

**THE PREVALENCE OF DEPRESSION AMONG MENOPAUSAL FEMALE  
TEACHERS IN NAIROBI COUNTY, KENYA**

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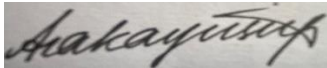
**A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT FOR THE  
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## DECLARATION OF ORIGINALITY FORM

I, Dr. Neema Araka hereby declare that this is my original work carried out in partial fulfilment of the award of master's degree of medicine in psychiatry at the University of Nairobi. I have not presented the same to any other higher institution for any award.

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## DEDICATION

I want to specially dedicate my thesis to my very young children. They welcome me warmly, excitedly and joyfully after hours and days of being absent. My dearest mother and sister for being a constant source of inspiration, encouragement and direction. And to each of my very close family members who have stepped in to help at the rise of every need.

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## LIST OF ABBREVIATIONS/ACRONYMS

<b>ACOG</b>	The American College of Obstetricians and Gynaecologists
<b>APA</b>	American Psychiatric Association
<b>CBT</b>	Cognitive Behavioural Therapy
<b>DSM-5</b>	Diagnostic & Statistical Manual of Mental Illnesses
<b>FMP</b>	Final Menstrual Period
<b>HPA</b>	Hypothalamus-Pituitary Axis
<b>HRT</b>	Hormone Replacement Therapy
<b>MT</b>	Mindfulness Therapy
<b>PDD</b>	Premenstrual Dysphoric Disorder
<b>PPD</b>	Post-Partum Depression
<b>VMS</b>	Vasomotor Symptoms
<b>WHO</b>	World Health Organization
<b>WPAI</b>	Work Productivity and Activity impairment
<b>YLD</b>	Years Lived with Disability

## DEFINITION OF OPERATIONAL TERMS

**Depression:** is a mental illness that adversely affects how you feel, think and behave. It can cause psychological and physical symptoms that can impair a person's ability to perform their functional roles (American Psychiatric Association 2002).

**Estrogen:** is a female reproductive hormone secreted by the ovaries (ACOG 2020).

**Menarche:** is the first menstrual period in women (M Rees 1995).

**Menopause:** is the spontaneous cessation of menstruation as a result of loss of ovarian function (WHO 1981).

**Ovaries:** are a paired organ of the female reproductive system that produce estrogen (ACOG 2020).

**Perimenopause:** are the years leading up to menopause characterized by irregular menses (ACOG 2020).

**Puberty:** is the beginning of hormonal development impacting physical, mental, emotional and social changes in both girls and boys. It begins from 12 years old (CDC 2021).

## ABSTRACT

**Background:** Menopause is generally well-tolerated in most women. Many studies, albeit inconsistent findings have shown that during the menopausal phase, women are 2 – 5 times more likely to get depression than in any other phase of their reproductive life cycle. The rate of depression declines 2 to 4 years after the Final Menstrual Period (FMP).

**Study objective:** The aim was to determine the prevalence of depression in menopause, the associated severity of menopausal symptoms with depression among female teachers in primary and secondary schools in Nairobi County, Kenya.

**Method:** The study used a descriptive cross-sectional study design. The calculated sample size was 296. Using multi-level sampling procedure, schools were randomly selected from four constituencies: Langata, Embakasi East, Westlands and Starehe in Nairobi County. Participants were equally distributed across the four constituencies with proportional sampling in primary and secondary schools. The tools used for the study included sociodemographic questionnaire, menopausal rating scale (MRS) and patient health questionnaire (PHQ-9).

**Data Analysis:** All completed forms were thoroughly checked for errors. Collected data was entered into Google forms. The data was analysed using SPSS V.22. Variables that were continuous have accompanying standard deviations. Bivariate analysis using Fischer's exact test was used to confirm correlation between variables using crude odds ratio.

**Results:** The prevalence of depression in menopause was at 49% with 35% (N=104) of the respondents reporting mild severity. Menopausal symptoms using the MRS scale were found in 92% of respondents with 53% (N=156) reporting moderate symptoms. 51% (N=152) had their Final Menstrual Period (FMP) less than 18 months ago. 85% (N=212) of the respondents were under GoK. Married respondents were 56% (N=165) with 48% (N=141) of their spouses having tertiary level of education. 76% (N=224) of the participants had at least 4 (four) children and all the respondents reported to exercise at least 30 minutes every day.

**Conclusion:** Depression is evidently common among menopausal teachers and is associated with moderate to severe menopausal symptoms. Absence of spouse and a teenage last born were significantly associated with menopausal depression. Married respondents with spouses of tertiary level of education reported fewer cases of depression. Locally, menopausal depression showed a higher prevalence compared to other forms of reproductive depression: PMDD 31% and PPD 11.1%. There were no studies on perimenopausal & post-menopausal depression. Further studies are necessary to better understand the scope of menopausal depression in order to guide appropriate interventions that can provide early detection and treatment for those at risk and affected by depression.

## CHAPTER ONE: INTRODUCTION

### 1.1 Background Information

Depression affects 350 million people worldwide. 1 in every 6 adults will experience depression at some point in their lives that is likely to result in substantial health loss. Depression is the leading cause of disability worldwide. In 2015, a total of 50 million Years Lived with Disability (YLD) were due to depression alone. Depression is also the biggest contributor of global disease burden resulting in approximately 1 million deaths to suicide annually (WHO 2017).

Depression is the most common mental illness affecting how a person feels, thinks and behaves. It can cause feelings of sadness, guilt, worthlessness and difficulty sleeping (American Psychiatric Association 2020). These emotional and psychological symptoms can lead to significant impairment in daily function and a diminished quality of life. In severe cases, depression can lead to suicide (World Federation for Mental Health 2012). Up to 80% of the global burden of depression is reported from middle- and low-income countries (WHO 2017).

A notably wide treatment gap in sub-Saharan Africa has been implicated in the huge depression burden which is worsened by lack of resources and public education on depression. A 98.8% treatment gap was recorded in Sierra Leone reflecting the disproportional inequality among those with mental illness and in need of treatment but are unable to access mental health care. Additionally, scarcity of psychiatrists and mental health outpatient centres contribute greatly to the treatment gap (Osman Sankoh, Stephen Sevalie & Mark Weston 2018).

Due to its global prevalence, persistence in functional impairment, stigma and human rights violations; depression has now been classified as a priority condition along with dementia, schizophrenia and epilepsy (mhGAP 2008). Poverty, unemployment, physical illness and alcohol use increase the risk of depression among adults. Between 2013 and 2016, 8.1% of American adults above 20 years old had a depressive episode with twice as many females as males. This represents a major health disparity (CDC 2018).

This disproportionate burden of depression on women is thought to result from hormonal and neurodevelopmental changes. The hormonal changes may explain the differences in gender prevalence in depression starting from puberty (Rachel H. Salk, Janet S. Hyde, Lyn Y. Abramson 2017). Before puberty, there is an equal odds ratio for depression between boys and girls which thereafter, doubles for women (WHO 2017). In females, puberty marks the

beginning of ovarian function; the first menstrual cycle. A transition into the reproductive lifespan which is then terminated by menopause.

According to WHO, menopause is the permanent cessation of menstruation due to loss of ovarian function. The menopausal phase can last up to 7 years after the Final Menstrual Period (FMP) (Nancy E. Avis, Sybil L. Crawford, Gail Greendale et al. 2015). After menopause, the risk of depression tends to lessen; narrowing the gap in gender differences. (Tracey J. Shors & Benedetta Leuner 2003). Ovaries produce estrogen, a reproductive hormone. The function of ovaries fluctuates throughout the reproductive lifecycle of a woman.

The cyclical function of estrogen levels during the various phases of a woman's life coincides with the specific forms of depression found only in women. These forms of depression include premenstrual dysphoric disorder (PMDD), postpartum depression (PPD), perimenopausal, menopausal and postmenopausal depression. Estrogen levels sharply fall immediately after delivery and during monthly menstruation. However, the exact underlying mechanism between estrogen levels and depression in women, still remains unclear (Paul R Albert 2015).

Low levels of estrogen after delivery and during monthly menses have been associated with Post-partum Depression (PPD) and Premenstrual Dysphoric Disorder (PMDD) respectively. However, the recurring fluctuations in ovarian function could not explain why only some women go on to get PPD and PMDD and others do not. The study concluded that cyclic hormonal changes were necessary but not sufficient to trigger a depression in these women (Melissa M. Batt, Korrina A. Duffy, Andrew M. Novick, Christina A. Metcalf & C. Neill Epperson 2020).

A study done in the US showed the prevalence rate of 10.2% in PPD. Another study done on 2,800 French women revealed that 12% of them met the diagnostic criteria of PMDD (Sabrina Hofmeister & Seth Bodden 2016). This depicted a slight statistical difference in the two forms of depression. However, majority of studies found PPD had comparable prevalence with other forms of depression in women of childbearing age, including PMDD (Melissa M. Batt, Korrina A. Duffy, Andrew M. Novick, Christina A. Metcalf & C. Neill Epperson 2020).

Women entering menopause are 2 -5 times more likely to get depression than women in any other phase of their lifecycle. Notably, the rate of depression declines 2 to 4 years after the final menstrual period (FMP) implying that depression in middle aged women is not due to ageing (Joyce T Bromberger & C. Neill Epperson 2018). Although menopause is a universal phase, the age of onset and duration tends to vary across different races and is influenced by multiple

factors including education, employment, marital status, use of contraception, mother's age at menopause, number of pregnancies and smoking.

Women in developing countries experience menopause earlier than those in developed countries (Ellen B. Gold 2011). The median age of onset of menopause among Caucasian women ranges between 50.1 to 52.8 years (S Palacios, V W Henderson, N Siseles, D Tan & P Villaseca 2010). For sub-Saharan African women, onset of menopause ranges between 45 and 55 years. Natural menopause is the spontaneous cessation of menstruation for 12 months consecutively (Engida Yisma, Natnael Eshetu, Stephanie Ly & Berhanu Dessalegn 2017).

A descriptive cross-sectional study conducted in outpatient clinics among women between the ages of 41 and 57 years found the mean age of menopause to be  $48.91 \pm 2.58$  years with hot flushes being commonly reported (P. O. Adefuye, B. O. Adefuye, M.A. Lamina, T. O Shorunmu & R. A. Akindele 2017). Negative attitudes toward menopause unfavourably influenced the frequency of menopausal symptoms and overall quality of life as measured by MENQOL (E. Yanikkerem, S. Oruc Koltan, A Goker Tamay & S Dikayak 2012).

Menopausal symptoms include vasomotor symptoms (VMS), physical symptoms and psychological symptoms. VMS include hot flushes and night sweats. Physical symptoms include vaginal dryness, changes in sexual desire and bladder problems. Psychological symptoms include depressed mood, irritability and mental exhaustion. Menopausal symptoms were more commonly reported in women who had strained relationship with their children and husband (E. Yanikkerem, S. Oruc Koltan, A Goker Tamay & S Dikayak 2012).

As women approach middle-age, their roles at home and at work become more important. VMS and sleep disturbance can limit them from performing their functional roles which could lead to increased risk of depression during menopause (M. de Kruif, A. T. Spijker, M. L. Molendijk 2016). Numerous studies have evidenced a strong correlation between vasomotor symptoms and sleep disturbance with depression in menopausal women. The causative role of disrupted sleep in depression can be difficult to ascertain since the symptom is present in both menopause and depression.

