.17	5.43	0.01	0.98	0.01
Post-test	8.83	4.86	18.9	6.09	50.07	0.01	0.46

Note: M= Mean, SD=Standard Deviation.

4.3.2 Demographic Variables Predicting the Reduction of Depression Levels

The second objective of the study was to establish demographic variables predicting the reduction of depression levels between patients on CBT treatment and those on non-CBT treatment. Two parallel multiple linear regression analyses were carried out to assess the degree of predictive influence of demographic variables on the reduction of depression levels, that is, one analysis on CBT treatment data and another on non-CBT treatment data. Gender,

age, marital status, residential status, employment status and education level were used to predict depression variance in the regression equation.

Table 2 displays both unstandardized and standardized regression coefficients of the predictors of reduction in depression levels. The general regression model was not statistically significant in both the CBT treatment, $F(6, 23) = .59, p > .05$, and the Non-CBT treatment data, $F(6, 23) = .29, p > .05$, with the six variables explaining about 13% ($R^2 = .13$) and 7% ($R^2 = .07$) of the depression variances respectively. This implies that together all the six variables did not have predictive influence on the reduction of depression levels. Particularly, results also indicate that each individual demographic variable had predictive influence on the reduction of depression levels in both the CBT treatment group and the Non-CBT treatment group. The influence of each variable was not statistically significant at .05 level of significance. This implies that the reduction in depression levels among stroke patients in both groups was not affected by their demographic characteristics.

Table 2: Multiple Linear Regression Results Summary - Unstandardized Coefficients and Standardized Coefficients for Demographic Variables Predicting Reduction of Depression

Predictor Variable	CBT Model		Non-CBT Model			
	B	SE	B	B	SE	β
Sex	-1.76	2.11	-.17	.10	1.38	.02
Age	.05	.15	.09	.19	.22	.33
Marital status	.92	1.13	.20	-.06	1.72	-.01
Residential status	-.48	2.20	-.05	.80	2.62	.07
Employment status	-1.44	2.15	-.15	-1.41	3.60	-.12
Education level	-.37	1.13	-.79	.49	1.23	.09

Note: SE= Standard Error.

4.3.3 Specific Depressive Variables Predicting the Reduction of Depression Levels

The third and final objective of the study was to assess the contribution of specific depressive variables predicting the reduction of depression levels between patients on CBT treatment and those on non-CBT treatment. Similarly, two parallel multiple linear regression analyses were carried out to evaluate the degree of predictability of depressive variables on the reduction of depression level, that is, one analysis on CBT treatment data set and another on non-CBT treatment data set. Twenty-one (21) specific depressive variables based on the BDI were used to predict depression variance in the regression equation.

Table 3 indicates both unstandardized and standardized regression coefficients of the predictors of reduction in depression levels. The general regression model was statistically significant in both the CBT treatment, $F(19, 10) = 204.92, p < .001$, and the Non-CBT treatment data, $F(21, 8) = 70.73, p < .001$, with the variables altogether explaining about 99.7% ($R^2 = .997$) and 99.5% ($R^2 = .995$) of the depression variances respectively. Using the regression results as a measure of goodness of fit, it seemed that the CBT treatment data met prediction expectation slight better than the Non-CBT treatment data, judging by about 0.2% difference in variance, accounted for R^2 , between the two data sets.

As expected, results demonstrated that the CBT treatment model had a considerable larger number of depressive variables statistically significantly predicting reduction in depression levels than the Non-CBT treatment model. For the CBT treatment data 17 out of 21 variables statistically significantly predicted reduction in depression levels as shown in table 4. Four of the variables, pessimism, punishment feelings, self-criticalness and loss of weight had no statistically significantly prediction.

Two of the 21 variables, that is, self-dislike and suicidal thoughts/wishes, had missing correlations, so they were deleted from the analysis. This means that they all had zero responses showing 100% contribution to the reduction of depression. For the non-CBT treatment data only 10 out of 21 variables statistically significantly predicted reduction in depression levels as also indicated in table 6. Eleven (11) of the variables, had no statistically significantly prediction.

Cognitive variables which had statistically significant prediction of reduction in depression level for the CBT treatment model were thoughts of past failure, indecisiveness, worthlessness and worries about physical problems. All the feelings variables, sadness, loss

of pleasure, guilt feelings, irritability, loss of interest, loss of energy, loss of weight, tiredness/fatigue, changes in appetite and loss of interest in sex, statistically significantly predicted reduction in depression levels. The two behaviour variables, crying and changes in sleeping pattern were also statistically significant in the CBT treatment model. For the non-CBT treatment model the cognitive variables which had statistically significant prediction were thoughts of self-dislike, self-criticalness, and worthlessness. Of all the feelings variables, only guilty feelings, loss of interest in pleasure, loss of interest in sex and changes in appetite, statistically significantly predicted reduction in depression levels. Unexpectedly, the two behaviour variables, crying and changes in sleeping pattern equally had statistically significant prediction in the non-CBT treatment model.

The greatest contributors to the reduction in depression in the CBT treatment data were suicidal thoughts or wishes, self dislike worries about physical problems and tiredness/fatigue, while the least contribution came from pessimism and loss weight. For the non-CBT treatment data the greatest contributing to the reduction in depression came from self-dislike and worthless, while the least contributors were loss of energy and suicidal thoughts.

Table 3: Multiple Linear Regression Results Summary - Unstandardized Coefficients and Standardized Coefficients for Depressive Variables Predicting Reduction of Depression

Predictor Variable	CBT Model			Non-CBT Model		
	B	SE	β	B	SE	β
Sadness	2.57	.82	.16*	.77	.53	.07
Pessimism	.49	.30	.06	.96	.89	.10
Past failure	.88	.29	.09*	-.30	.79	-.03
Loss of pleasure	1.21	.26	.12**	.51	.55	.07
Guilty feelings	1.27	.55	.05*	1.26	.47	.14*
Punishment feelings	.67	.40	.06	-.65	.81	-.06
Self-dislike	-	-	-	1.99	.45	.27**
Self-criticalness	-.13	.56	-.01	1.87	.72	.22*
Suicidal thoughts/wishes	-	-	-	.38	.45	.04
Crying	1.36	.22	.12**	1.24	.36	.15**
Irritability	.84	.19	.11**	-1.54	.90	-.13
Loss of interest	1.36	.23	.17**	1.96	.59	.20*
Indecisiveness	1.47	.29	.17**	1.19	.55	.12
Worthlessness	.94	.17	.14**	1.62	.41	.25**
Loss of energy	1.14	.27	.15**	.21	.86	.02
Changes in sleeping patterns	.90	.23	.10**	1.35	.47	.16*
Tiredness/fatigue	1.33	.21	.23**	.83	.55	.09
Changes in appetite	1.24	.28	.11**	2.10	.57	.19**
Loss of weight	.49	.46	.04	2.65	.59	.20**
Worries about physical problems	1.51	.23	.21**	1.45	.71	.15
Loss of interest in sex	.94	.20	.13**	1.61	.51	.21*

Note. The dependent variable was depression level. $R^2 = .997$ and $.995$ for CBT data and non-CBT data respectively. * $p < .05$ and ** $p < .01$. B = Unstandardized beta coefficient; SE = Standard Error; β = Standardized beta coefficient.

4.4 Interaction Effect of Stroke Severity on Depression Scores

An interaction effect on depression scores between treatment and stroke severity was also determined. This was to find out whether the severity of stroke had affected the CBT treatment outcomes in any way. A two way ANOVA was run to statistically evaluate the

magnitude of the interaction between the CBT and non CBT groups. The analysis yielded both descriptive and inferential statistics for the CBT and non-CBT data sets. Table 4 shows descriptive statistics in form of means and standard deviations for post-test depression results between the groups.

Table 4: ANOVA Descriptive Statistics Results for Post-test Depression Scores describing the interaction effect of stroke severity on depression scores.

Stroke severity	Patients on CBT treatment		Patients on non-CBT treatment	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Minor	5	3.54	14.83	3.33
Major	9.6	4.78	19.92	6.24

Note: M=mean, SD= Standard Deviation

The mean difference in pre-test depression scores between the two groups for minor stroke was 9.83 whereas in the major stroke it was 10.32. The mean difference between minor and major stroke within the group on CBT treatment was 4.6 and within the group on non-CBT treatment it was 2.91. This shows that CBT had a slightly more reduction effect on depression for patients with minor stroke than it was for patients with major stroke.

Table 5 displays inferential statistics for tests of statistical significance in the observed mean differences in the post-test depression scores between the CBT and non CBT groups. even though the descriptive statistics show a slightly more reduction effect on depression for patients with minor stroke than those with major stroke, a two way ANOVA to determine the interaction effect on depression scores between treatment and stroke severity showed that there was no statistically significant interaction between treatment and stroke severity, $f(1,56) = .19, p > .05$.

Table 5: ANOVA Inferential Statistics Results for Post-test Depression describing the interaction effect of stroke severity on depression scores.

Source	Type III sum of squares	<i>Df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Treatment* stroke severity	0.521	1	0.21	0.019	0.891
Error	1548.667	56	56		
Total	14818	60			

Note: Df= Degree of freedom, MS= Mean of Squares,

4.5 Conclusion

The results from MANOVA and Multiple Linear Regression Analysis have provided salient insights into how CBT affects depression scores on patients with PSD. Generally, CBT had significantly greater effects on depression scores than the traditional pharmacological treatment. Its use was not effectively facilitated by and demographic and socio-economic characteristics. CBT appears to overcome most of the depressive symptoms in patients except punishment feelings affecting overall depression scores more than the traditional pharmacological treatment.