Therefore, identifying which came first, sleep disturbance as a menopausal symptom associated with new-onset depression or new-onset depression presenting with sleep disturbance during menopause poses a clinical dilemma (Ellen W. Freeman 2015). A National Comorbidity Study recorded the highest incidence of depressive symptoms in women during their menopausal phase (Ellen W. Freeman 2015). In 2014, another study on 1280 middle-aged women revealed that 59.8% of the participants had depression.

Education, income, relationship with spouse and children and smoking affected the severity of depression in menopause (Poorandokht Afshari, Sedighe Manochehri, Mitra Tadayon, Mahbobeh Kianfar, Mohammedhosain Haghghizade 2015). Using the Hamilton Depression Scale (HAMD), the prevalence of depression in menopause yielded inconsistent findings. In a meta-analysis that included 23 cross-sectional studies revealed a 36.3% pooled prevalence of depression in menopause. (Liang-Nan Zeng, Yuan Yang, Yuang Feng et al 2019).

Menopausal women scored higher than non-menopausal women on Work Productivity and Activity impairment (WPAI) 38% and 18% respectively. There was associated impaired productivity and work absenteeism (Edith Mwangi, Peterson Warutere, Anthony Wanyoro & Gilber Koome 2019). Depression and vasomotor symptoms adversely affect cognitive function which may contribute to lower performance at work (Patrizia Monteleone, Giulia Mascagni, Andrea Giannini, Andrea R. Genazzani & Tommaso Simoncini 2018).

Studies on prevalence of depression in menopause are relatively new. The findings have thus far alluded to the plausible assumption that there is an increased risk of depression in middle-aged women. According to WHO, women in sub-Saharan Africa are expected to have an increased life expectancy of up to 76 years, on average (WHO 2015). This projected rise indicates that more women will live past the age of menopause increasing the risk of depression in middle-aged women even further.

Therefore, it is imperative to first assess and identify the presence of depression in menopause in our local context so that we can be able to create systems and structures that will, in future, effectively address the negative impacts of depression in menopause among these women.

## 1.2 Problem Statement

Depression is disabling and can affect anyone, at any age and anytime. It is very pervasive and is considered a global crisis (WHO 2017). Depression impairs the quality of life particularly in areas of independence, spirituality/ personal beliefs, social interactions and living conditions (M. C. Angermeyer, A. Holzinger, H. Matschinger, K. Stengler-Wenzke 2002). Depression is the leading cause of disease burden with a female preponderance 50% higher than in men (WHO, 2008).

Before puberty, there is an equal odds ratio for depression between boys and girls which thereafter, doubles. Estrogen, a reproductive hormone produced by the ovaries has been largely implicated in the increased risk of depression in the life cycle of a woman (Paul Albert 2015). The cyclic fluctuations of estrogen, though unclear how, are thought to trigger the different

types of depression during the different reproductive phases in a woman's life. These include premenstrual dysphoric disorder, postpartum and postmenopausal depression.

The highest incidence of depression among the reproductive forms of depression was found in perimenopause and menopause was attributed to the declining ovarian function (Paul Albert 2015). The dramatic changes in estrogen levels suppress HPA axis predisposing the woman to the risk of depression. Additionally, these hormonal changes render the woman sensitive to psychosocial, environmental and physiological triggers that further increase the risk of depression (Meir Steiner, Edward Dunn & Leslie Bor 2003).

Although depression in Sub-Saharan Africa is becoming increasingly recognized as an important medical illness, levels of detection and access to treatment are still substantially low. Stigma surrounding mental illness is another challenge impeding the efforts against the burden of depression. For instance, sub-Saharan African women tend to seek treatment for the physical symptoms of depression from a general practitioner instead of a mental health practitioner often leading to misdiagnosis of depression and delay of interventions for treatment of depression.

The preference to see the general practitioner has been attributed to the ongoing stigma surrounding mental health (M Ngcobo, BJ Pillay 2008). The global treatment gap for depression is 56% with Sub-Saharan Africa recording the least outpatient mental health visits annually. (Osman Sankoh, Stephen Sevalie and Mark Weston 2018). In sub-Saharan Africa, research on menopause focuses on menopausal symptoms, related medical illnesses or work productivity.

Studies on depression in menopause are lacking perhaps due to the positive outlook women have on menopause as they look forward to the freedom of no longer menstruating which may explain why the phase of menopause is generally well tolerated among women in sub-Saharan Africa (A O Adekunle, A O Fawole, M A Okunlola 2000). With depressive symptoms in menopause being the least reported (P. O. Adefuye, B. O. Adefuye, M.A. Lamina, T. O Shorunmu & R. A. Akindele 2017).

In Kenya, the researcher could not find any studies on the prevalence of depression in menopause. And since depression during menopause burdens different areas of functioning, early detection and intervention among these women will timely mitigate the adverse impact of depression and allow menopausal women to retain their functional ability. The choice of our study participants is informed by the significant role teachers play in the society. In Kenya, half of the teachers are female.



The demands of being a teacher in the country are high and as female teachers near the age of retirement, they have to concurrently deal with the different biopsychosocial changes of the menopausal phase potentiating the risk of depression. It is therefore important to create awareness about depression in menopause so as to allow those already affected to seek appropriate treatment for menopausal depression at the earliest detection of symptoms so as to maintain an overall healthy well-being, productivity and usefulness during this transition.

### 1.3 Significance and Rationale

This study will focus on the prevalence of depression in menopause among female teachers in Nairobi County. Education being a basic human need makes teachers, arguably, the most critical mediators of knowledge (Mark Mason 2003). Teachers are responsible for different roles in education and make up the strongest pillar of strength in the society. In 2016, the total number of teachers in Kenyan schools were 489, 241. With nearly 50% of them being female teachers (Ministry of Education 2016).

Using these figures, it is plausible to presume that there will be a high turnout in the number of female teachers in schools going through menopause. The findings of this study will contribute mainly to awareness creation. Being informed about menopausal depression will allow teachers to prepare more adequately in identifying early symptoms, apply learned coping mechanisms and seek proper mental health treatment. Moreover, awareness creation leads to openness in conversations about menopausal depression.

More awareness can encourage healthy seeking behaviours for menopausal women experiencing depressive symptoms. It can help create support systems for menopausal women. In addition to educating teachers on menopausal depression, the educated teachers can spread awareness to parents of students they come in contact with from many other professions like medicine, nursing, law and others. The results of this study will also inform healthcare workers to screen for depression among ‘at risk’ menopausal women and offer appropriate referrals.

This study will also be used to influence policy makers to introduce routine screening as well as provide accessibility to mental health care for depression among menopausal women. Moreover, health promotion programs geared towards empowering menopausal women with coping strategies can be put in place to improve the general well-being and overall quality of life for the depressed women during menopause. This study can also be used to provide motivation for further research into menopausal depression.

#### 1.4 Main Objective

The overall objective of the study is to determine the prevalence of depression in menopause, the associated severity of menopausal symptoms with depression in menopause among female teachers in primary & secondary schools in Nairobi, Kenya.

#### 1.5 Specific Objectives

1. To determine the prevalence of depression in menopause among female teachers in Nairobi County, Kenya
2. To determine the severity of menopausal symptoms among female teachers in Nairobi County, Kenya
3. To determine the association between severity of menopausal symptoms and depression in menopause among female teachers in Nairobi County, Kenya.
4. To determine the association between socio-demographic factors and depression in menopause among female teachers in Nairobi County, Kenya.

## CHAPTER TWO: LITERATURE REVIEW

### 2.1 Introduction

Depression, depressive episodes are marked by feelings of sadness, emptiness or irritability with diminished interest in previously enjoyed activities lasting most of the day or nearly daily for two weeks (WHO 2021). The diagnosis of a depressive episode is made when the symptoms cause significant difficulty in social, occupational, or other important areas of functioning. The elicited depressive symptoms must not be attributable to any other factors including medical conditions or adverse effects of drugs (DSM-5). Depression affects at least 322 million adults. The number of depressed adults rise annually. Between 2005 to 2015, there was an 18.4% increase in the number of people living with depression. Prevalence of depression is expected to rise in relation to the growing population sizes (WHO 2017). Depression causes a major health disparity; with women twice more likely to get depressed than men at odds ratio of 1.95:1 (Rachel H. Salk, Janet S. Hyde & Lyn Y. Abramson 2017). This 2:1 gender ratio in depression is not universal. Variations have been noted across different nations.

With factors such as economic development affecting gender equality being listed as an important area of investigation in understanding the varying gender differences in depression cases (Kessler & Usten, 2008). Gender inequality at the workplace was associated with increased gender disparity in depression. (Joao Pedro Goncalves Pacheco, Julia Belizario Silveira, Raphae Paiva Cock Ferreira, Kenneth Lo, Jenyfer Regonini Schineider, Henrique Ton Azeved Giacomin, Wilson Wai San Tam 2019).

Many assertions have been made to explain the psychopathology of depression including empirical and theoretical work. The current consensus holds that the gender differences in the development of depression is caused by multiple factors (J M Cyranoswki, E Frank, E Young & M K Shear 2000). Sociocultural practices have been linked with the higher reported cases of depression in women. Women are more likely to seek treatment for depression while men often resort to alcohol use (Tracey J. Shors & Benedetta Leuner 2003).

Additionally, women experience depressive episodes longer than men. Perhaps because they are more attentive to their mood than men. And therefore, more likely to seek treatment. This has been witnessed by twice the number of antidepressants prescribed to women than men (Paul R. Albert 2015). Exposure to specific stressors and stress responsiveness, particularly, in women as compared to men is thought to have brought on the gender variation in lifetime

prevalence of depression with 21.3% in women and 12.7% in men (Susan Nolen-Hoeksema 2001).

Stress responsiveness also labelled the 'limbic system hyperactivity' in women was considered principal in the distinct manner in which women express depressive symptoms as compared to men (Gordon Parker & Heather Brotchie 2010). Concerted efforts by scientists have been directed to understanding the biological basis of depression in a bid to explain the gender disparity in depression (Sucharita Maji 2018). The onset of gender differences in depression is fundamentally based on the developmental psychopathology which is now widely accepted.

In depression literature, gender differences emerge in puberty which is marked by various changes in reproductive hormones in both males and females (Rachel H. Salk, Janet S. Hyde & Lyn Y. Abramson 2017). In puberty, females attain reproductive ability secondary to maturation of ovaries. The function of ovaries is to produce estrogen, a reproductive hormone. Through the modulation of the hypothalamic-pituitary-ovarian-axis (HPA axis), ovaries are stimulated to produce estrogen in a rhythmic fashion causing the monthly menstruation.

The first menstrual period in a woman's life cycle is called menarche and is considered a critical declaration of fertility (Amy E. Lacroix, Hurria Gondal & Michelle D. Langaker 2021). The pulsatile pattern of estrogen secretion by the ovaries correlates timely with the forms of depression found only in women. Specifically starting in the pubertal phase, before monthly menses, after pregnancy before and during menopausal transition. Leading to the assumption that fluctuations in ovarian function may trigger depressive episodes in women (Paul R. Albert 2015).