CHAPTER FIVE: DISCUSSION

5.1 Overview

This section will focus on discussing the findings of the study on the effects of CBT on PSD patients. The chapter has discussed the findings and compared to previous findings. The aims were to: determine whether there was a statistically significant difference in overall depression scores between patients on CBT and those on non-CBT; establish demographic variables predicting the reduction of depression levels between patients on CBT and those on non-CBT; and assess specific depressive variables predicting the reduction of depression levels between patients on CBT and those on non-CBT. This will be done according to the outlined objectives of the study derived from the main objective. The chapter has further discussed the preliminary finding on the interaction effect on depression scores between treatment and stroke severity, after which a conclusion has been drawn.

5.2 Effects of CBT on PSD

The main objective of the study was to investigate the effects of CBT on PSD. It has been split into three objectives and discussed as presented below.

5.2.1 Differences in the Depression Scores between the CBT and Non-CBT Group

The first objective of this study was to determine whether there was a statistically significant difference in overall depression scores between patients on CBT and those on non-CBT. Both descriptive and inferential statistics illustrated that the CBT group had more reduction effect on post-stroke depression than non-CBT group. This was in line with the hypothesis that CBT is effective in the reduction of depression in patients with stroke. Indeed, patients who were exposed to CBT showed more reduction in depression than the controls. This implies that supplementing pharmacological treatment with CBT in treating PSD would facilitate more positive outcomes than using pharmacological treatment only.

This finding was consistent with the study of Renee et al (2013) to assess the effectiveness of CBT on PSD patients. In his findings, there was a significant decline in the level of depressive symptoms over the course of CBT. This was probably because CBT techniques were applied and patients learnt how to manage their thoughts, feelings and behaviour. In line with that, Dwight-Johnson et al (2000) also found that psychological treatment is beneficial in reducing depressive symptoms and is preferred above antidepressant drugs by the majority of patients with stroke. This was also the case with this study as most patients

did not really prefer drugs because they were also taking many other drugs to treat other ailments they suffered from apart from depression.

There was more reduction of depressive symptoms in the treatment group for both Renee's (2013) study and this particular study because of the nature of CBT as compared to pharmacological treatment. CBT is an active and problem-focused type of psychotherapeutic treatment. It helps patients to deal with current depressive symptoms. CBT is based on the understanding that feelings, thoughts, and behaviour are interconnected (Lökk and Delbari 2011, Weinberger et al 2009). It combines methods from cognitive and behavioural therapies. Cognitive methods include identifying and understanding dysfunctional emotions and thought patterns in order to ultimately adapt them into more positive or rational ones (winkle et al 2003).

The aim of behavioural techniques in CBT is to teach individuals skills to alter their maladaptive behaviour and engage in more pleasant or satisfying activities (Beck et al., 1979; Beck, 2005). Thus, CBT affects mood (depressed) by changing negative thinking and participating more often in enjoyable activities, individuals' view of life is assumed to become more positive (Buttle, 2011; Hoffman et al., 2013). Consequently, CBT has been found effective for treating depression in individuals with stroke (Joosten et al., 2012). In this study individuals with PSD had a lot of negative thought distortions and exaggerations about: their appearance; and not being functional in their family/society. Using CBT techniques, patients in the CBT group for this study were taught to manage the functional consequences of their stroke more effectively and this led to positive results.

Consistently, other studies also found CBT to be effective in improving mood (Rossello and Jimenez-Chafey, 2006; Lustman et al., 2009; Kootker et al., 2012; Kootker et al., 2014). Findings from these studies showed that in comparison with the rate of depression before the CBT intervention was higher while the rate of depression in these patients had a considerable decrease after the intervention. Therefore CBT was recommended as a better treatment modality for PSD. These studies also found CBT to teach individuals skills to alter their maladaptive behaviour and engage in more pleasant or satisfying activities. Consistent with findings of these studies, this study also reviewed that CBT really alters an individual's thought distortions.

In the non CBT group, there was no significant reduction in the depression levels. It was therefore concluded that poor response to pharmacological treatment for the non CBT group

was because pharmacological treatment works differently from CBT. In as much as pharmacological treatment improves mood (Hackett et al 2011), it doesn't involve an individual's effort to take mastery of their thoughts (Almeida et al 2010, Anson et al 2010) and is not sustainable (Hackett et al 2011, King, 2009). That is why it is better supplemented with CBT than used alone (Dwight-Johnson et al., 2000).

Poor results in the non-CBT group which was on the traditional pharmacological treatment would sometimes be attributed to poor adherence to medication. This is consistent with a study by Katona et al (2000) where individuals who underwent pharmacological treatment performed poorly because of poor adherence to drugs. However, this study avoided mere speculations that poor performance of pharmacological treatment was as a result of poor adherence to treatment by non-CBT patients. Rather it made follow-ups to ensure that the controls adhered to depression drugs. Therefore, the controls did not probably perform well because they were not exposed to CBT.

However, the findings of this study contradicted findings from some prior studies which found CBT not to be effective for treating PSD (Ahmed et al., 2012; Lincoln and Flannaghan 2003; Lincoln, et al., 1997). In their findings, there were no statistical differences in the depression scores between patients on CBT and those who were not. Meaning pharmacological treatment reduces PSD symptoms as much as CBT does. However, there are some limitations in these studies which may have contributed to poor results. Among these include: lack of clarity as to whether the treatment was provided according to a specific CBT manual; and whether individual therapists that provided CBT were receiving supervision and support from experienced CBT practitioners. According to sources reviewed in the archives at the area of study, this study like those in other countries was also the first RCT ever to be done at UTH in Zambia.

A study by Rasquin et al (2009) also yielded negative results, contrary to the findings of this study. One possible explanation for this was that the study was a quasi experiment. However, just like in this study, including a control group was required in order to clarify how efficacious CBT was above other treatment modalities.

Most of the findings showed that CBT is efficacious for individuals with PSD. If well conducted by following proper methodology CBT is observed to be efficacious for the depressed post stroke patients.

5.2.2 Demographic Variables Predicting the Reduction of Depression Levels

The second objective of the study was to establish demographic variables predicting the reduction of depression levels between patients on CBT and those on non-CBT. The study encompassed male and female PSD patients with different, age, sex, marital status educational level, residential and employment status. These 6 variables were used to predict depression variance in the regression equation. The influence for each variable was not found to be statistically significant at $p = 0.05$. This implies that the post-assessment results in both groups were not affected by the demographic characteristics of participants. The positive results from the CBT group were not dependent on any of the demographic and socioeconomic variables. In the same way, the demographic and social economic variables did not also have any impact on the negative treatment outcomes for the non CBT group.

Consistent with this study, Sheikholeslami's (2010) study on CBT has been reported to be effective in treating depression across all age groups, gender, socio-economic status, educational level and employment status. This is because CBT is a talking therapy where a therapist helps a patient to overcome thought distortion to improve behaviour and this is applicable to all demographic and socio-economic factors (Kootker et al 2012). The reduction of depressive symptoms in the CBT group for this study was therefore not because of the influence of demographic variables but because of the nature of CBT as a treatment modality. CBT cuts across all individuals of different races and social economic conditions as long as their cognitive state is intact (Laidlaw et al., 2010). It can be offered in any language as long as both the client and therapist are comfortable with it and are able to communicate.

The findings of this study were also consistent with the findings of Renee et al (2013) which indicated that, by treatment of interaction effect gender does not significantly affect remission of depressive symptoms. This means that both men and women respond comparably to the treatment protocol in their study. However, contrary to the findings of this study, trends noted for education indicated poorer treatment outcomes for those with low education level. One possible explanation for this disparity may have come from limitations such as the therapists' failure to use alternative means of giving written home works to patients, since most of the patients who are of low educational level may find challenges in written work. Renee et al (2013) did not explain how individuals with low educational level were handled during the CBT sessions.

Thimm and Antosen (2014) also did a study to assess the effect of CBT on PSD. CBT yielded positive results, similar to this study. However, there were no significant differences on the demographic variables (age, sex, partner status, education, social economic status and working) examined between treatment responders and non-responders. CBT therefore effectively treated PSD regardless of all demographic variables of the participants.

Similar to the findings of this study, Cohen et al's (2015) study which analysed whether key variables associated with prevalence of post stroke depression, also predicted treatment response. Although this was a pre-post test experiment, CBT effectively treated PSD. However, initial depression severity, hemispheric location, level of social support, age, gender, and antidepressant adherence did not interact with the treatment so as to line up with percent change in Hamilton Rating Scale for Depression.

Another similar study was done by Hyninen et al (2010) and the findings were consistent with the findings of this study. At $p=0.05$, there were no statistically significant differences between the groups in any of the clinical or socio demographic variables except for mean education years. Mean education years was also statistically significant (contradiction). One possible explanation for this disparity may have been that the study was done on patients who were depressed due to other physical disabilities and not necessarily stroke.

Contrary to the findings of this study, Thorn et al (2011) and Campbell (2011) found that low literacy and related variables posed potential barriers to participation and positive outcome of CBT for patients with stroke and other acquired brain injuries. Their findings show that individuals with lower education and reading levels were less likely to begin treatment. Also participants with lower education and income were less likely to complete treatment which adversely affected their post assessment results. According to the studies (Thorn et al., 2011); Campbell, 2011) such results could have been due to the nature of the CBT as it incorporates written home work, which may not be suitable for such class of people. However, this study had no difference in these demographic variables because it incorporated oral and art homework for those with low literacy levels, as long as they had no impaired use of hands.

Just like the findings of this study, most of the studies highlighted above found no statistically significant influence of demographic characteristics of patients on the reduction of depression. However, few studies found the educational level to have a significant influence on the reduction of depression (Hyninen et al., 2010; Renee et al., 2013; Thorn et al., 2011)

contrary to what this study's findings. The results for these studies may be attributed to not finding an alternative way of handling individuals with low education level. There might have been language barriers and the therapists might not have been convincing patients on the importance of CBT, taking into account that their level of education was low. As for this study, the findings may be so because in the CBT group, the number of patients who went at least up to tertiary educational level out-numbered those who did not complete primary education. Besides that, oral and art work were utilised for the illiterate patients. Further research is however recommended in this area with a larger heterogeneous sample size.