The dramatic changes of estrogen levels suppress HPA (Hypothalamic-Pituitary-Adrenal) axis predisposing the woman to the risk of depression. Additionally, these hormonal changes render the woman sensitive to psychosocial, environmental and physiological triggers further increasing the risk for depression (Meir Steiner, Edward Dunn & Leslie Bor 2003). Postpartum Depression (PPD) occurs within the first year after delivery following a drastic decline in estrogen levels.

Collectively, studies comparing the prevalence of depression in postpartum women and depression in non-postpartum women found them to have similar prevalence rates (Melissa M. Batt, Korrina A. Duffy, Andrew M. Novick, Christina A. Metcalf & C. Neill Epperson 2020). Depression occurring during monthly menstruation is called Premenstrual Dysphoric Disorder (PMDD). It affects about 5% of women during their reproductive years. PMDD is attributed to the cyclic decline in estrogen levels during menses (Tracey J. Shors & Benedetta Leuner 2003).

Health service utilization is reportedly higher in women with PDD likely making this form of depression relatively stable and less prevalent (H – U Wittchen, E Becker, R Lieb & P Krause 2002). Perimenopause or menopausal transition is an ill-defined phase consisting of a poorly defined number of years leading up to menopause. It is associated with profound hormonal fluctuations which significantly increase the risk of depression. Menstrual irregularity is the hallmark symptom of perimenopause indicating the beginning of the final years of reproductive capacity (Nanette Santoro 2015).

Hormonal perturbations in perimenopause confer burdensome challenges psychologically and physically. Perimenopausal women tend to experience these biopsychosocial changes without major difficulties. However, some women may experience menopausal symptoms such as hot flashes and night sweats. Making them 4 times more likely to get depressed than premenopausal and postmenopausal women (Jasmine Willi, Hannah Susss & Ulrike Ehlert 2020).

## 2.2 Review of Studies

### 2.2.1 Global Studies

The overall prevalence of depression in menopause has been evidenced by numerous studies albeit inconsistent findings. Menopause is a period of momentous transition physiologically, physically, mentally and emotionally posing a ‘window of vulnerability’ for increased risk of new onset depression in some women (Luciano Minuzzi, Benicio N. Frey and Claudio N. Soares 2012). The menopausal phase is mostly well-tolerated, however approximately 20% of women get depression during menopause (Nita V Bhatt 2019).

Depression was higher at 21% in the beginning of menopause than in the later phase of menopause (Hayden B Bosworth 2004). In a descriptive cross-sectional study involving 350 women assessing the complications of menopause, 80.2% had depression as the most common psychological complication (Mozhgan Modoodi, Faranak Jalilvand, Ataei, Mina Zare, Somayeh, Sara Saeieh & Maryam Mirzae 2020). Menopause, natural menopause is the permanent cessation of menstruation for 12 consecutive months resulting from total loss of ovarian function.

Menopause is not induced by medication or surgical removal of ovaries (Heidi D Nelson 2008). It is a normal phase in the reproductive life cycle of a woman occurring at the median age of 51 years (American Family Physician 2014). The function of ovaries is to secrete estrogen, a reproductive hormone that plays a pivotal role in menopause. Progressive decline of estrogen

levels triggers menopausal symptoms. There are two cardinal symptoms of menopause vasomotor symptoms (VMS) and vaginal symptoms.

These symptoms tend to reach their peak 1 year after FMP (ACOG 2014). Other symptoms of menopause include sleep disturbance, fatigue, joint pains and decreased libido (Nanette Santoro, C. Neill Epperson, Sarah B Mathews 2015). Vasomotor symptoms are more commonly reported than vaginal symptoms. Vasomotor symptoms include hot flushes and night sweats. Hot flushes had the highest incidence of 46% among African American menopausal women (Wulf H Utian 2005).

Hot flushes are subjective sensations of sudden, episodic moments of increased body heat accompanied by profuse sweating and flushing of the face, neck and chest. The rate, frequency and severity of vasomotor symptoms vary by race and ethnicity (LM Gerber, LL Sievert & JE Schwartz 2016). Studies show that moments before the hot flushes, there's a small rise in core body temperature which then dips in response to heat dissipation associated with the reducing estrogen (Zhi Zhang, Johnathon R. DiVittorio, Alexia M. Joseph & Stephanie M. Correa 2021).

Although the pathophysiology of hot flushes remains unclear, estrogen is, undoubtedly at the centre of it. The presence of estrogen (E<sub>2</sub>) receptors on the thermoregulatory centres in the brain have been associated with feedback signalling of hypothalamic-pituitary-ovarian axis in triggering hot flushes. (Rebecca C. Thurston & Hadine Joffe 2011). This linked deficiency of estrogen levels to VMS led Food and Drug Administration (FDA) to approve estrogen therapy as an effective treatment for VMS in menopause (D. Ashley Hill & Susan R. Hill 2016).

Presence of VMS in menopause has been associated with depression. After adjusting for multiple factors including marital status, paid employment and BMI, menopausal women with moderate vasomotor symptoms had correlating moderate depression (Roisin Worsley, Robin J. Bell, Pragya Gartoulla, Penelope J. Robinson & Susan R. Davis 2017). A systematic review of 33 publications, revealed a bidirectional relationship between VMS and depression in menopause (Roisin Worsley, Robin Bell, Jayashri Kulkarni & Susan R. Davis 2014).

The existing bidirectional relationship between VMS and depression in menopause has yielded convincing evidence. However, not all menopausal women with vasomotor symptoms get depressed. More research is therefore warranted to ascertain the differential effect vasomotor symptoms have on depression during menopause (Natari, Rifani B., Clavarino, Alexandra M., McGuire, Treasure M., Dingle, Kaeleen D, Hollingworth, Samatha A. 2018). The pivotal role of estrogen goes beyond the reproduction.

Estrogen in limbic system has been associated with anxiety and depression. Decreased levels of estrogen on the limbic system correlated with increased levels of anxiety and depression (Gert J ter Horst 2010). Results from another laboratory study on rats revealed that when estrogen was administered to the hippocampus of rats whose ovaries were removed, anxiety and depressive behaviours significantly decreased. The exact mechanism of action for this relationship still eludes scientists (Alicia A Walf & Cheryl A Frye 2006).

### 2.2.2 Regional Studies

There is paucity of data on the prevalence of depression in menopause in the sub-Saharan Africa. Most studies focus on menopausal symptoms and associated psychological challenges without specifically linking depression to menopause. Depressed mood was reported as one of the most common symptoms among menopausal women but with a mild severity (Engida Yisma, Natnael Eshetu, Stephanie Ly & Berhanu Dessalegn 2017). However, depressed mood is a symptom of menopause and depression.

Mental exhaustion ranked second after sexual problems among menopausal women in a study aimed at assessing how African women cope with menopausal symptoms. Menopausal women with good education status coped well (Abiodun Idowu Adanikin 2013). Most menopausal women were positive about the freedom from cycling menses. This positive attitude towards menopause may explain why menopausal symptoms are well tolerated by a majority of sub-Saharan menopausal women (A O Adekunle, A O Fawole, M A Okunlola 2000).

A study on Ghanaian women found hot flushes as the most common and disturbing symptom of menopause among tiredness, sleeplessness, weight gain and anxiety. The median age at menopause was 48.05 (E. Y. Kwawukuma, T.S. Ghosh & J.B. Wilson 1993). Hot flushes, night sweats and interrupted sleep were commonly reported in sub-Saharan Africa and were found to pose significant challenges among menopausal women (N. J. Ramakuela, L.B. Khoza, H.A. Akinsola 2012).

### 2.3 Socio-Demographic Data: Correlation between Depression and Menopause

Menopausal women are 3 times more likely to get depressed than premenopausal women. Depression in menopause is multifactorial. Factors such as VMS, ethnicity, attitude towards menopause, negative life events, employment status, marital status, BMI and smoking have been found to contribute to the high CES-D scores (Ellen W. Freeman, Mary D. Sammel & Hui Lin 2006). Vasomotor symptoms increase the risk of depression by two-fold compared to menopausal women without vasomotor symptoms (Shaver & Joan 2009).

Women with self-reported VMS during menopause were at a significantly increased risk of new onset depression. (Lee S Cohen, Claudio N Soares, Allison F Vitonis, Michael W Otto & Bernard L Harlow 2006). Attitude towards menopause vary from woman to woman. Some may find it comforting to no longer have to deal with monthly menses and bearing children while others may find menopause unsettling. Negative attitude towards menopause was associated with new onset depression (Anita H. Clayton & Philip T. Ninan 2010).

Obesity during menopause is a serious health challenge for women. It is associated poor self-view, low self-esteem and substantially contributes to depressive episodes during menopause (S. R. Davis, C. Castelo-Branco, P. Chedraui, M.A. Lumsden, R.E. Nappi, D. Shah & P. Villaseca 2012). Menopausal women who had a positive outlook on menopause and ageing had a positive body image and showed decreased levels of depression during menopause (Nulufer Erbil 2018).

Level of education & income were found to significantly influence the risk of depression during menopause. Women who were illiterate and not earning an income were found to have the highest rate of depression compared to women who were educated and earning an income (Poorandokht Afshari, Sedighe Manochehri, Mitra Tadayon, Mahbobeh Kianfar & Mohammadhosain Haghizade 2015). Marital intimacy during menopause affected the experience of menopausal symptoms and risk of depression.

Risk of depressive symptoms was higher in women who had low levels of intimacy with their spouse (Su Jin Kim & Se Young Kim 2013). About 30-50% cases of depressive episodes get missed during clinic visits in the general population. Therefore, it is important to identify and screen specific populations at risk of depression, especially menopausal women. This will improve diagnostic accuracy and proper treatment for menopausal depression (Anita H. Clayton & Philip T. Ninan 2010).

Menopausal depression is not yet a DSM-5 classification therefore therapeutic options are not yet standardized. Antidepressants and hormone replacement therapy (HRT) are currently the proposed treatment for menopausal depression. Psychological forms of therapies are currently being explored. With Cognitive Behavioural Therapy (CBT) and Mindfulness Therapy (MT) showing promising therapeutic effect in combination with medication (Sheryl M. Green, Brenda L. Key, Randi E. McCabe 2015).

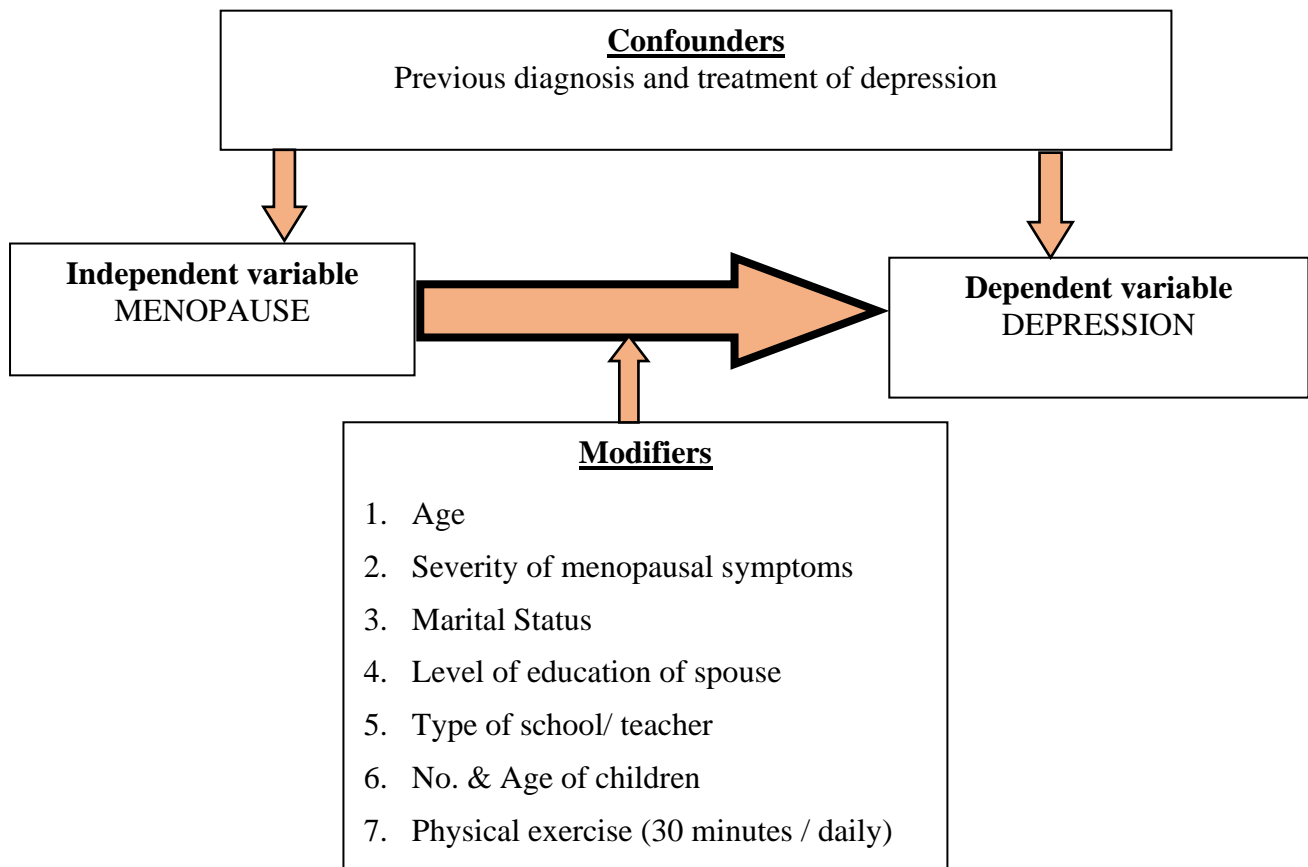
Menopause being a reproductive related depressive disorder is beginning to gain more and more scientific attention. However, a systematic search done on the prevalence of depression in menopause is raising concerns over over-pathologizing menopausal depression and the



rising need to routinely screen menopausal women. The point of contention being that depressive symptoms during menopause lack specific diagnostic significance (Fiona K. Judd, Martha Hickey & Christina Bryant 2012).

## 2.4 Conceptual Framework

This is a conceptual framework illustrating the association between depression and menopause among female teachers in Nairobi County, Kenya. Existing evidence has shown that women during menopause can experience a specific form of depression as they transition from reproductive years to non-reproductive years. Several factors have been implicated among women with depression in menopause. Some factors like having less severe menopausal symptoms, physical fitness and a good relationship with spouse were found to be protective against the development of depression during menopause while other factors such as severe vasomotor symptoms, strained relationship with partner and children, physical inactivity and high body mass index (BMI) were found to contribute to new onset of depression during menopause. These factors have been listed in the framework below as modifiers and will be explored to understand their transactional relationship posed by the exposure variable (menopause) and the outcome variable (depression) among female teachers in Nairobi County, Kenya.



## CHAPTER THREE RESEARCH METHODOLOGY

### 3.1 Introduction

This chapter outlines the methodology used in achieving the objectives of the study. It describes the study design, study site, population size, sample size, methods and procedures used to identify data source, inclusion and exclusion criteria, data collection instruments and ethical considerations.

### 3.2 Study Design

This was a descriptive cross-sectional study with quantitative data collection because of the type and nature of data collection that was conducted in the field.

### 3.3 Study Site

The study was conducted in Nairobi County which is the capital city of Kenya. Nairobi County is made up of seventeen constituencies. The total number of public schools in these constituencies is 11,820. Public schools include primary and secondary schools. The current record shows that there are 26,308 teachers across the county of Nairobi. Teachers were either employed under the Government of Kenya (GoK) or Board of Management (BoM). Approximately 60% of the total number of teachers in Nairobi County are female. The study focused on four constituencies out of the seventeen constituencies in Nairobi County. The study participants recruited were female teachers from Starehe, Westlands, Embakasi East and Langata constituency.

Table 1

<b>TEACHERS IN NAIROBI COUNTY</b>			
<b>SCHOOLS</b>	<b>MALE TEACHERS</b>		<b>FEMALE TEACHERS</b>
PRIMARY SCHOOLS	7,944		13,305
SECONDARY SCHOOLS	2,401		2,658
<b>FEMALE TEACHERS IN NAIROBI COUNTY</b>			
<b>Primary Schools</b>		<b>Secondary Schools</b>	
GoK	BoM	GoK	BoM
3,874	399	1,446	177

### 3.4 Study Population

The study population consisted of female teachers between the ages of 48 and 55 years old.

#### **Inclusion Criteria**

Female teachers:

- Between the ages of 48 to 55 years old
- With a Final Menstrual Period (FMP) more than 12 months ago
- And less than 2 years since their Final Menstrual Period (FMP)

#### **Exclusion Criteria**

- Surgically or medically induced menopause
- Participants on Hormonal Replacement Therapy (HRT)
- Non-consenting participants

### 3.5 Sampling Method

This study used multilevel sampling procedure. It focused on four constituencies in Nairobi County. These included: Starehe, Westlands, Embakasi East and Langata. Public schools from each constituency were randomly selected, with proportional representation of eligible female teachers from primary and secondary schools. In each of the randomly selected schools, with the help of the school head teacher, approached female teachers within the given age bracket (48 to 55 Years), and screened to ascertain that Final Menstrual Period (FMP) is more than 12 months ago and less than 2 years and the participants had not undergone any surgical menopause or hormone replacement treatment. Those who passed this screening test were invited onto the next stage where details of the study were explained. Discretion under the guidance of the head teacher was provided for each participant as they consented to the study and went on to fill the questionnaire forms for sociodemographic characteristics designed by the researcher, severity of menopausal symptoms using MRS scale and depression using PHQ-9 scale. The researcher moved on to the next randomly selected school until the proportionate sample size was achieved for each of the constituencies from primary and secondary schools. Collection of data was done over four weeks.

### 3.6 Sample Size Determination

This study made use of the Fisher et al (1998) formula. The following assumption from a similar study Prevalence of depression and anxiety symptoms and their influence factors during menopausal transition and post menopause in Beijing city (Ying Li, Qi Yu, Liangkun Ma,

Zhengyi Sun & Xia Yang 2008), was considered for that calculation. The prevalence of depression in a total of 1208 women was 306 (23.9%).

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

Where;

n = desired sample size

Z = value from standard normal distribution corresponding to desired confidence level (Z=1.96 for 95% CI)

P = expected proportion of Depression in the population.

d = absolute error or precision

$$\frac{1.96^2 \times 0.239 \times (1 - 0.239)}{0.05^2} = 279$$

Factoring for population size

N= Population size. (This study will only be focusing on Female teachers from public primary and secondary schools, N= 5896)

$$\text{New sample size} = \frac{nN}{n+(N-1)}$$

$$\frac{279 \times 5896}{279 + (5896 - 1)} = 267$$

The final sample size was arrived at **296** after factoring 10% margin for errors in data collection.

### 3.6.1 Sampling Proportions

The study area covered 4 constituencies in Nairobi County. Those constituencies included Starehe, Westlands, Embakasi East and Langata constituency. Public schools from each constituency were randomly selected and eligible female teachers were recruited for the study. Since the distribution of schools and female teachers was not readily available to inform proportional allocation of sampling proportions for each constituency, the researcher settled on equal distribution of willing participants in each of the four constituencies. The sample size of

296 was equally divided into the four constituencies bringing the recruitment in each constituency to 74 participants.

Available data has shown that there were more female teachers in primary schools than secondary schools in Nairobi County. Therefore, the number of female teachers recruited from randomly selected primary and secondary schools in each constituency was according to their overall proportions.

Primary Schools:	$\frac{4273}{5896} \times 100 = 72\%$ ,	$72\% \times 74 = 53$
Secondary Schools:	$\frac{1623}{5896} \times 100 = 28\%$ ,	$28\% \times 74 = 21$

In each constituency, the researcher recruited 53 participants from primary schools and 21 participants from secondary schools.

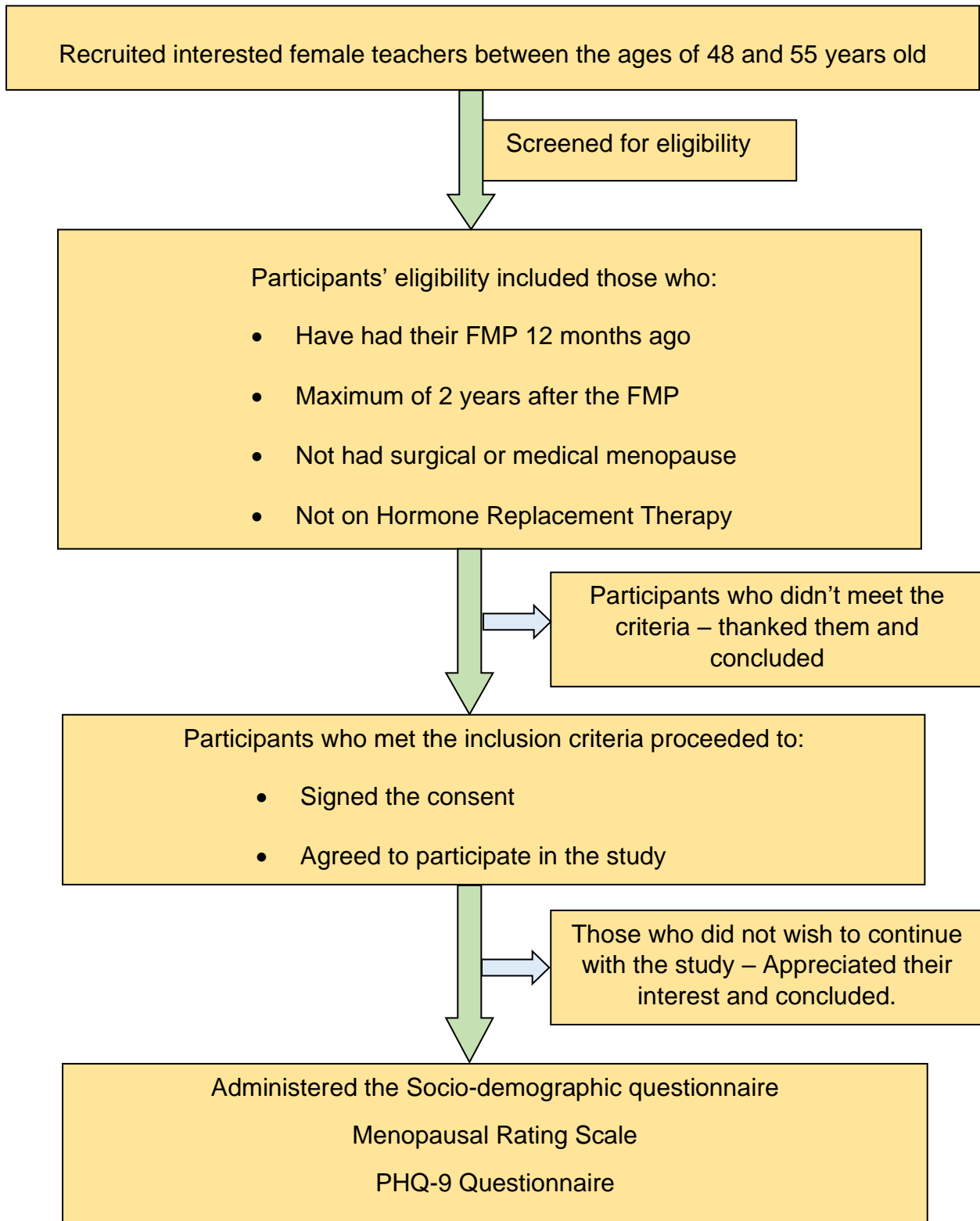
### 3.7 Recruitment and Data Collection Procedures