5.2.3 Specific Depressive Variables Predicting the Reduction of Depression Levels

The third and final objective of the study was to assess specific depressive variables that predict the reduction of depression levels between patients on CBT treatment and those on non-CBT treatment. As anticipated using findings by other scholars, the results demonstrated that the CBT model had a considerably larger number of depressive variables being statistically significant in predicting reduction in depression levels compared to the Non-CBT model. The CBT model had 17 out of 21 variables that were statistically significant while the non CBT model had 10 out of 21 variables that were statistically significant. This means that patients who were exposed to CBT had more reduction in depression than those who were not.

The depressive variables were divided into three, which were: thoughts; feelings; and behaviour variables. The thought variables included: pessimism; past failure; self dislike; suicidal thoughts or wishes; indecisiveness; worthlessness; and worries about physical problems. The feeling variables included: sadness; loss of pleasure; guilt feelings; punishment feelings; self criticalness; irritability; loss of interest in people; loss of energy; loss of weight; tiredness or fatigue; loss of interest in sex. And the behaviour variables included: crying; changes in sleeping patterns; and changes in appetite.

The findings from this study were consistent with Hyninen et al (2010). In their study, most of the thought variables improved. This was obviously because CBT deals directly with altering negative thought patterns and focuses on symptom reduction through cognitive and behavioural techniques to challenge negative automatic thoughts (foster et al 2012). However, one thought variable (pessimism) was not statistically significant in predicting reduction of depression in the CBT intervention group. This means that even after CBT was

administered, some patients did not cease to have some pessimistic thoughts. Some of them were still feeling discouraged about their future. The lack of gains in this area was probably because of their permanent disabilities. According to Ayerbe et al (2013), individuals with stroke remain with permanent impairments which do not enable them to achieve most of the ADLs and reach self actualization. Because of that, there is lack of immortality in them. It is very difficult for them to look forward to anything since they would be wheel chaired for the most part of their lives (Hackett et al., 2009; Craig et al., 2008). This continues to be a psychological stressor for them. CBT works more effectively if psychological stressors are identified and removed (Laidlaw et al (2010). However, the permanent impairments and disabilities for stroke survivors continue to be a permanent stressor (Marit, 2014) and that may affect the healing process to a large extent.

Although some other studies have shown that CBT curbs pessimistic thoughts (Stefan et al., 2013; Winkle et al., 2009; Zakopoulos et al., 2013), for this study, it was uniquely found that pessimistic thoughts in PSD patients were still present even after the CBT intervention. Perhaps, with more sessions, those thoughts would be dealt with. Further research is however welcome in this area.

Most feeling variables were also statistically significant for the CBT group; of all the 11 variables for feeling, only 3, which are: punishment feelings; self criticalness; and loss of weight were not statistically significant. Consistent with Thorn et al (2011), some feeling variables are challenging to curb in individuals who are depressed due to a sudden physical challenge. In this study, the lack of gains in this area may be attributed to mobility being a challenge to most of the participants. They had challenges in movements; and yet, they needed to frequent the hospital, and sit on long queues for different treatments. For example; physiotherapy, general medical checkups, nutritional advice and many others which seemed not to even be working for them. On top of that, they needed to be coming for CBT sessions weekly. They frequented the hospital but still remained with those permanent impairments. This continued making them feel like they were being punished as a hospital turned to be a psychological stressor for most patients (Cafarella et al., 2012). Most of them preferred staying at home rather than frequenting the hospital. Those who received CBT from their homes due to transport challenges coupled with those who did not have many other hospital appointments, did not complain of punishment feelings in their post assessment.

As for “loss of weight, the negative findings might have been because most of the participants were not sure whether they had gained or lost weight and by how many pounds. They didn’t go on the scale but they judged based on how they felt. This means that it was not very clear whether they really lost weight or not. This was a limitation and it might have compromised the findings.

All in all, perhaps more CBT sessions were needed for patients to improve in those remaining 4 symptoms or variables (one thought and three feeling), as some studies proposed up to 16 sessions (National Health Service, 2014; Kootker et al., 2014; Royal College of Psychiatrists, 2013). However, contrary to that, a pilot study by Scheffer et al (2011) had suggested an improvement in mood with an average of 6-8 sessions per patient which was consistent with this study. Besides that, it may not be practical for stroke patients to be frequenting the hospital for more CBT sessions because of mobility challenges for most and economic pressures for others.

Offering CBT from homes may also not be feasible because of transport costs for the therapist as well as other ethical issues. Therefore, 8 sessions were averagely well (Thompson, 2009; Scott et al., 2010). In fact, other patients were able to recover in less than 8 sessions. The lack of positive treatment outcomes in these few areas could also have been due to lack of understanding, willingness, and belief in the therapy rather than the limited number of sessions. Despite the lack of improvement in these few symptoms, CBT had 81% reduction of depressive symptoms as compared to non CBT (48%), which means that it is very effective as compared to the traditional pharmacological treatment.

Although antidepressant medications interact with chemicals in the brain called neurotransmitters to improve mood (Hackett et al., 2011), the non CBT group patients did not show improvement in most of the depressive variables. This was consistent with Almeida et al (2010) who found that antidepressant drugs are not sustainable in the reduction of depression. In line with that, 11 out of 21 variables for this study were not statistically significantly predicting reduction of depression. Moreover, all the thought variables did not also improve. Although Mathew (2016) says that depression drugs reduce depressive thoughts like suicidal thoughts or wishes, Kootker et al (2014) argues that there are no treatments that specifically stop suicidal thoughts; but rather, for each individual, identifying and treating any mental illness, and dealing with any stressors can reduce the risk of suicide.

Beck (2005) also says that people who frequently have suicidal thoughts may benefit more from specific types of psychotherapy (“talk therapy” or counselling).

The thought variables would have probably reduced with CBT since they reduced in the CBT group. This is because CBT addressed negative thoughts and cognitive distortions (Foster et al 2012). She further stated that, cognitive distortions are ways that the mind reads things around us in an overly negative way. For example, if someone receives a critical comment from one person, they believe everyone thinks badly about them. By repeated practice, people can learn to overcome these thought patterns and reduce depression and suicide risk (Bruno et al., 2016). CBT has been shown in many research studies to help improve symptoms of depression and anxiety disorders (foster et al., 2012; Kootker et al., 2014; Ellis et al., 2010). That is why in the CBT treatment group for this study, there was 86 % improvement of thought variables and in all the patients 100% had no more suicidal thoughts/wishes. As for the non CBT group, there was no talking therapy used on them to address those negative distortions.

In the same way most of the feeling variables were also not addressed in the non CBT group. These were: sadness; loss of energy; loss of pleasure; irritability; and tiredness or fatigue. The major symptoms of depression are sadness and loss of pleasure (anhedonia) [(DSM IV TR 2004)]. Both of them were not significant in the non CBT group which means that despite the other 10 symptoms improving, the major determinants of depression did not improve for this group. This means that depression was still present in the non-CBT group despite receiving the traditional pharmacological treatment. It could be assumed that some of the symptoms may have remained stagnant or worsened because of the possible side effects of depression drugs. For example some antidepressants cause: irritability; loss of energy; tiredness and fatigue in some patients (Almeida et al 2010) and these symptoms were still present in patients after the traditional pharmacological treatment was administered. However, this may need further research for proof or more valid evidence because it is founded on data which lacks empirical evidence.

As for loss of pleasure and sadness the non-CBT group did not improve in both of these main variables as opposed to the CBT group. Since CBT focuses on helping one identify and deal with negative thoughts and feelings that lead to undesirable behaviour (Laidlaw et al., 2010), the non CBT group was not exposed to this treatment modality. This means if the non-CBT group were also exposed to CBT, patients would have improved in these variables just like

the CBT group. CBT therefore had more adverse effects in the improvement of depression in more symptoms as compared to pharmacological treatment.

5.3 Interaction Effect of Stroke Severity on Depression Scores

Stroke severity was identified in two ways; major and minor stroke. Major stroke represented those with severe and moderate strokes while minor represented those with mild strokes. The interaction effect on depression scores between treatment and stroke severity was tested using ANOVA and results showed that there was no statistically significant interaction between treatment and stroke severity. This means that in the treatment group CBT worked well for both PSD patients who had major and minor strokes. In the same way the higher depression scores for the non-CBT group had nothing to do with stroke severity.

Findings from this study were consistent with the findings of prior studies (Cohen et al., (2015; Hyninnen et al., 2010; Thimm and Antosen 2014; Cohen et al., 2015) which also found stroke severity not to influence depression scores. However, the findings contradicted with other findings in certain studies (Thorn et al. 2011 and Campbell, 2011).

Contrary to the findings of this study, a study done by Thorn et al (2011) showed that minor stroke had more interaction effect on PSD patients than major stroke. One of the reasons for this disparity could be because of poor treatment participation in CBT for patients with major stroke. This may have been because of mobility challenges where some patients fail to travel from their homes to the hospital for treatment because it is costly and difficult for them. As for this study, transport incentives were offered to patients who could not afford to go to UTH. As for those who could not move, CBT was offered from home. Therefore, both patients with major and minor strokes were catered for adequately.

Another study by (Campbell, 2011) was carried out, and results contradicted with this study. Campbell (2011) found patients with minor stroke to respond more positively and faster to CBT than those with major stroke. The study further stipulated that, PSD patients with major stroke may benefit less from CBT than their counterparts. This is probably because they tend to have co-morbidities. So CBT is likely to deal with many stressors, that is why they recover slowly. On a contrary, this study addressed depressive needs adequately for both groups.

However, in this study, even though both PSD patients with major and minor strokes responded positively to CBT, the ones with minor strokes mostly recovered before the 8 weeks treatment as compared to their counterparts. This was probably because the findings

observed that patients with major strokes generally had higher BDI scores with co-morbidities than those with minor strokes. But even if it were so, both groups (major or minor strokes) responded well to CBT, they responded within the stipulated period (8 weeks) and their differences are not even statistically significant. CBT is therefore suitable for post stroke patients who have major as well as minor strokes.

5.4 Conclusion

This chapter has provided an in-depth discussion of the results. Generally, it has been established that CBT is effective in the treatment of PSD. The CBT group performed well regardless of stroke severity, demographic variables or characteristics. CBT also favoured performance on 17 out of 21 depressive variables more than traditional pharmacological treatment. Therefore, consistent with other studies discussed in the chapter, an examination of differences in the magnitude of means, variances, beta weights, and correlation coefficients revealed that CBT had more improvement effects on PSD than pharmacological treatment. Therefore CBT is effective in the reduction of depression in patients with PSD.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 Overview

This chapter has looked at the conclusions and recommendations of the study. It wraps up the whole study. It touches all sections and chapters, with the objectives at the centre of it. The aims of the study were to: determine whether there was a statistically significant difference in overall depression scores between patients on CBT treatment and those on non-CBT treatment; assess demographic variables predicting the reduction of depression levels between patients on CBT treatment and those on non-CBT treatment; and assess specific depressive variables predicting the reduction of depression levels between patients on CBT treatment and those on non-CBT treatment.

6.2 Conclusion

This study established the effects of CBT in the treatment of PSD; specifically it determined the difference in depression scores between patients exposed to CBT and those who remained on traditional pharmacological treatment. Generally, results demonstrated a statistically significant mean difference in depression scores between the CBT and non-CBT groups. Patients who were exposed to CBT out-performed their counterparts who remained on traditional pharmacological treatment. This implies that CBT offered to patients with PSD reduces depressive symptoms better than pharmacological treatment. The magnitude of the mean difference in their improvement within the group was larger for CBT group than for non-CBT group. This implies that administering CBT to PSD patients had more significant improvement effects on depression scores than using traditional pharmacological treatment.

The influence of demographic and socio-economic characteristics on the CBT and non-CBT in facilitating reduction of depression was also established. Results showed that gender, age, marital status, educational level, residential status and employment status were not statistically significant in explaining the reduction of depression variance in both the CBT model and non-CBT model. Furthermore, the influence of stroke severity on the reduction of depression was also established. Similarly, results showed that both major and minor stroke was not statistically significantly explaining the reduction of depression variance in both the CBT model and non-CBT model. However, CBT had a slightly more reduction effect on depression for patients with minor stroke than it was for patients with major stroke; although the difference was not statistically significant.

Finally, the study assessed specific depressive variables which statistically significantly affected overall depression scores more for CBT than non-CBT group. Results indicated that the CBT group had more statistically significant depressive variables contributing to the reduction of depression levels than the non-CBT group. For the CBT group of all the 21 depressive variables, 17 of them statistically significantly contributed to the reduction of depression levels while 11 statistically significantly contributed to the reduction of depression levels for the non-CBT group. The magnitude of the beta weight and correlation coefficients suggest that CBT facilitated reduction of depression in more depressive variables (85%) than pharmacological treatment (55%).

Since pharmacological treatment also contributed to the reduction of depression, the study also concluded that the combination of CBT and pharmacotherapy for patients with PSD have an advantage compared to the traditional treatment alone. A combination of the two adds to the unique advantages of both treatment modalities. Pharmacotherapy may provide earlier symptomatic relief and CBT may provide long lasting symptomatic improvement (Craig et al., 2008). The major strength of CBT for PSD is that the proposed intervention is innovative, as it applies cognitive behavioural therapy in a stroke-adjusted manner (Barker, 2007). CBT leads to better outcomes in societal participation, goal attainment, and coping strategies of the participants (Ayerbe et al., 2013). Therefore, both treatments are necessary to help patients with PSD.

6.3 Recommendations

- Pharmacological treatment should be supplemented with CBT to help patients with PSD.
- Clinicians should regularly assess symptoms of depression in people who report a stroke in their clinical history and put up interventional measures as soon as possible.
- Since most patients didn't know that the symptoms they had were for depression, UTH medical staff should raise awareness to stroke patients about what PSD is and where to seek help if they experience the depressive symptoms.
- Post stroke patients should form groups or associations where they share ideas about their experiences on their altered life situations as well as the challenges they face. This would even somehow prevent them from getting depressed

because they would be open to one other and council one another in a group; hence their burden may seem lighter.

- Looking at the escalating numbers of PSD patients, more manpower (psychologists) is needed at clinic six to assist, patients; not only with PSD but also depression in general and other psychiatric conditions.

6.3.1 Recommendations for Further Research

- Effects of CBT on depression relapse on PSD patients should be considered
- Another study of more than 8 weeks and a larger sample should be conducted in order to establish why the four other symptoms of depression remained even after administering CBT; especially pessimism.
- Another trial should be conducted on PSD patients using CBT alone to see whether it can work without ADs.
- Further research should also capture psychotic PSD and find ways of helping them.

REFERENCES

- Adair, J. G. and N. Vohra, 2008. The Explosion of Knowledge, References, and Citations. *American Psychologist*. 58, 15-23.
- Adeloye, A. and K. Stefan, 2014. Estimate of Incidence and Prevalence of Stroke in Africa: A Systematic Review and Meta Analysis Centre for Pop Health Sciences. University of Edinburg, Med School, Edinurg, Midlothias: UK. *Journal of Pub Med.*, 19, 17-28.
- Ahmed, K.F., G. Wang, J. Silander, A.M. Wilson, J.M. Allen et al., 2013. Statistical Downscaling And Bias Correction of Climate Model Outputs for Climate Change: Impact Assessment In The U.S. *Northeast. Glob Planet Change.*, 100, 320-332. Doi:10.1016/J.Gloplacha.2012.11.003.
- Almeida, O. P., A. Waterreus, and G.J. Hankey, 2010. Preventing Depression after Stroke: Results from a randomized placebo-controlled trial. *Journal of Clinical Psychiatry.*, 67:1104–9.
- American Psychiatric Association, 2013. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Arlington: American Psychiatric Publishing.
- American Stroke Association, 2013. *Guidelines for the Early Management of Patients with Acute Ischemic Stroke*. www.Stroke,Ahjaournals.Org
- Angela L., Neese, A.L., L.D. Pittman and R. Hunemorder, 2013. Depressive Symptoms and Somatic Complaints among Zambian Adolescents: Associations With Stress And Coping. *Journal of Research on Adolescence.*, 23, 118–127.
- Annika, K., M. Tovote, J. Schroevers, E. Snippe, P.M. Emmelkamp, P.T. Links, R. Sanderman, And J. Fleer, 2017. What Works Best For Whom? Cognitive Behaviour Therapy and Mindfulness-Based Cognitive Therapy For Depressive Symptoms In Patients With Diabetes. Published: June 29, 2017. <https://doi.org/10.1371/journal.pone.0179941>
- Anson, K. and J. Ponsford, 2010. Evaluation of a Coping Skills Group Following Traumatic Brain Injury. *Journal of Brain Injury.*, 20:167–178. Doi: 10.1080/02699050500442956.
- Anther, M. 2015. Provision of Inpatient Rehabilitation and Challenges Experienced With

Participation Post Discharge: Qualitative And Quantitative Inquiry of African Stroke Patients. *Journal of Biomed Central.*, 15:423-435.

Astrom, M., R. Adefsson and K. Asplund, 2011. Major Depression in Stroke: A 3 Year Longitudinal Study. *Journal of American Heart Association.*, 24:976-982.

Australian, R. and N. Depression, 2009. Australian and New Zealand Clinical Practice Guidelines for the Treatment of Depression. *Aust. N. Z. Journal of Psychiatry.*, 38: 389–407.

Ayerbe, L., S. Ayis, C.D. Wolfe and A.G. Rudd, 2013. Natural History, Predictors and Outcomes of Depression after Stroke: Systematic Review and Meta-Analysis. *Br Journal of Psychiatry.*, 202: 14-2.

Barker, C.S. 2007. Depression and Anxiety Three Months Post-Stroke: Prevalence and Correlates: Achieves of Neuropsychology. *Journal of Clin Neuropsychol.*,22:519-31.

Barker, G. 2007. *Getting Back to Work after Stroke*. London: The Stroke Association & Different Stroke, United Kingdom.

Barth, J., M. Schumacher and C. Herrmann-Lingen, 2006. Depression as a Risk Factor for Mortality in Patients with Coronary Heart Disease: a meta-analysis. *Journal of Psychosomatic Medicine.*, 66:802–813.

Bartoli, F., N. Lillia, A. Lax, C. Crocamo, V. Mantero, G. Carrà, E. Agostoni and M. Clerici, 2013. Depression after Stroke and Risk of Mortality: A Systematic Review and Meta-Analysis. *Journal of Stroke Research and Treatment.*, 2013. Article ID 862978, 11 pages. <http://dx.doi.org/10.1155/2013/862978>.

Bateman, A. 2017. *Computerized CBT for Mood Problems after Stroke*. London: Cambridge shire Community Services NHS Trust.

Beck, J. 1979. *Cognitive Therapy for Challenging Problems: What To Do when The Basics*. New York: the Gulford Press.

Beck, J. S. 2005. *Cognitive Behavior Therapy: Basics and Beyond (2nd edition)*. New York.

Becker, S and R. Kaufmans 2005. Managing an Uncertain Illness Trajectory in old Age: Patients and Physicians Views of Stroke. *Journal of Medical Anthropology*

Quarterly, 20:504-20.

Bhugal, S.K., R. Teasell, N. Foley, and M. Speechley 2009. Lesion, Location and Post-Stroke Depression: A Systematic Review Of Methodological Limitations In Literature. *Article in Journal of Pub Med.*, 35:794-802.

Bozikas, V.P., G. Gold, E. Kovari, F. Herrmann, A. Karavatos, And P. Giannakopoulos, 2012. Pathological Correlates of Post stroke Depression in Elderly Patients. *American Journal of Geriatr Psychiatry*, 13:166-9.