Once KNH/UON ERC and NACOSTI approved the study, the formal response letters were presented to the County Commission of Nairobi County who recommended the study to the Ministry of Education. Through the Regional Director of Education in the Ministry of Education, an introduction letter to the sub-country director of education was obtained to authorize the research in the four constituencies. These letters were submitted to each of the four sub-county directors of education informing about the study.

The headteacher, from nearly all schools in the four constituencies, referred the researcher to the deputy who then organized access to female teachers who met the eligibility criteria using the brief screening tool that had been provided. The brief screening tool screened for female teachers that met the: 1. Age group criteria 48 – 55 years 2. Final Menstrual Period (FMP) more than 12 months ago. 3. Final Menstrual Period (FMP) less than two years ago 4. Has not had surgical menopause 5. Not on hormone replacement therapy (HRT) to participate in the study. Once the meeting was arranged, the researcher met with the respondents within the school compound in a designated space to explain the details of the study. Once the participants understood, they proceeded to signing the consent and filling the three questionnaire forms. The first questionnaire was the socio-demographic questionnaire assessing characteristics of participants designed by the researcher, followed by the menopausal rating scale (MRS) which assessed the severity of menopausal symptoms and concluded by the PHQ-9 questionnaire to assess for depression in the last two weeks. The researcher readily addressed arising concerns.

Participants were aware the study was voluntary and could withdraw at any stage without having to give any explanation. The researcher repeated the same until sample size was achieved.

Figure 2: Recruitment and data collection procedure flowchart



### 3.8 DATA COLLECTION TOOLS

The researcher designed a brief screening tool that was used to screen female teachers for eligibility to participate in the study. The head teacher of the randomly selected school in each constituency provided assistance and guidance on how to access female teachers that met the age bracket of 48 – 55 years to meet with the researcher.

Female teachers within the age bracket (48 – 55 years) were invited using the brief screening tool designed by the researcher to screen for eligibility and willingness to participate in the study. The brief screening tool screened female teachers who had their Final Menstrual Period (FMP) in the last 12 months and less than 2 years, with no history of surgical or medical menopause and no use of hormone replacement treatment.

Teachers who met the criteria and were willing to participate in the study went on to fill the consent forms followed by a semi-structured socio-demographic interview designed by the researcher to assess specific characteristics of participants, the Menopausal Rating Scale (MRS) to assess severity of menopausal symptoms and the PHQ-9 questionnaire which will assess for depressive episodes.

#### Interviewing tools

##### Brief Screening tool

This is a researcher designed brief screening tool that was used to screen for female teachers within the age bracket (48 – 55 years). The head teacher of each of the randomly selected schools assigned the deputy the task of assisting the researcher in obtaining access to female teachers meeting this age bracket (48-55 years). Once the deputy head teacher identified female teachers meeting the age bracket criteria, a brief screening tool inviting those participants who met the criteria of having their Final menstrual period (FMP) of more than 12 months ago and less than 2 years, with no history of surgical or medical menopause and not on hormone replacement treatment.

##### Sociodemographic questionnaire

This tool was developed by the researcher to capture specific characteristics in the participants relevant to this study. Items such as type of school, employer, marital status, level of education of spouse, number of children, age of last child and daily physical activity etc.

### Menopausal Rating Scale

The MRS is a validated scale that is widely accepted to assess for menopausal symptoms. It is a 11-item questionnaire that focuses on 3 dimensions of menopausal complaints: somatic-vegetative, psychological and urogenital symptoms (Lothar AJ Heinemann, Peter Potthoff & Hermann PG Schneider 2003).

### PHQ-9 questionnaire

The Patient Health Questionnaire contains 9 questions that assess the degree of depressive symptoms in the participants. The 9 questions correspond to the DSM-IV criteria for diagnosis depressive episodes (Kurt Kroenke & Rober L Spitzer 2001). This screening tool for depression is self-administered. Participants indicated the frequency of the depressive symptoms using descriptions such as not at all, several days, more than half the days and nearly every day over the previous two weeks before the day of the study interview. Each description of the frequency on the 9 questions has a corresponding numerical score for example not at all = 0, several days = 1, more than half the days = 2 and nearly every day = 3.

The score on each of the 9 questions is then summed up to determine the severity of depressive symptoms. Severity scores in PHQ-9 range from 0-4 no depression, 5-9 mild depression, 10-14 moderate depression, 15-19 moderately severe depression and 20-27 severe depressive disorder.

## 3.9 DATA COLLECTION AND QUALITY CONTROL

Once the head teacher has provided a discrete space for conducting the studies, eligible participants will receive elaborate details of the study. Each stage of the study will be explained to the participant's satisfaction. All questions and concerns raised will be addressed prior to study. With provision to allow further clarification during the study. Consent to the study will then be sought and those willing to proceed will be provided with a pen for a written consent. After this stage, the participant will go on to fill out the three questionnaire forms using recall memory. Finally, the primary researcher will check each filled form thoroughly for completeness.

### 3.10 Data Management

The collected data will always be kept locked and confidential and will only be accessible to the principal investigator and Statistician.



Entered data will be converted to a password protected Microsoft Excel sheet. Only the principal investigator and the authorized biostatistician will be allowed to access the information. Data will be backed up online preserved until analysis, presentation and archival are done.

#### 3.10.1 Data Coding and Entry

Once the data is collected in the form of questionnaires it is then coded and entered into Microsoft Excel.

#### 3.10.2 Data Cleaning

Microsoft Excel will be used for error detection and rectification. All data will be cleaned using Microsoft Excel while ensuring that integrity is maintained. Data will be stored safely and securely in a flash disk and a password locked cloud. After cleaning and validating, the data will be transferred to SPSS V23 for analysis.

### 3.11 STATISTICAL ANALYSIS

The data obtained will be cleaned and analysed using SPSS version 26. Descriptive statistics will be used to describe the sociodemographic characteristics of teachers. Categorical data will be summarized as frequencies and percentages while Continuous data will be described as means and standard deviations or medians and interquartile ranges. The prevalence of depression among the participants will be calculated as a proportion of those female teachers with depressive symptoms and reported as a percentage.

Bivariate analysis will be used to determine sociodemographic factors associated with depression and test for any association between severe menopausal symptoms and depression among the female teachers. Chi-square test and t-test will be used for categorical and continuous variables respectively. For all statistical tests a p-value <0.05 will be taken to show statistical significance.

#### 3.12 Quality Assurance Procedures

Participants will be fully informed about the details of the study. Thorough explanations about the aims of the study and the questions being asked will be done. Any arising questions and concerns regarding the study will be sufficiently addressed. Collected data will be recorded and securely stored in locked cabinets that will be accessible only to the primary researcher.

### 3.12.1 Ethics and Informed Consent

The proposal for this study will be sent for Ethical approval from University of Nairobi/Kenyatta National Hospital Ethics Review Committee. Another approval will be sought from NACOSTI and Ministry of Education.

### 3.12.2 Obtaining Informed Consent

Willing participants will be sufficiently furnished with details of the study before proving a written consent to participate in the study.

### 3.12.3 Potential Benefits to Study Participants

Depression in menopause has not been examined in our local context. Yet, the population of women entering menopause is growing exponentially. The data from this study will bring out the unexplored prevalence of depression among menopausal women. Increased awareness about the potential risk of getting depression in menopause will encourage those affected by depression to seek mental health services and improve their overall well-being.

### 3.12.4 Potential risks

Since the interviews depend on recall memory of participants, certain negative psychological states can be provoked which could potentially lead to acute stress reaction. The interview will be paused and help the patient calm down. The interview will then proceed only if the patient is still willing and ready. Should the acute stress reaction persist, then the interview will be discontinued and the patient will refer to a facility of choice for mental health services.

### 3.12.5 Confidentiality

The purpose of this study is completely academic. Subjects will be assured of absolute confidentiality. The subjects' participation in the study will be anonymous. All the information collected throughout the interviews will be handled securely.

### 3.12.6 Voluntary Participation

The recruitment of participants in the study is purely on voluntary basis. For willing participants, information regarding participation in the study will be given. Since participation is voluntary, subjects are free to withdraw from the study at any stage without having to offer an explanation.

### 3.13 Dummy Tables

Table 1: Socio-Demographic Characteristics of respondents

<b>Variable</b>	<b>Category</b>	<b>Frequency (N)</b>	<b>Percentage (%)</b>
Constituency			
AGE (48 – 55)			
FMP (Final Menstrual Period)			
Type of school	Primary		
	Secondary		
Type of teacher	GoK		
	BoM		
Marital status	Single		
	Married		
	Partnered		
	Separated		
	Divorced		
	Widowed		
Level of education of spouse	None		
	Primary		
	Secondary		
	Tertiary		
Number of children			
Age of last child			
Physical activity 30 minutes daily			

Table 2: Data variables

	<u>Exposure variables</u>	<u>Outcome variables</u>	<u>Source of Data</u>
<p><b><u>Objective 1</u></b> To determine the prevalence of depression among the participants.</p>	Menopause	<ul style="list-style-type: none"> <li>• Depressed</li> <li>• Not Depressed</li> </ul>	Patient health Questionnaire. (PHQ-9)
<p><b><u>Objective 2</u></b> To determine the severity of menopausal symptoms</p>	Menopausal symptoms		Menopausal Rating Scale. (MRS)
<p><b><u>Objective 3</u></b> To determine the severity of menopausal symptoms associated with depression</p>	Menopausal symptoms	<ul style="list-style-type: none"> <li>• Depressed</li> <li>• Not Depressed</li> </ul>	<ul style="list-style-type: none"> <li>• Menopausal Rating Scale. (MRS)</li> <li>• Patient health Questionnaire. (PHQ-9)</li> </ul>
<p><b><u>Objective 4</u></b> To determine the association between socio-demographic factors and depression in the participants</p>	<p><b>Sociodemographic characteristics</b></p> <ol style="list-style-type: none"> <li>1. Age</li> <li>2. Constituency</li> <li>3. Final Menstrual Period</li> <li>4. Type of school</li> <li>5. Type of teacher</li> <li>6. Marital status</li> <li>7. Spouse (education level)</li> <li>8. Number of children</li> <li>9. Age of last child</li> <li>10. Physical activities (30 mins daily)</li> </ol>		<ul style="list-style-type: none"> <li>• Sociodemographic Questionnaire</li> <li>• Patient health Questionnaire. (PHQ-9)</li> </ul>

Table 3: Sociodemographic factors associated with Depression.

Variable	Category	Depression		P-value
		Yes	No	
Constituency	Starehe			
	Westlands			
	Embakasi East			
	Langata			
AGE (48 – 55)				
FMP (Final Menstrual Period)				
Type of school	Primary			
	Secondary			
Type of teacher	GoK			
	BoM (Public)			
Marital status	Single			
	Married			
	Partnered			
	Divorced			
	Widowed			
Level of education of spouse				
Number of children				
Age of last child				
Physical activity 30 minutes daily				

### 3.14 BUDGET (SAMPLE)

Item	Quantity/ People	Days	Unit Cost (Ksh.)	Total Cost (Ksh.)
Stationery	30	N/A	500	15,000
Ethics Payment	1	1	2000	2,000
Pens	50	N/A	15	750
Transport	2	30	200	12,000
Airtime	2	30	100	6,000
Data Entry	1	15	1,000	15,000
Data Analysis	1	15	2,000	30,000
TOTAL				80,750
Contingency (10%)				8,075
GRAND TOTAL				88,825

### 3.15 WORK PLAN (SAMPLE)

	2021				2022							
Activity	S	O	N	D	J	F	M	A	A	M	M	J
Writing the proposal	■	■	■									
Proposal approval by supervisors		■	■									
Submitting final copy of proposal to ethics			■									
Review by Ethics				■	■	■	■					
Data Collection and Entry								■	■			
Data Analysis								■	■			
Writing chapter 4 & 5 of the thesis										■	■	
Final draft and submission											■	
Presentation of the finalized research project											■	
Working on panel recommendations												■
Submission of final research project												■

## CHAPTER FOUR

### 4.1 Introduction

This chapter will provide a description of the results of the collected data with respect to the objectives of the study; the prevalence of depression in menopause, associated severity of menopausal symptoms and depression in menopause among female teachers in Nairobi County, Kenya. The explanation and interpretation of the study findings will be achieved through charts, graphs, tables

#### 4.1.1 Response Rate

The calculated sample size was 296 but the number of willing and eligible participants was approximately 330. More than 100 of willing participants met the age bracket criterion but were still menstruating, had premature menopause of more than 2 years since their FMP, had surgical menopause due to gynaecological reasons or were in perimenopause. The other 34 had some issues with their forms that were either incomplete forms or wrong answers to questions. The final number of analysed questionnaires was 296 which translated to 100% response rate.

### 4.2 Descriptive statistics

#### 4.2.1 Socio-demographic characteristics

**Age:** A total of 296 menopausal teachers were recruited into the study. The respondents age ranged between the ages of 48 and 55 years. The mean age (Mean  $\pm$  SD) was found to be 52  $\pm$  1.61 years. The study evenly sampled 74 menopausal teachers from each of the 4 constituencies: Starehe, Embakasi, Langata and Westlands.

**FMP:** The Final Menstrual Period (FMP) was expected to be more than 12 months. Out of the 296 female teachers, 152 (51%) were counting 12 to 18 months since their FMP while 144 (49%) were in their 19<sup>th</sup> to 24<sup>th</sup> month since their FMP.

**Type of employer:** An overwhelming majority of menopausal teachers from both primary and secondary schools in the four constituencies were employed by the GoK (Government of Kenya) and only 15% (N=44) were employed by the BoM (Board of Management).

**Marital Status:** Majority of the female teachers were married (56%) while 37% were either widowed or divorced and less than 10% were single or partnered.



**Level of education of spouse:** 48% (N=141) of the spouses to the married menopausal teachers had tertiary level of education while 9% (N=28) had either primary or secondary education. All respondents who were single, widowed or divorced used 'none' on the level of education to indicate the absence of a spouse with very few of the married respondents indicating 'none' as the level of education of the spouse making up 43% (N=127) of the spouses with no level of education.

**Number of Children:** The mean number of children was  $3 \pm 1.40$ . With 76% (N=224) of the participants having 4 children, 15% (N=45) having more than four children, 6% (N=19) having one child and 3% (N=8) with no child children.

**Age of last child:** The age of the last child among menopausal teachers was mostly above 15 years of age. With 76% (N=224) being above 18 and 14% (N=14%) being above 15 years.

**Physical Activity:** All the respondents reported that they spend more than 30 minutes a day in physical activity.

Table 4.2.1: Socio-Demographic Characteristics

Sociodemographic characteristic	Category	Frequency (N=296)	Percentage
Constituency	Embakasi East	74	25%
	Langata	74	25%
	Starehe	74	25%
	Westlands	74	25%
Age in years	(Mean $\pm$ SD)	52 $\pm$ 1.61	
Final menstrual Period (FMP) in months	(Mean $\pm$ SD)	18 $\pm$ 2.55	
FMP	12-18	152	51%
	19-24	144	49%
Type of teacher	BoM	44	15%
	GoK	252	85%
Level of school	Primary	212	72%
	Secondary	84	28%
Marital Status	Single	16	5%
	Married	165	56%
	Partnered	6	2%
	Widowed	60	20%
	Divorced	49	17%
Level of education of spouse	None	127	43%
	Primary	6	2%
	Secondary	22	7%
	Tertiary	141	48%
No of children	(Mean $\pm$ SD)	3 $\pm$ 1.40	
Parity	No child	8	3%
	1 child	19	6%
	Up to 4 children	224	76%
	>4 children	45	15%
Age of the last child (Mean $\pm$ SD)		21 $\pm$ 6.43	
Age of last child	None	8	3%
	<15	21	7%
	15-18	43	14%
	>18	224	76%
Physical activity (30 minutes) daily	Yes	296	100%

#### 4.2.2 Prevalence of depression in menopause using PHQ-9 questionnaire

The prevalence of depression in menopause was found to be 49% (N=144). This was achieved using the PHQ-9 questionnaire. Majority of the respondents had mild depression at 35% (N=104) followed by moderate depression at 12% (N=36) and 2% (N=2%) for moderately severe depression. There were no reported cases of severe depression.

Figure 4.2.2.1 Prevalence of depression (PHQ-9 questionnaire)

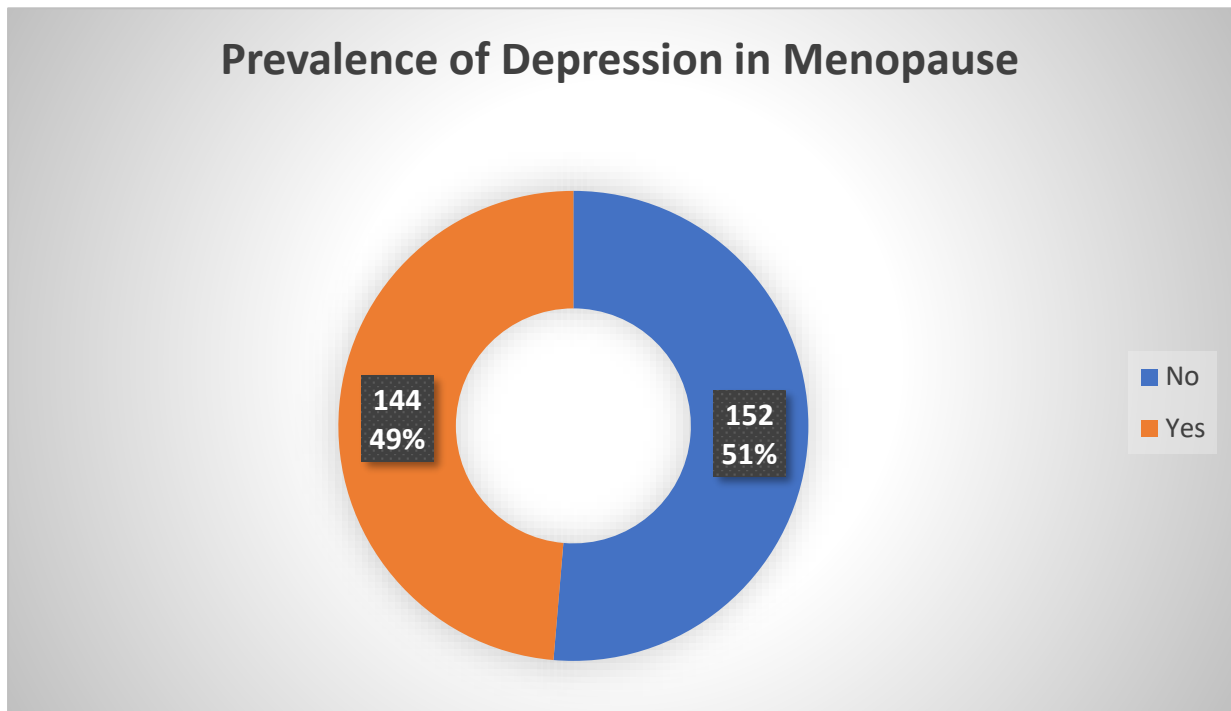


Table 4.2.2.2 Severity of depression among respondents

Item	Severity	Frequency	Percentage
Patient Health Questionnaire (PHQ-9) Scoring	None	152	51%
	Mild	104	35%
	Moderate	36	12%
	Moderately severe	4	2%

Majority of respondents 35% (N=104) reported mild severity depression while 14% had moderately to moderately severe depression.

#### 4.2.3 Severity of menopausal symptoms (MRS)

Menopausal symptoms were assessed using the Menopausal Rating Scale (MRS). 271 respondents reported presence of menopausal symptoms while 25 of them reported no symptoms of menopause. Out of the 271 respondents who reported menopausal symptoms, 53% said they were experiencing moderate symptoms, 23% reported mild symptoms and 16% were experiencing severe symptoms

Table 4.2.3.1 Severity of menopausal symptoms among the respondents using MRS scoring

Category	Severity	Frequency	Percentage (%)
Menopausal Rating symptoms scoring (MRS- scoring)	None	25	8%
	Mild	67	23%
	Moderate	156	53%
	Severe	48	16%

### 4.3 Inferential Statistics

#### 4.3.1 Association between severity of menopausal symptoms and depression

The association between severity of menopausal symptoms and depression was based on 271 respondents who met the threshold for severity of menopausal symptoms with 144 of the total respondents who reported depression in the previous two weeks. Out of the 48 respondents who reported severe menopausal symptoms, 47 of them had associated depression. With 82 out of the 156 respondents who reported moderate menopausal symptoms having associated depression. Using bivariate analysis, the study found a significant statistical significance between severity of menopausal symptoms with depression with p values of  $p < 0.001$ . The odds ratio was not calculated for severity of menopausal symptoms because all the respondents who did not have menopausal symptoms did not also have associated depression.