Broomfield, M.N., T.J. Quinn, N.A. Abdui- Rahim, R.M. Nalters, and J. Evance, 2014. Depression and Anxiety Symptoms Post-Stroke/TIA: Prevalence and Associations in Cross-Sectional Data from a Regional Stroke Registry. *Journal of BMC neurology.*, 14:198.

Brown, C., H. Hasson, V. Thyselius and A.H. Almborg, 2012. Post-Stroke Depression and Functional Independence: A Conundrum. *Journal of Acta Neurol. Scand.*, 126, 45-51.

Bruno, A.V., L. Durkalski, C.E. Hall, R. Juneja, W. G. Barsan, et al., 2016. The Stroke Hyperglycemia Insulin Network Effort (SHINE) Trial protocol; a randomized, blinded, efficacy trial of standard versus intensive hyperglycemia treatment in acute stroke. *Int J Stroke.*, 9: 246–251.

Bueno, V.F., A. R. Brunoni, P.S. Boggio, I.M. Bensenor and F. Fregni, 2011. Mood and Cognitive Effects of Transcranial Direct Current Stimulation in Post-Stroke Depression. *Neurocase.*, 17:318-22.

Buttle, A.C., E.M. Chapman and A.T. Formen, 2014. The Imperical Status of CBT. *Clin Psychol Rev.*, 26: 17-31.

Cafarella PA, T.W. Effing, Z.A Usmani 2012. Treatments for Anxiety and Depression in Patients with Chronic Obstructive Pulmonary Disease: A Literature Review. *Respirology.*, 17:627-38.

Campbell, L. C. 2011. Addressing Literacy as a Barrier in Delivery And Evaluation Of Cognitive-Behavioral Therapy For Pain Management. *Pain.*, 152: 2679 –2680. doi:10.1016/j.pain.2011.09.004S0304- 3959(11)00543-4.

Carrà, G., S. Johnson, and P. Bebbington, 2012. The Lifetime and Past-Year Prevalence of Dual Diagnosis in People with Schizophrenia across Europe: Findings From The European

Schizophrenia Cohort (Eurosc). *European Archives of Psychiatry And Clinical Neuroscience.*, 262: 607–616.

Chemerinski, E., R.G. Robinson, and J.T Kosier, 2014. Improved Recovery In Activities Of Daily Living Associated With Remission of Post stroke Depression. *Journal of Stroke.*, 32: 113–117.

Chollet, F., J. Tardy, J.F. Albucher, C. Thalamas, E. Berard, et al., 2011. Fluoxetine for Motor Recovery after Acute Ischaemic Stroke (FLAME): A Randomised Placebo-Controlled Trial. *Lancet Neurol.*, 10:123-30.

Cicerone, K.D. 2012, Evidence-Based Cognitive Reha-Bilitation: Updated Review of the Literature from 2000 through 2010. *Archives of Physical Medicine and Reha-Bilitation.*, 92:519-30.

Clin, J. 2013. The Recognition and Management of Psychological Reactions to Stroke: A Case Discussion. *Journal of Prim Care Companion Psychiatry.*, 8: 234–240.

Craig P, P. Dieppe, S. Macintyre, S. Michie S. 2008. Developing And Evaluating Complex Interventions: The New Medical Research Council Guidance. *Bmj.* 337:A1655. Doi: 10.113.

Cribbie, R. A., P.R. Wilcox, C. Bewell, and H.J. Keselman, 2015. Tests For Treatment Group Equality When Data Are Nonnormal And Heteroscedastic. *Journal Of Modern Applied Statistical Methods.*, 6:117-132.

Christie, D. and D. Weigall, 2011. Social Work Effectiveness in Two-Year Stroke Patients: A Randomised Controlled Trial. *Journal of Community Health Studies.*, 8: 26–33.

Cuijpers, P., E. Weitz, J. Twisk, C. Kuehner, I. Cristea, et al (2014). Gender As Predictor And Moderator Of Outcome In Cognitive Behavior Therapy And Pharmacotherapy For Adult Depression: An "Individual Patient Data" Meta-Analysis. *J Depress Anxiety.*, 31: 941-51. doi: 10.1002/da.22328.

De Wit, 2007. Motor and Functional Recovery after Stroke: A Comparison of 4 European. *Rehabilitation Cen-Ters, Stroke.*, 38: 2107-7.

Dilevko, J. 2007. *Inferential Statistics And Librarianship. Library And Information Science Research.*, 29, 209-229.

Dilevko, J. 2011. Inferential Statistics and Librarianship. *Library and Information Science Research.*, 29: 209-229.

Diaz, M and S. Norma, 2015. *Depression Following Stroke in California Adults*. Thesis PhD 52; 1585516 DOI: 10.1186/s12888-014-0292-x.

Donnellan, D., D. Hevey, A. Hickey and D. O'Neill, 2006. Defining and Quantifying Copying Strategies After Stroke: A Review Journal of Neurology. *Neuro Surgery Of Psychiatry.*, 25: 1288-1295.

Donnellan, C., A. Hickey, D. Hevey, and D. O'Neill, D. 2010. Effect of Mood Symptoms on Recovery One Year after Stroke., *Int.J.Geriatr.Psychiatry*, 25: 1288-1295.

Dossa, A., M.E. Glickman, and D. Berlowitz, 2011. Association Between Mental Health Conditions and Rehospitalisation, Mortality, and Functional Outcomes in Patients With Stroke Following Inpatient Rehabilitation. *BMC Health Services Research.*, 11: 311.,

DSM-IV-TR. 1994 *Diagnostic and Statistical Manual of Mental Disorders*. 4th edition, Washington, DC: American Psychiatric Association.

Dwight-Johnson, M., C.D. Sherbourne, D. Liao, K.B. Wells, 2000. Treatment Preferences Among Depressed Primary Care Patients. *J Gen Intern Med.*, 15:527-34.

Eams, S., K. Mc-Kenna, L.G. Worrall and S. Read, 2003. The Suitability Of And Written Education, Materials For Stroke Survivors and Their Caregivers: *Topics In Stroke Rehabilitation.*, 10:70-83.

Elfil, M And A. Negida, 2017. A Sampling Methods in Clinical Research: *An Educational Review Emerg (Tehran)* 5: 52. PMID: PMC5325924.

Ellis R.J., D. Rosario, D.B. Clifford, J.C Mcarthur and D. Simpson, 2010. Continued High Prevalence And Adverse Clinical Impact of Human Immunodeficiency Virus-Associated Sensory Neuropathy In The Era Of Combination Antiretroviral Therapy: The CHARTER Study. *Arch Neurol.* 67:552-8. Doi: 10.1001/Archneurol.2010.76.

Eriksson, M., K. Asplund, E.L. Glader, B. Norrving and A. Stegmayr, 2004. For Riks-Stroke Collaboration. Self-reported depression and use of antidepressant after stroke: a national survey. *Stroke-Journal of American Heart Association.*, 35: 936-941.

Feigin, V. L., S. Barker-Collo, V. Parag, H. Senior, C.M. Lawes et al., 2010. Auckland

Stroke Outcomes Study. Part 1: Gender, stroke types, ethnicity, and functional outcomes 5 years poststroke. *Neurology*, 75, 1597-1607.

Feigin, V.L. and M.H. Forouzanfar, 2013. Global and Regional Burden of Stroke. *The Lancet, Early Online Publication.*, 58: 245-221.

Ferro, J.M., L. Caeiro and C. Santis, 2009. Post Stroke Emotional and Behavioural Impairment: A Narrative Review. *Cerebro Vascular Disease.*, 20: 132-153.

Fiske, A., J. Wetherell, and M. Gatz, 2010. Depression In Older Adults: *Annu Rev Clin Psychol*, 5:363–389.]

Fotowwat, Z. and Madiha L. 2012 Effect of Cognitive Behavioral Therapy (CBT) On Depressed Female patients in Karachi. *Journal of Social and Behavioral Sciences* 69 : 798 – 806.

Foster-Schubert, K.E., C.M. Alfano, C.R. Duggan And L. Xiao, 2011. Effect Of Diet And Exercise, Alone Or Combined, On Weight And Body Composition In Overweight-To-Obese Post-Menopausal Women Obesity. *Silver Spring*. 20: 1628–1638.

Fróes, K.S., M.T. Valdés, P. Lopes, and C.E Silva, 2014. Factors Associated With Health-Related Quality of Life for Adults With Stroke Sequelae. *Arq Neuropsiquiatr.*, 69:371-6.

Fournier, J.C., M.M. Robert, J. DeRubeis, D.H Steven and S. Dimidjian et al 2010. Antidepressant Drug effects and Depression Severity: A Patient-Level Meta-Analysis *JAMA.*, 303: 47–53.

Gainotti, G., A. Azzoni, and C. Marra, 2014 Frequency, Phenomenology And Anatomical-Clinical Correlates of Major Post-Stroke Depression. *Br J Psychiatry.*, 175:163-7.]

Gallagher-Thompson, D., A. Steffen, L. Thompson and M. Vandenbulcke, 2009. *Handbook of Behavioral and Cognitive Therapies with Older Adults*. New York: Springer.

Glass, T.A., D.B. Matchar, M. Belyea and J.R Feussner, 2005. Impact of Social Support on Outcome in First Stroke. *Stroke.*, 24:64-70.

Hackett, L.M., C.S. Anderson, A.O. House and J. Xia, 2014. Interventions For Treating Depression after Stroke. *Journal of Stroke.*, 4:20-39.