Table 4.3.1: Association between severity of menopausal symptoms with depression

Item	Category	Depression		P-value
		No N=152	Yes N= 144	
MRS Score	None	25(16%)	0(0%)	<b>&lt;0.001</b>
	Mild	52(34%)	15(10%)	
	Moderate	74(49%)	82(57%)	
	Severe	1(1%)	47(33%)	
Menopausal rating	No	25(16%)	0(0%)	<b>&lt;0.001</b>
	Yes	127(84%)	144(100%)	
Somatic	No	18(12%)	0(0%)	<b>&lt;0.001</b>
	Yes	134(88%)	144(100%)	
Psychological	No	15(10%)	0(0%)	<b>&lt;0.001</b>
	Yes	137(90%)	144(100%)	
Urogenital	No	15(10%)	1(1%)	<b>&lt;0.001</b>
	Yes	137(90%)	143(99%)	

The table above shows the association between severity of menopausal symptoms and depression. Menopausal symptoms are divided into three groups: vasomotor symptoms, psychological symptoms and urogenital symptoms. All the three groups of menopausal symptoms revealed a statistically significant association with depression.

#### 4.3.2 Association between sociodemographic characteristics and depression

All participants' sociodemographic characteristics were assessed for association with depression. These included constituency where the respondent came from, type of school, type of teacher, Final Menstrual Period (FMP), age of respondent, marital status, level of education of spouse, number of children, age of last child and those who engage in physical activity for 30 minutes daily.

Using logistic regression, Westlands constituency revealed the highest prevalence of depression with a Crude OR (CI) 4.95 (2.46, 9.94) with p-value  $p < 0.001$  followed by Langata constituency Crude OR (CI) 3.31 (1.67, 6.56) with p-value  $p = 0.001$ . After adjusting for all the other factors except for level of education of spouse, the p-value remained unchanged for both Westlands and Langata constituencies.

Absence of spouse was associated with depression. Respondents who were widowed had a Crude OR (CI) 7.23 (2.15, 24.35) with a p-value  $p = 0.001$  while those who were divorced had a Crude OR (CI) 4.54 (1.35, 15.28) with a p-value of  $p = 0.015$ . Married respondents who had spouses with tertiary level of education showed a significantly reduced associated with depression with Crude OR (CI) 0.08 (0.01, 0.72) with a p-value  $p = 0.024$ . Respondents with a last child between 15 – 18 revealed an associated with depression with a Crude OR (CI) 2.72 (1.50, 4.95) with a p-value  $p = 0.001$  and after adjusting OR (CI) 2.16 (1.06, 4.39) with a p-value  $p = 0.034$ .

For age and of participants and age of children, Mann Whitney U-test was used because the variable was abnormally distributed. There was no associated found between the age of respondents, final menstrual period (FMP), type of teacher, level of school and number of children with depression.

Table 4.3.2: Association between sociodemographic characteristics and depression

		Depression		Crude OR(CI)	P-value	Adjusted OR(CI)	P-value
		No N=152	Yes N= 144				
Constituency	Starehe	53(35%)	21(15%)	Ref		Ref	
	Embakasi East	42(28%)	32(22%)	1.92(0.97,3.81)	0.061	2.28(0.99,5.25)	0.052
	Langata	32(21%)	42(29%)	3.31(1.67,6.56)	<b>0.001</b>	4.48(1.82,11.06)	<b>0.001</b>
	Westlands	25(16%)	49(34%)	4.95(2.46,9.94)	<b>&lt;0.001</b>	8.51(3.26,22.22)	<b>&lt;0.001</b>
Age in years (Mean ± SD)		53 ± 1.58	52 ± 1.63	-	<b>0.033</b>	-	
FMP(in Months) (Mean ± SD)		18 ± 2.51	18 ± 2.60	-	0.976	-	
FMP	12-18	79(52%)	73(51%)	Ref		Ref	
	19-24	73(48%)	71(49%)	1.05(0.67,1.66)	0.826	0.73(0.39,1.34)	0.304
Type of teacher	GoK	135(89%)	117(81%)	Ref		Ref	
	BoM	17(11%)	27(19%)	1.83(0.95,3.53)	0.07	1.25(0.54,2.85)	0.603
Level of school	Primary	107(70%)	105(73%)	Ref		Ref	
	Secondary	45(30%)	39(27%)	0.88(0.53,1.47)	0.631	0.89(0.47,1.67)	0.713
Marital Status	Single	11(7%)	5(3%)	Ref		Ref	
	Marrried	110(72%)	55(38%)	1.10(0.36,3.32)	0.866	0.55(0.14,2.17)	0.394
	Partnered	1(1%)	5(3%)	11.00(1.01,120.43)	0.05	2.72(0.21,35.02)	0.442
	Divorced	16(11%)	33(23%)	4.54(1.35,15.28)	<b>0.015</b>	3.22(0.75,13.79)	0.116
	Widowed	14(9%)	46(32%)	7.23(2.15,24.35)	<b>0.001</b>	5.66(1.31,24.55)	<b>0.021</b>
Level of education of spouse	None	41(27%)	86(60%)	-		-	
	Primary	1(1%)	5(3%)	Ref		Ref	
	Secondary	10(7%)	12(8%)	0.24(0.02,2.41)	0.225		
	Tertiary	100(66%)	41(28%)	0.08(0.01,0.72)	<b>0.024</b>		
No of children (Mean ± SD)		3 ± 1.38	3 ± 1.42		0.686		
	0	7(5%)	1(1%)	Ref		Ref	
	1	8(5%)	11(8%)	9.63(0.98,94.54)	0.052	11.83(0.89,156.98)	0.061
	2-4	116(76%)	108(75%)	6.52(0.79,53.84)	0.082	10.85(0.96,122.70)	0.054
	≥5	21(14%)	24(17%)	8.00(0.91,70.46)	0.061	15.50(1.20,200.27)	<b>0.036</b>
Age of the last child (Mean ± SD)		22 ± 7.24	21 ± 5.44		<b>0.023</b>		
Age of last child	None	7(5%)	1(1%)	-		-	
	<15	11(7%)	10(7%)	1.15(0.47,2.83)	0.759	0.60(0.19,1.91)	0.39
	15-18	15(10%)	28(19%)	2.72(1.50,4.95)	<b>0.001</b>	2.16(1.06,4.39)	<b>0.034</b>
	>18	119(78%)	105(73%)	Ref		Ref	

## CHAPTER FIVE

### 5.1 Discussion

#### 5.1.1 Sociodemographic characteristics of menopausal female teachers

This study focused on menopausal female teachers in public schools in Nairobi County, Kenya. Recruitment of participants was evenly spread across four constituencies: Westlands, Langata, Embakasi and Starehe in Nairobi County. Proportional sampling in primary and secondary schools was based on proportional statistics as per Ministry of Education (MOE 2016). The mean age of respondents was  $52 \pm 1.61$  with two main categories of final menstruation period (FMP). 51% (N=152) had their FMP 12 – 18months ago while 49% (N=144) had the FMP 19 – 24 months ago.

Majority of the respondents 85% (N=252) were under GoK (Government of Kenya) and a few 15% (n=44) were under BoM (Board of Management), this aligned with the initial numbers found in the database of MOE 2016. Half of the respondents 56% (N=165) were married, 20% (N=60) widowed and 17% (N=49) divorced. Married respondents had 48% (N=141) of their spouses having tertiary level of education.

This study found 76% (N=224) of the menopausal teachers had 4 children and 15% (N=45) had more than 5 children. The mean age of the last child was  $21 \pm 6.43$  with 76% (N=224) having a last child who is more than 18 years. All the respondents reported physical activity at least 30 minutes every day and this was attributed to the nature of their work which involves a lot of moving around in the classroom and from one class to another.

#### 5.1.2 Prevalence of depression in menopause

Extant research has yielded inconsistent findings in the prevalence of depression in menopause. This study found 49% prevalence of depression in menopause among female teachers in Nairobi County, Kenya. The findings coincided with a study done in Australia using the BDI-II that found a 48.9% prevalence of depression in menopause (Roisin Worsley, Robin J. Bell, Pragya Gartoulla, Penelope J. Robinson & Susan R. Davis 2017).

Using HAM-D, a study in Iran, found a 59% prevalence of depression in menopause (Poorandokht Afshari, Sedighe Manochehri, Mitra Tadayon, Mahbobeh Kianfar, Mohammedhosain Haghighizade 2015). Another study in USA, using CES-D scale found a 28% prevalence of depression in menopause. There were no studies found on depression in menopause in sub-Saharan Africa or Kenya to draw comparisons between populations.

### 5.1.3 Association between severity of menopausal symptoms and depression in menopause among female teachers

There is a strong correlation between severity of menopausal symptoms and depression (Hung Sa Lee, Chunmi Kim 2010). Our study also reached the same conclusion, we found a statistically significant association between severity of menopausal symptoms with depression ( $P=0.001$ ). Respondents who reported moderate to severe symptoms of menopause had stronger associated with depression than those who reported mild menopausal symptoms. The more severe the menopausal symptoms, the more significant the association with depression.

Following a systematic review of 33 publications, researchers found a bidirectional relationship between vasomotor symptoms (hot flushes and night sweat) with depression (Roisin Worsley, Robin Bell, Jayashri Kulkarni & Susan R. Davis 2014). This aligned with the findings of our study where the p-value for somatic symptoms i.e. vasomotor and heart discomfort was ( $p<0.001$ ).

Psychological symptoms such as sleep disturbance and depressed mood which are found in both depressive symptoms and menopausal symptoms pose a challenge when assessing association of these symptoms to depression. Considered as a whole subscale under menopausal rating scale (MRS), the severity of psychological symptoms of menopause were undeniably associated with depression with a p-value ( $P<0.001$ ).

### 5.1.4 Association between socio-demographic factors and depression in menopause among female teachers in Nairobi County

Our study found that menopausal teachers from Westlands and Langata constituencies had odds ratio of 4.95 and 3.31 respectively higher than Starehe constituency. The odds ratio increased after adjusting other sociodemographic factors (except for level of education of spouse) to 8.51 and 4.48 in Westlands and Langata constituencies respectively. A menopausal teacher in Westlands constituency is 4.95 times more likely to get depression than her counterpart in Starehe constituency.

Absence of spouse was found to increase the risk of depression in menopause (Moon-Soo Lee, Jong-Hun Kim, Man Sik Park, Jaewon Yang, Young-Hoon Ko, Seung-Duk Ko, Sook-Haeng Joe 2010). Our study yielded the same findings; respondents who were widowed ( $P=0.015$ ) and divorced ( $P=0.001$ ) showed a statistically significant association with menopausal depression. Having a lastborn teenager also increased the association of menopausal



depression. Respondents who had a last child between the ages of 15 and 18 had a Crude odds ratio of 2.72 compared to those whose last child was above 18 years of age.

Level of education of spouse influenced the risk of depression in menopause. Out the 141 participants whose spouse had tertiary level of education, 100 of them had no associated depression with menopause. The study found a Crude OR of 0.08 and a p-value ( $P=0.024$ ) compared to respondents with spouses of primary level of education. Tertiary level of education of spouse reduced the likelihood of depression in menopause by 0.08.

## 5.2 Conclusion

The prevalence of depression in menopause was 49% among female teachers in Nairobi County, Kenya. With 35% ( $N=104$ ) recording mild severity and 14% ( $N=40$ ) being moderate and moderately severe depression.