Hackett, M. L., C. Yapa, V. Parag, and C.S Anderson, 2011. Frequency of Depression

- after Stroke: A Systematic Re- View Of Observational Studies,” *Stroke.*, 36:154-175.
- Hackett, M and C. Anderson, 2010. Treatment Options for Post-Stroke Depression in the Elderly. *Journal of Aging Health.*, 1:95–105.
- Harmandayan, M., M. Romanowicz, And C. Sola, 2011. Successful Use Of Ect In Post-Stroke Depression. *Gen Hosp Psychiatry.*, 34:102.E5-6.
- Hind, D., G. Mountain, R. Gossage-Worrall, J. W. Stephen, Et Al, 2014. Putting Life In Years (Pliny): A Randomised Controlled Trial And Mixed-Methods Process Evaluation Of A Telephone Friendship Intervention To Improve Mental Well-Being In Independently Living Older People. *J. Public Health Research.*, 27:119-138.
- Hofmann, G.S., A. Asnaani, J.J. Vonk, T.A. Sawyer, and A. Fang, 2013. The Efficacy Of Cognitive Behavioural Therapy: A View of Meta Analyses. *Cognit ther res.*, 36:427-440. Doi:10.007/S10608-012-9476-1.
- Høifødt, R.S., M. Mittner, K. Lillevoll, S.K. Katla, N. Kolstrup, et al 2015. Predictors of Response to Web-Based Cognitive Behavioral Therapy With High-Intensity Face-to-Face Therapist Guidance for Depression: A Bayesian Analysis. *J Med Internet Res*; 17:e197 .DOI: 10.2196/jmir.4351. PMID: 26333818. PMCID: 4642793.
- House, A., P. Knapp, J. Bamford, 2009. Mortality 12 and 24 Months after Stroke May Be Associated with Depressive Symptoms at One Month. *Stroke.*, 32: 698-701.
- Hynninen, J.M, N. Bjerke, S. Pallesen, P. Bakke, And S. Nordhus 2010. A Randomized Controlled Trial Of Cognitive Behavioural Therapy For Anxiety And Depression In Copd. *Journal Of Respiratory Medicine.*,104 : 986-994
- Ian and Kneebone 2012. Framework to Support CBT For Emotional Disorders After Stroke. *Journal of Cognitive And Behavioral Practice.*, 23: 99-109.
- Ibeneme, S.C., C.C Anyachukwu, A. Nwosu, M. Bakare, and G. Fortwengel, 2016. Symptoms of Poststroke Depression among Stroke Survivors: An Appraisal of Psychiatry Needs and Care during Physiotherapy Rehabilitation. *Scientifica.*, 2016. Article ID 5646052, 6 pages.
- Jacquiline, M., 2006. *Service Needs of Stroke Survivors and their Informal Carers: Journal of Advanced Nursing.*, 16: 559-564.

Janicak, P. G., S.M. Dowd, B. Martis, D. Alam, and D. Beedle, et al 2010. Repetitive Transcranial Magnetic Stimulation Versus Electroconvulsive Therapy for Major Depression: Preliminary Results of A Randomized Trial. *Biol.Psychiatry*, 51: 659-667.

Joosten, E.A.G., L. DeFuentes-Merillas, T. de Weert, G.H. Sensky and C.P. Van der Staak, 2012. Systematic Review of The Effects of Shared Decision-Making on Patient Satisfaction, Treatment Adherence and Health Status. *Psychotherapy and Psychosomatics*, vol. 77.

Katherine, S., M. Swati , B. Sanjit, T. Robert and M.D. Teasell 2013. *Post Stroke Depression: Evidence-Based Review of Stroke Rehabilitation. J Stroke Cerebral vasc Dis.*, 22:1243-51.

Katona C. 2000. Managing Depression and Anxiety in the Elderly Patient. *Eur Neuropsychopharmacol.* 10:S427–S432.

Kemp, B., M. Corgiat, and C. Gill, 2010. Effects of Brief Cognitive-Behavioral Group Psychotherapy on Older Persons With And Without Disabling Illness. *Behave Health Ageing.*, 2:21–28.

Kim, B.R., D.Y. Kim, M.H. Chun, H.J. Yi, and J.S Kwon, 2010. Effect of Repetitive Transcranial Magnetic Stimulation on Cognition And Mood In Stroke Patients: A Double-Blind, Sham-Controlled Trial. *Am J Phys Med Rehabil.* 89:362-8.

King, R.B. 2009. Quality of life after stroke. *Stroke.* 27:1467–72.

Kirkevold, M., R. Martinsen, B.A. Bronke and K. Kvigne, 2014. Promoting psychosocial wellbeing following stroke using narratives and guided self-determination: a feasibility study. *BMC Psychology.*, 2:4. DOI: 10.1186/2050-7283-2-4.

Knapp, P. And J. Hewison, 2014. The Protective Effects of Social Support Against Mood Disorder After Stroke. *Psychology, Health, and Medicine.*, 3:275-283.

Kneebone I.I. and B.N. Lincoln 2012. Psychological Problems after Stroke and Their Management: State of Knowledge. *J Neuroscience & Medicine* 3: 83-89.

Kohen, R., K.C. Cain, A. Buzaitis, V. Johnson and K.J Becker, 2015. Response To Psychosocial Treatment In Poststroke Depression Is Associated With Serotonin Transporter Polymorphisms. *Stroke.* 42:2068-70.

Kootker, J.A, M.C. Rasquin, P. Smits, A.C. Geurts, and M.V. Caroline 2014. An Augmented Cognitive Behavioural Therapy for Treating Post-Stroke Depression: Description of A Treatment Protocol. *Clinical Rehabilitation.*, 29: 833-43.

Kootker, J.A., L. Fasotti, S.M. Rasquin, C.M. Van-Heugten, and A.C Geurts, 2012 The Effectiveness of An Augmented Cognitive Behavioural Intervention for Post-Stroke Depression with or without Anxiety (PSDA): The Restore4Stroke-PSDA trial. *BMC Neurology*, 12:51.

Kouwenhoven, S. E., M. Kirkevold, K. Engedal and H.S. Kim, 2011. Depression In Acute Stroke: Prevalence, Dominant Symptoms and Associated Factors. A Systematic Literature Review, *Disability And Rehabilitation.*, 33:539-56.

Kouwenhoven, S.E., C.L. Gay, L.N. Bakken , and A. Lerdal, 2013. Depressive symptoms in acute stroke: A cross-sectional study of their association with socio-demographics and clinical factors. *Neuropsychological Rehabilitation/.*, 23:658-677. doi: 10.1080/09602011.2013.801778.

Lai, S.M., S. Studenski, L. Richards, S. Perera, D. Reker et al 2009. Therapeutic Exercise and Depressive Symptoms after Stroke. *J Am Geriatr Soc.* 54:240–247. doi: 10.1111/j.1532.

Laidlaw, K. 2010. Post-Stroke Depression and CBT With Older People. In: Dolores G-T, Ann MS, Lary WT, editors. *Handbook of Behavioural and Cognitive Therapies with Older Adults.* New York: Springer.

Lieberman, D., M. Friger, V. Fried, Y. Grinshpun and Mytlis, N. 2010. Characterization of Elderly Patients in Rehabilitation: Stroke Versus Hip Fracture. *Disabil Rehabil.* 21:542-7.

Lincoln, 2012. Psychological Problems after Stroke and Their Management: State of Knowledge. *Journal of Neuroscience And Medicine.*, 3:83-89.

Lincoln, N and T. Flannaghan, 2003. Cognitive Behavioral Psychotherapy For Depression Following Stroke: A Randomized Controlled Trial. *Stroke.* 34:111- 115.

Lincoln, N., T. Flannaghan, L. Sutcliffe, and L. Rother, 1997. Evaluation Of Cognitive Behavioural Treatment For Depression After Stroke: A Pilot Study. *Clin Rehabil.* 11:114-22.

Linden, T., C. Blomstrand and I. Skoog, 2011. Depressive Disorders after 20 Months In

Elderly Stroke Patients: A Case-Control Study. *Stroke*. 38:1860–1863.

Lindley, R. and J. Bernhardt, 2010. *Clinical Guideline for Stroke Management*. Australia: National Stroke Foundation.

Lökk, L. And A Delbari, 2011. Management of Depression in Elderly Stroke Patients: Prediction of Response to Medication and Cognitive Therapy in The Treatment of Moderate to Severe Depression. *J Consult Clin Psychol.*, 77: 775–787. Doi: 10.1037/A0015401.

Loubinoux, I.,G. Kronenberg, M. Endres, P. S. Bard, T. Freret, et al 2012. Post-Stroke Depression: Mechanisms, Translation And Therapy. *J Cell Mol Med.*, 16: 1961–1969.

Lustman, J.P., E.K. Freeland, L.S. Griffith, and R.E. Clouse, 2009. Predicting Response to Cognitive Behavioural Therapy of Depression in Type 2 Diabetes. *Gen Hosp Psychiatry.*, 20:302-6.

Lyvia, S., B.A. Chriki, S. Szofia, M.D. Bullain, and A. Theodore, 2008. The Recognition and Management of Psychological Reactions to Stroke: A Case Discussion: The Primary Care Companion. *Journal of The Association of Medicine And Psychiatry* Vol 8:234-240

Manly, T. 2011. Cognitive Rehabilitation for Unilateral Neglect: Review. *Neuropsychological Rehabilitation.*, Vol. 12: 289-310.

Mapulanga, M. 2010. *The Socio-Economic Impact of Stroke on Households In Livingstone District, Zambia*. MA dissertation, University of Zambia.

Marit, K., M. Randi, A. Berit, and K. Kari, 2014. Promoting Psychosocial Wellbeing Following Stroke Using Narratives And Guided Self Determination. *BMC Psychology.*, 2:4.

Masharip, A. 2012. Stroke Characteristics and Outcomes of Adult Patients Admitted to The University Teaching Hospital Lusaka Zambia. *The Open General And Internal Med Journal*. 20: 54-58.

Matthews, D.J. 2016. Cognitive Behavioral Therapy Approach For Suicidal Thinking And Behaviors In Depression [Http://Dx.Doi.Org/10.5772/52418](http://dx.doi.org/10.5772/52418)

Malliari, A and A. Togia, 2016. An Analysis of Research Strategies of Articles Published In Library Science Journals: the example of Library and Information Science Research.

Qualitative and Quantitative Methods in Libraries. *The American Statistician*, 31: 147-150.

Mills, L., E. Abdulla, A.C. Robert, 2010. "Quantitative Methodology Research:

Is it on Psychologists' Reading Lists?" *Tutorials in Quantitative Methods for Psychology* 6: 52-60.

Mayawa, 2015. The Burden of Stroke in Africa, A Glance at The Present and Glimpse Into The Future. *Cardiovascular Journal Of Africa* 26 :3.

Mozaffarian D, and E.J. Benjamin 2015. Heart Disease And Stroke Statistics–2015 Update: A Report From The American Heart Association. *Circulation.*, 131:E29–E322.

Mshelia A. A., V. C. Onyecho, C. Adebowale and O. Timothy, 2014. Demographic And Clinical Factors on Depression among Stroke Patients. *American Journal of Clinical Medical Research.*, 4:38-42.

Mwanza, C. 2015. *Physiotherapist Perceptions on Stroke Rehabilitations With Focus on Palliative Care In Lusaka Zambia*. Electronic Thesis And Dissertations Repository.

Mweshi, M.M., K. H. Shula, A. L. Nkhata and Chiluba, B. 2016. The Best Time to Start Stroke Rehabilitation: A Review of the Evidence in Resource Adequate and Resource Constrained Settings. *Journal of Preventive and Rehabilitative Medicine* 1: 7-15.

Shorten, A and C.Moorley, 2014. Selecting The Sample. *Evid Based Nurs.* 17eb–2014–101747–. doi:10.1136/eb-2014-101747.

Nakagawa, A., S.M. Mitsuhiro, D. Mitsuda, D. Fujisawa and T. Kikuchi, 2015 Effectiveness of Cognitive Behavioural Therapy Augmentation in Major Depression Treatment (ECAM Study): Study Protocol for A Randomised Clinical Trial NHS Improvement- Stroke *Improving Access to Psychological Care After Stroke.*, 4., 10-24.

National Health Service. 2014. Cognitive Behavioural Therapy. Retrieved from <http://www.nhs.uk/conditions/Cognitive-behavioural-therapy/Pages/Introduction.aspx>

Naeem F., And D. Kingdom, 2010. *Cognitive Behavioural Therapy Urdu manual* (Soach Aur Bertyo Therapy Manual). *Social and Behavioural Science.*, 69:798-806.

Norma, D. 2015. *Depression Following Stroke In California Adults*. MA Dissertation, California State University, Long Beach.

Ntanda, M.P. 2011. *Nature And Outcome Of Strokes In Adult Zambian Patients Admitted At The University Teaching Hospital, Lusaka, Zambia*. MA dissertation, university of Zambia.

Ojagbemi, A., M. Owolabi, M. Atalabi and O. Baiyewu, 2013. Stroke Lesions And Post-Stroke Depression Among Survivors In Ibadan, Nigeria. *Afr J Med Med Sci* 42:245-51.

Price, A., L. Rayner, E. Okon-Rocha, A. Evans and K Valsraj, 2011. Antidepressants for the Treatment of Depression in Neurological Disorders: A Systematic Review And Meta-Analysis of Randomised Controlled Trials. *J Neurol Neurosurg Psychiatry.*, 82:914-23.

Rasquin, S.M., J. R.W. Lodder, M. Ponds, I. Winkens and J. 2009. Cognitive Functioning After Stroke: A One-Year Follow-Up Study. *Dement Geriatr Cogn Disord.* 18:138-44.

Rector, A.N. 2010. *Cognitive Behavioural Therapy: An Information Guide*. Canada: Library and Archives Cataloguing in Publication.

Renée P.W., J.A. Hiltunen and E. Kocys, 2013. Effectiveness Of Cognitive Behavioral Therapy: An Evaluation Of Therapies Provided to Post Stroke Patients By Trainees At A University Psychotherapy Training Center. *Psych J.*, 2: 101–112.

Robert G., M.D. Robinson, E. Ricardo and M.D. Jorge, 2015. Post-Stroke Depression: A Review: *Am J Psychiatry.*, 173:221–231; doi: 10.1176/appi.ajp.2015.15030363.

Robinson, R.G. 2006. *The Clinical Neuropsychiatry of Stroke*. New York: Cambridge University Press.

Robinson, R.G., G. Spalletta, and R.E Jorge, 2015. Decreased Heart Rate Variability Is Associated With Post Stroke Depression. *American J Geriatr Psychiatry.*, vol;16:867-873.

Rossello, M.J. and M. Jimenez-Chafey, 2006. Cognitive Behavioural Therapy For Depression In Adolescents With Diabetes: A Pilot Study. *International Journal Of Psychology.*, 40:219-26.

Royal College of Psychiatrists. 2013. Cognitive Behavioural Therapy. Retrieved from <http://www.rcpsych.ac.uk/mentalhealthinformation/therapies/cognitivebehaviouraltherapy.aspx>

Sam, C., C. Canice, A. N Akachukwu, C. Georgian and B. Muideen, 2016. Symptoms of Posts-stroke Depression among Stroke Survivors: An Appraisal of Psychiatry Needs and

Care during Physiotherapy Rehabilitation. *Journal of Scientifica (Cairo)*, 5646052. Published online 2016 Apr 13. Doi.

Scheffer, M., J.K. Monteiro and R.M. De-Almeida, 2011. Frontal Stroke: Problem Solving, Decision Making, Impulsiveness, and Depressive Symptoms in Men and Women. *Psychol Neurosci*. Vol ;4:267-78.

Schepers, V., Post, M., Visser-Meily, A., van de Port, I., Akhmouch, M., & Lindeman, Schmid, A. A., K. Kroenke, H.C. Hendrie, T. Bakas and J.M. Sutherland, 2014. Post-stroke Depression and Treatment Effects on Functional Outcomes. *Neurology*, 76: 1000-1005.

Scott, A.I.F and C. Freeman, 2010. Edinburgh primary care depression study: Treatment Outcome, Patient Satisfaction, And Cost After 16 Weeks. *BMJ*., 304: 883–887.

Sembi, S., N. Tarrier, P. O'Neill, A. Burns and B. Fa- Ragher, 2010, Does Post-Traumatic Stress Disorder Occur After Stroke: A Preliminary Study. *International Journal of Geriatric Psychiatry*, Vol. 13:457-469.

Sheikholeslami, F 2010. Effect of Group Therapy on Depression Following Myocardial Infarction. *Scientific Journal Hamedan University of Medical Science*. 11:48-53.

Shorten, A. And C. Moorley, 2014. Selecting the Sample. *Journal of Evidence Based Nursing*., 17, Issue 2.

Sonnenberg, C., A. Beekman and D. Deeg, 2010. Sex Differences In Late-Life Depression. *Acta Psychiatr Scand*. 101:286–92.

Souza, A.C., M.O. Rocha, A.L. Teixeira, J.O. Dias Júnior, A.L. Sousa, et al., 2013. Depressive Symptoms and Disability In Chagasic Stroke Patients: Impact On Functionality And Quality Of Life. *J Neurol Sci*., 324:34-7.

Spalletta, G and R.G. Robinson, 2012. How Should Depression Be Diagnosed In Patients With Stroke? *Acta Psychiatr Scand*., 121:401-3.

Srinivivasa, R. S., S.P. Thatikonda, S.K. Chennamsetty and A. Bhogaraju, 2014. A Prospective Study on Prevalence of Post Stroke Depression and Its Relationship With Lesion Laterally And Socio Demographic Factors. *Journal of Psycho Med.*, 15: 65-73.

Srivastava, A, A.B. Taly, A. Gupta, and T. Murali , 2010. Post-Stroke Depression:

Prevalence And Relationship With Disability In Chronic Stroke Survivors. *Ann Indian Acad Neurol.*, 13: 123–127.doi: 10.4103/0972-2327.64643.

Stephano, P. 2009. Epidemiology and Treatment of Post Stroke Depression. *Journal of Neural psychiatric Disease and Treatment.*, 3: 198-210.

Tess, A.V and G.W. Smetana, 2009. Medical Evaluation Of Patients Undergoing Electroconvulsive Therapy. *N Engl J Med.*, 360 :1347-44.

Thim and Antosen, 2014. Effectiveness of CBT Group Therapy for Depression In Routine Practice. *BMC Psychiatry.*, 14:292.

Thomas, M. 2010. Stroke Incidence Studies in Africa. *Journal of Global Health Cerebralvascular Disease.* 9: 180-187.

Thompson, L.W. 2009. *Cognitive-Behavioral Therapy and Treatment For Late-Life Depression.* *J Clin Psychiatry.*, 57: 29–37.

Thorn, B. E., M.A. Day, J. Burns, M.C. Kuhajda, S.W. Gaskins, et al., 2011. Randomized Trial of Group Cognitive Behavioural Therapy Compared With A Pain Education Control For Low-Literacy Rural People With Chronic Pain. *Pain*, 152, 2710– 2720. doi:10.1016/j.pain.2011.07.007.

Uher,R And B. Pavlova, 2016. Long-Term Effects Of Depression Treatment. *Journal Of Thelancet.Com/Psychiatry.*, 3: 137-145.

UNICEF 2005. Programming For Psychosocial Support, Frequently Asked Question. 18:12-21.

Unwin, G., I. B, Biza, B. Stenfertk, And R. Sabihaazmi, 2016. Effectiveness Of Cognitive Behavioural Therapy (Cbt) Programmes For Anxiety Or Depression In Adults With Stroke: A Review Of The Literature. *Journal of Research In Disabilities.*, 51-52.

Verdelho, A. H., F. Henon, F. Lebert and D.L. Pasquoer, 2004. Depressive Symptoms After Stroke And Relationship With Dementia. *Neurology.*, 62: 905-911.