There was a significant statistical correlation between severity of menopausal symptoms and depression with somatic and psychological symptoms being the most commonly reported menopausal symptoms associated with depression in menopause.

The sociodemographic characteristics revealed a statistical difference in marital status, level of education of spouse and age of spouse. Final Menstrual Period, type and level of school did not show any statistical significance.

There are multiple factors associated with depression in menopause. An understanding into how these factors interplay during menopause to trigger new-onset depression in some women and not in others is worth evaluating.

Severe menopausal symptoms have been strongly linked with menopausal depression and may be put forward as a potential risk factor.

## 5.3 Recommendations

Based on the study findings, these are the proposed recommendations:

1. Clinical level
  - Educate clinicians on menopausal depression, risk factors, available interventions
  - Clinicians to routinely screen middle-aged women at risk for depression and offer appropriate interventions and referral
  - Clinicians to encourage regular check-ins with middle-aged women to regularly assess for depression

- Reproductive health specialists to liaise with mental health practitioners on menopausal women with severe menopausal symptoms
  - Increase access to mental health practitioners in clinical settings for easy accessibility
2. Public Health level
- Create awareness about depression in menopause in the general public
  - Educating family members about depression in menopause, risk factors, complications etc.
  - Provide psychosocial training to family members of women with menopausal depression
  - Creating support groups for women with menopausal depression
  - Normalize asking for help among menopausal women
  - Increase access to mental health providers
3. Research
- A bigger sample size that captures more details, characteristics about menopausal women and factors associated with menopausal depression will help in better understanding the problem.
  - To address the study limitations such as the ascertainment issue with menopausal diagnosis, a better study design would be encouraged.
4. Policy
- Since this is the first study about depression in menopause in the region, there are no specific recommendations to be made yet. More research is necessary to get a better comprehension of the problem.
  - Collaboration between MOH and MOE to incorporate screening of depression among menopausal teachers in schools

#### Study Limitations

- Because the study was conducted on a specific population group, the results cannot be generalized.
- The study relied on recall memory and the information given may not be accurate.
- Data collection was achieved using questionnaire and not clinical assessment.

#### Strength of the study

Despite the above limitations, the study is credible because

- It enabled the researcher to determine the prevalence of depression in menopause and also determine the associated variables with depression

- It enabled the researcher to establish preliminary evidence which can be used to plan for future, more in-depth studies.

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## APPENDICES

### APPENDIX 1: PARTICIPANT INFORMATION AND CONSENT FORM

#### **TITLE OF THE STUDY: THE PREVALENCE OF DEPRESSION IN MENOPAUSE & THE ASSOCIATED SEVERITY OF MENOPAUSAL SYMPTOMS WITH DEPRESSION AMONG FEMALE TEACHERS IN PRIMARY & SECONDARY SCHOOLS IN NAIROBI COUNTY, KENYA**

**Primary Investigator: Dr Neema Araka, University of Nairobi.**

#### **Introduction:**

My name is Dr Neema Araka. I am a medical doctor. I would like to invite you to participate in my study thesis that I am doing in pursuit of my post-graduate degree in Psychiatry at the University of Nairobi. The topic of my study is to determine the prevalence of depression in menopause, the associated severity of menopausal symptoms with depression among female teachers in Nairobi County. Following the brief screening questionnaire you filled earlier, you are eligible to participate in this study.

I would like you to know that participation in the study is voluntary and in anonymity. You can withdraw from the study at any given stage without having to give an explanation. The data collected from this study is confidential and will be used purely for educational purposes.

Can I go ahead and tell you more about the study?

Yes

No

The study has been approved by KNH/UON Ethics and Research Committee protocol No. P941/12/2021. The research has been licensed by NACOSTI under Licence No. NACOSTI/P/22/17055, recommended by County Commission Nairobi County, authorized by Regional Director of Education and informed the subcounty director of education of all the four constituencies: Westlands, Langata, Embakasi and Starehe.

#### **WHAT IS THIS STUDY ABOUT?**

The main aim of this study is to assess the prevalence of depression in menopause, the associated severity of menopausal symptoms with depression among female teachers in Nairobi County. The first questionnaire will assess your sociodemographic characteristics which has been designed by the researcher, the second questionnaire will assess the severity of menopausal symptoms using a validated Menopausal Rating Scale (MRS) and the last questionnaire will assess for a depressive episode in the last two weeks using PHQ-9 scale.

## **WHAT WILL HAPPEN IF YOU DECIDE TO PARTICIPATE IN THIS RESEARCH STUDY?**

Upon consenting to participate in this study, the researcher will provide you with the three questionnaire forms and a pen. You will go on to fill all the questions in all the three questionnaire forms. This is expected to take about 20 minutes.

## **ARE THERE ANY RISKS, HARMS DISCOMFORTS ASSOCIATED WITH THIS STUDY?**

This research does not involve any medical procedures. However, the questions asked may provoke potential psychological, emotional or even physical symptoms of distress. Psychological First Aid will be promptly offered by the researcher. If the response is effective and the participant is still willing, the research will proceed to completion. If the intervention is ineffective, the research will be stopped and appropriate referral will be given to the affected participant to obtain proper mental health care.

## **ARE THERE ANY BENEFITS BEING IN THIS STUDY?**

Yes. There is direct benefit from participating in the study. The assessment done through the questionnaires will make you aware about the symptoms of menopause and depression. There will be a talk on depression in menopause at the end of the study where participants can ask questions and engage with the researcher to answer other related questions regarding depression in menopause.

## **WILL BEING IN THIS STUDY COST YOU ANYTHING?**

There is no charge for participating in the study. Completion of the study questionnaires will take about 20 minutes.

## **WILL YOU GET REFUND FOR ANY MONEY SPENT AS PART OF THIS STUDY?**

No. This study for academic work. There is no refund for money spent on this study.

## **CONFIDENTIALITY AND PRIVACY**

All the details collected during research will be handled securely and confidentially. Participants will anonymously use initials instead of names. The information collected will be used for research purposes only. Access will be allowed only to the primary researcher. The storage system will be password protected and only the researcher will have access.

## **WHAT IF YOU HAVE QUESTIONS IN FUTURE?**

For further questions or clarification about your participation in this study, you can call or email the principal investigator on +254 704 383 969 or [neemaaraka@students.uonbi.ac.ke](mailto:neemaaraka@students.uonbi.ac.ke).

To know more about your rights in participating in an academic study, you can contact the

Secretary/Chairperson, Kenyatta National Hospital-University of Nairobi Ethics and Research Committee Telephone No. 2726300 Ext. 44102 email: [uonknherc@uonbi.ac.ke](mailto:uonknherc@uonbi.ac.ke).

**WHAT ARE YOUR OTHER CHOICES?**

Your participation in this study is absolutely voluntary. You can decide to withdraw from the study at any time with no attached consequences.

**CONSENT FORM (STATEMENT OF CONSENT)**

**Participant’s statement**

I have been well informed about the details of this study. My concerns regarding the study have been addressed. I understand that my participation is voluntary and can withdraw from the study at any stage. All the possible risks during the research have been explained to me. Information about my identity will be held confidentially.

I hereby consent to participating in this study.

\_\_\_\_\_  
(Signature/ Thumb Print of Participant)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Participant's name – printed)

**Statement of Person Who Obtained Consent**

The details of this study have been discussed with the participant. The participant has been made well aware of the benefits, risks and the steps involved throughout the research study.

\_\_\_\_\_  
(Signature of Person who Obtained Consent)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Name of Person who Obtained Consent - printed)



## APPENDIX II: DATA COLLECTION INSTRUMENTS

### BRIEF SCREENING TOOL

Hello, I would like to invite you to participate in an academic study on the prevalence of depression in menopausal teachers. Participation is voluntary. All the details of the study will be explained to those who meet the following criteria.

At the end of the study, there will a talk on menopausal depression by the researcher. There will also be an opportunity to ask questions about depression in menopause.

Age in years	
Final Menstrual Period (FMP) more than 12 months ago	
Final Menstrual Period (FMP) less than 2 years ago	
History of medical of surgical menopause	
Currently on Hormone Replacement Therapy (HRT)	

APPENDIX III SOCIO-DEMOGRAPHIC QUESTIONNAIRE

<b>DEMOGRAPHIC INFORMATION</b>		
	Code	W001, E001, L001, S001 Primary WP001, Secondary WS001
Q.1	Constituency	<input type="checkbox"/> Westlands <input type="checkbox"/> Embakasi East <input type="checkbox"/> Langata <input type="checkbox"/> Stahere
Q.2	Age in Years	
Q.3	Final Menstrual Period (months)	
Q.4	Level of school	<input type="checkbox"/> Primary <input type="checkbox"/> Secondary
Q.5	Type of Teacher	<input type="checkbox"/> GoK <input type="checkbox"/> BoM
Q.6	Marital Status	<input type="checkbox"/> Single <input type="checkbox"/> Married <input type="checkbox"/> Partnered <input type="checkbox"/> Divorced <input type="checkbox"/> Widowed
Q.7	Level of education of spouse	
Q.8	No. of Children	
Q.9	Age of the last child	
Q.10	Physical activity (30 minutes) daily	<input type="checkbox"/> Yes <input type="checkbox"/> No

APPENDIX IV MENOPAUSAL RATING SCALE (MRS)

Which of the following symptoms apply to you at this time?

(X ONE Box For EACH Symptom) For Symptoms That Do Not Apply, Please Mark "None").

**Symptoms:**

	none	mild	moderate	severe	extremely severe
	-----	-----	-----	-----	-----
<b>Score =</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
1. Hot flashes, sweating (episodes of sweating).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Heart discomfort (unusual awareness of heart beat, heart skipping, heart racing, tightness).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Sleep problems (difficulty in falling asleep, difficulty in sleeping through the night, waking up early).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Depressive mood (feeling down, sad, on the verge of tears, lack of drive, mood swings).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Irritability (feeling nervous, inner tension, feeling aggressive) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Anxiety (inner restlessness, feeling panicky) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Physical and mental exhaustion (general decrease in performance, impaired memory, decrease in concentration, forgetfulness).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Sexual problems (change in sexual desire, in sexual activity and satisfaction) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Bladder problems (difficulty in urinating, increased need to urinate, bladder incontinence).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Dryness of vagina (sensation of dryness or burning in the vagina, difficulty with sexual intercourse).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Joint and muscular discomfort (pain in the joints, rheumatoid complaints) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX V PATIENT HEALTH QUESTIONNAIRE - 9

PATIENT HEALTH QUESTIONNAIRE - 9				
Over the <u>last 2 weeks</u> , how often have you been bothered by any of the following problems?	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3
<p><i>FOR OFFICE CODING</i></p> <p>0 + _____ + _____ + _____</p> <p>=Total Score: _____</p>				
<p>If you checked off <u>any</u> problems, how <u>difficult</u> have these problems made it for you to do your work, take care of things at home, or get along with other people?</p> <p> <span style="margin-right: 100px;">Not difficult at all <input type="checkbox"/></span> <span style="margin-right: 100px;">Somewhat difficult <input type="checkbox"/></span> <span style="margin-right: 100px;">Very difficult <input type="checkbox"/></span> <span>Extremely difficult <input type="checkbox"/></span> </p>				
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