Weinberger, W., W.M. Tierney, P. Booher and S.L. Hiner, 2009. Social Support, Stress, And Functional Status in Patients With Osteoarthritis. *Social Science and Medicine.*, 30:54-68.

World Health Organization, 2016. *Country Statistics and Global Health Estimates: The*

Global Health Observatory (http://who.int/gho/mortality_burden_disease/en/)

Whittick, 2010 Post-Stroke Depression: The Case for Augmented, Individually Tailored Cognitive Behavioural Therapy. *Clin Psychol Psychother*, 18:202–217.

Whyte, E.M E.H. Mulsant, 2003. Post Stroke Depression: Epidemiology, Pathophysiology And Biological Treatment. *Biological Psychiatry*.20: 43-54

Willey, J. Z., N. Disla, Y.P. Moon, M.C. Paik and R.L. Sacco, et al 2010. Early Depressed Mood After Stroke Predicts Long-Term Disability: The Northern Manhattan Stroke Study (NOMASS). *Stroke.*, 41: 1896-1900.

Williams. L.S., S.S. Ghose and R.W. Swindle, 2014. Depression and Other Mental Health Diagnosis Increase Mortality Rate After Ischemic Stroke. *Am J Psychiatry.*, 161: 1090-1095.

Winkle, J., R. Fatovich and P. Underwood, 2009. *Migrane and Tension Headaches: A Multi Modal Approach to Prevention and Control of Headache*. University Of Western Australia. *The Self Care Research Team*.

World Health Organization, 2010 “Mental and neurological disorders,” November 2014, <http://www.who.int/mediacentre/factsheets/fs265/en/>.

Zakopoulos, N. And S. Stamatelopoulos, 2013. First-Stroke Recovery Process: The Role Of Family Social Support. *Archives of Physical Medicine and Rehabilitation*. 81:456-469.

Zhang, H.,Y. Lu, M. Liu, Z. Zou, and L. Wang, 2013. *Strategies For Prevention Of Postoperative Delirium: A Systematic Review And Meta-Analysis Of Randomized Trials*. *Crit Care*. 17:R47. Doi: 10.1186/Cc12566.

APPENDICES

APPENDIX A)

QUESTIONNAIRE

DEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS

Instructions

Tick in the appropriate box.

OPD Registration No. _____

Sex: Male Female

Age:

Marital Status: Single Married Divorced Widowed

Residence Status: Rural Urban

Employment Status: Employed Unemployed

Education Level: Non Primary Secondary Higher

APPENDIX B)

BECK'S DEPRESSION INVENTORY

This depression inventory can be self-scored. The scoring scale is at the end of the questionnaire.

- 1 0 I do not feel sad.
 - 1 I feel sad
 - 2 I am sad all the time and I can't snap out of it.
 - 3 I am so sad and unhappy that I can't stand it.

- 2 0 I am not particularly discouraged about the future.
 1. I feel discouraged about the future.
 2. I feel I have nothing to look forward to.
 3. I feel the future is hopeless and that things cannot improve.

- 3 0 I do not feel like a failure.
 - 1 I feel I have failed more than the average person.
 - 2 As I look back on my life, all I can see is a lot of failures.
 - 3 I feel I am a complete failure as a person.

- 4 0 I get as much satisfaction out of things as I used to.
 - 1 I don't enjoy things the way I used to.
 - 2 I don't get real satisfaction out of anything anymore.
 - 3 I am dissatisfied or bored with everything

5. 0 I don't feel particularly guilty
 - 1 I feel guilty a good part of the time.
 - 2 I feel quite guilty most of the time.
 - 3 I feel guilty all of the time.

6. 0 I don't feel I am being punished.
 - 1 I feel I may be punished.
 - 2 I expect to be punished.
 - 3 I feel I am being punished.

- 7 0 I don't feel disappointed in myself.
 1. I am disappointed in myself.
 2. I am disgusted with myself.
 3. I hate myself.

- 8 0 I don't feel I am any worse than anybody else.
 1. I am critical of myself for my weaknesses or mistakes.
 2. I blame myself all the time for my faults.
 3. I blame myself for everything bad that happens.

- 9 0 I don't have any thoughts of killing myself.
 1. I have thoughts of killing myself, but I would not carry them out.
 2. I would like to kill myself.

3. I would kill myself if I had the chance.
- 10 0 I don't cry any more than usual.
 1. I cry more now than I used to.
 2. I cry all the time now.
 3. I used to be able to cry, but now I can't cry even though I want to.
- 11 0 I am no more irritated by things than I ever was.
 1. I am slightly more irritated now than usual.
 2. I am quite annoyed or irritated a good deal of the time.
 3. I feel irritated all the time.
- 12 0 I have not lost interest in other people.
 1. I am less interested in other people than I used to be.
 2. I have lost most of my interest in other people.
 3. I have lost all of my interest in other people.
- 13 0 I make decisions about as well as I ever could.
 1. I put off making decisions more than I used to.
 2. I have greater difficulty in making decisions more than I used to.
 3. I can't make decisions at all anymore.
- 14 0 I don't feel that I look any worse than I used to.
 1 I am worried that I am looking old or unattractive.
 2 I feel there are permanent changes in my appearance that make me look unattractive.
 3 I believe that I look ugly.
- 15 0 I can work about as well as before.
 1. It takes an extra effort to get started at doing something.
 2. I have to push myself very hard to do anything.
 3. I can't do any work at all.
- 16 0 I can sleep as well as usual.
 1. I don't sleep as well as I used to.
 2. I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
 3. I wake up several hours earlier than I used to and cannot get back to sleep.
- 17 0 I don't get more tired than usual.
 1. I get tired more easily than I used to.
 2. I get tired from doing almost anything.
 3. I am too tired to do anything.
- 18 0 My appetite is no worse than usual.
 1. My appetite is not as good as it used to be.
 2. My appetite is much worse now.
 3. I have no appetite at all anymore.
- 19 0 I haven't lost much weight, if any, lately.
 1. I have lost more than five pounds.

- 2. I have lost more than ten pounds.
 - 3. I have lost more than fifteen pounds.
- 20 0 I am no more worried about my health than usual.
- 1. I am worried about physical problems like aches, pains, upset stomach, or constipation.
 - 2. I am very worried about physical problems and it's hard to think of much else.
 - 3. I am so worried about my physical problems that I cannot think of anything else.
- 21 0 I have not noticed any recent change in my interest in sex.
- 1. I am less interested in sex than I used to be.
 - 2. I have almost no interest in sex.
 - 3. I have lost interest in sex completely.

INTERPRETING THE BECK DEPRESSION INVENTORY

Now that you have completed the questionnaire, add up the score for each of the twenty-one questions by counting the number to the right of each question you marked. The highest possible total for the whole test would be sixty-three. This would mean you circled number three on all twenty-one questions. Since the lowest possible score for each question is zero, the lowest possible score for the test would be zero. This would mean you circled zero on each question. You can evaluate your depression according to the Table below.

Total Score_____	Levels of Depression
1-10_____	These ups and downs are considered normal
11-16_____	Mild mood disturbance
17-20_____	Borderline clinical depression
21-30_____	Moderate depression
31-40_____	Severe depression over
40_____	Extreme depression

APPENDIX C)

INFORMATION SHEET

(To be read to each respondent in her chosen language.)

This is an important form giving you information about this study that we are conducting. Please read it or someone will read it for you, carefully, and ask questions where it is not clear for you. If you decide to participate in this study, you will confirm by signing or putting your thumb print at the indicated space. You are free to refuse the participation in this study without any risk of change or influence on your treatment and care that you will be receiving in this hospital.

Invitation

You are invited to take part in the research in titled **The Effects of Cognitive Behavioural Therapy on Post Stroke Depression**. Cognitive behavioural therapy (CBT) is a psychosocial intervention for individuals with Post Stroke Depression (PSD).

Purpose of Research and Procedures.

The aim of this study is to find out if CBT is an effective therapy for post stroke patients with depression. Thereafter the findings will be given to health planners to consider this therapy in their quest to deliver quality services to patients with stroke.

Do I have to take part?

It's up to you whether or not to be involved. If you decide to take part, you will be given this information sheet to keep and asked to sign a consent form. You are also free to withdraw from this study at any time you wish to do so without giving reason.

What will happen if I agree to take part?

You will be put on CBT in order to reduce the depressive symptoms from you and improve your mood by working on changing the thoughts that are leading to depression.

Risks and benefits

To be a participant to this study has no risk at all. You will benefit, instead by having post stroke psychological care as well as monitoring your recovery and receiving the treatment that you need.

Confidentiality

All the information including your name and all your personal and medical details will be kept confidential. No individual will be identifiable in any reports or publications. All the information collected and the counselling sessions will be destroyed after transferring the

data to the computer where initials of your names will be replaced by computer number of each participant.

For any queries on this study, you are free to contact me physically or on the

Following address:

University teaching hospital (UTH), department of psychiatry clinic 6,

Lusaka,

E.mail: kapumpechilufya@yahoo.com, kapschilu@gmail.com, mobile: 0977-505395

OR contact the Ethics Committee on:

ERES Converge IRB

33 Joseph Mwilwa Road

Rhodes Park

LUSAKA

Tel: 0955 155633/4

E-mail: eresconverge@yahoo.co.uk

APPENDIX D)

CONSENT FORM

TITLE OF RESEARCH: EFFECTS OF COGNITIVE BEHAVIOURAL THERAPY ON POST STROKE DEPRESSION.

Participant reference number:.....

1. I confirm that I have read the information sheet dated ----/-----/2017 for the above study. I have had an opportunity to ask questions and I have had satisfactory answers.

2. I understand that my participation is voluntary and I am free to withdraw consent any time without giving reason.

3. I agree to my written notes from the CBT course being used by the researcher

Signature of participant..... Signature of Witness.....

Thumb Print..... Signature of researcher.....

Date..... Date.....