INFLUENCE OF THE CONSUMPTION OF FOODS CONTAINING PHYTOESTROGEN ON SEVERITY OF PERIMENOPAUSAL SYMPTOMS AMONG WOMEN IN NJORO DISTRICT, KENYA

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EGERTON UNIVERSITY

MARCH, 2014

DECLARATION AND RECOMMENDATION

Declaration

I declare that this thesis is my original work, and has not been presented in any other University

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Recommendation

This thesis has been submitted for examination with our approval as University Supervisors

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DEDICATION

God my source of strength, who has given me life and the inspiration to carry on with this study,

To my late father Joram Dulo and my mother Judith Alando who allowed me to go to school. To my late cousin Dr. Omolo Kamariwa and brother Hezbon Mariwa who facilitated my education.

To my husband, James Achar Munga and our children Paul, Silas, Peter and Esther who have been a real source of encouragement, support and whose love and inspiration have kept me going.

ABSTRACT

Going through peri menopause is stressful for any woman and it is often difficult to accept the changes caused by the imbalance in hormone levels in the body during this period. Perimenopause is a transitional phase that occurs before menopause and may have severe physical, emotional and cognitive symptoms. To address this problem, Hormone Replacement Therapy (HRT) has been used to control the symptoms, despite the fact that HRT is associated with breast and uterine cancers. Foods that contains phytoestrogen, a plant derived estrogen, can however be used to control the symptoms with less negative effects. The purpose of the study was to determine the influence of consumption of foods containing phytoestrogen on severity of perimenopausal symptoms among women aged between forty and fifty five years. Quantitative and Qualitative research methods were used in the study. The study employed descriptive survey design and was conducted in Njoro District of Nakuru County. Snowball sampling technique was used to select 118 women in perimenopausal phase. Data was collected using interviews and Focus Group Discussions. The validity and reliability of the instruments was ascertained using content validity and Cronbach coefficient alpha respectively. The reliability based on Cronbach's alpha was 0.87. Data was analyzed using both descriptive and inferential statistics aided by Statistical Package for Social Sciences (SPSS) version 17.0. The inferential statistics used were spearman's rho (r_s) rank correlation coefficient and Chi-Square to establish the influence of foods containing phytoestrogen consumed by the women on the severity of perimenopausal symptoms, and was tested at 0.05 level of significance. The findings showed that the types of foods containing phytoestrogen significantly influenced the severity of perimenopausal symptoms with nuts and soy products indicating stronger relationship. Similarly the high frequency and duration of consumption of foods containing phytoestrogen significantly reduced the severity of the perimenopausal symptoms. Those who started during childhood and adolescence, 61% of the participants experienced between none to medium levels of severity of the symptoms, while those who started during adulthood, 39% experienced high to very high levels of severity of the symptoms. This study revealed that most of the interviewed women (84%) seemed to be ignorant about perimenopausal phase and the symptoms experienced during this time. The study recommends awareness creation on the perimenopausal phase and its implication; this will empower the women to take control over their lives during this difficult phase in their lifespan. It can be done through health institutions, women groups and schools.

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ABBREVIATION AND ACRONYMS

FGD	Focus Group Discussion
GOK	Government of Kenya
HDL	High Density Lipoprotein
HRT	Hormone Replacement Therapy
IU	International Unit
LDL	Low Density Lipoprotein
NCST	National Council of Science and Technology
SERMS	Selective Estrogen Receptor Modulators
SPSS	Statistical Package for Social Sciences
USA	United States of America
YRS	Years
WHI	Women's Health initiative

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Perimenopause, a period just prior to the cessation of menstrual flow in women, is a transitional phase of life that many women go through (Cherry & Cherry, 1999). It is inevitable and natural. Also referred to as climacteric or turning point, perimenopausal period is a time of important physical, emotional and psychological changes in a woman's life. During this phase, symptoms such as hot flash, memory loss, vaginal dryness, irritability insomnia and many others are experienced in different degrees, that is, from low, medium, high to very high. These symptoms may occur gradually, usually between the ages of forty or forty five and fifty five years, however, the symptoms can exhibit from as early as twenty five to as late as seventy years (Rajeev, 2009; Mandenhall, 2009). Being the period when the women have active lifestyle; various responsibilities such as community development activities, taking care of the family, having adolescent children and they may also have jobs to keep outside the home, the severity of the symptoms experienced are likely to affect their lives and these activities. In addition to the changes and symptoms, the women's relationships within and outside the home may be affected. (Wambui, 2006; Henkel, 2001). However, how a woman will adapt to any change depends largely on the health of her total being, that is, physical, emotional and cognitive. Some women go through this phase unnoticed; others mildly and about 10-30% go through it painfully (Cherry& Cherry, 1999).

According to Ojeda (1990), the attitude of the women during this time can also be linked to cultures of different societies. Studies show that the stereotype of an irrational woman during this phase is not universal and the negative reaction to common physiological pressure such as menstruation, perimenopause and menopause are culturally engendered. Depending on individual binding sites for estrogen, hormone dependent symptoms may predominate or lack altogether. Cherry & Cherry (1999) assert that most women are ignorant about this phase of life, although many experience the symptoms associated with it. Because of this ignorance, many women seek medical attention assuming that symptoms experienced are as a result of some other ailments.

The imbalance brought about by lack of progesterone and estrogen hormones during perimenopause period cause a wide range of physical, emotional and cognitive symptoms; and duration of these symptoms varies from woman to woman. Physical changes are in the menstrual cycle, vaginal dryness, hot flashes and sleep disorders. Emotional and cognitive changes include mood swing, memory loss, loss in sexual arousal, irritability and many others, causing frustration and helplessness (Rajeev, 2009). To alleviate these problems, hormone replacement therapy (HRT) has been used, and though medical doctors prescribe treatment by giving oral tablets, questions arise particularly from the women about their effect and safety, especially when they have to take them for the rest of their lives. These drugs have also been associated with diseases such as breast and uterine cancers (Beck, 2003; Henkel, 2001).

To avoid the negative effect of HRT, certain foods and nutritional supplements that contain phytoestrogen, a plant derived estrogen have been cited as possible natural alternatives (Rajeev, 2009; Pamplona, 2009). However, La Marca (2010) argues that, phytoestrogen-rich diet has to begin in childhood if it is to protect a woman from perimenopausal disorders and the risk of breast cancer. According to Cherry & Cherry (1999), symptoms of perimenopause can be controlled by the consumption of Mediterranean diet that features a high intake of vegetables, legumes, fruits and cereals. Women in the Eastern countries consume these foods, and hence do not experience severe perimenopausal symptoms. Vegetarian diets that include, Soy, peanuts and sweet potatoes contain plant hormone phytoestrogen which takes the place of the body's estrogen when levels decrease, easing symptoms of perimenopause and osteoporosis (Omoni & Aluko, 2005). High fiber diets found in whole meal cereals, pulses and vegetables have also been found to be beneficial in preventing many ailments including perimenopausal symptoms. Other recommended nutrients during perimenopause include; Vitamins A, B, C, D and E, magnesium, calcium, zinc and boron (Ludington & Diehl, 2001).

Foods containing phytoestrogen such as red and yellow fruits, green leafy vegetables, red and yellow vegetables, peas, cabbage, Irish potatoes, sweet potatoes, beans, fruits, peanuts, soy and soy product are grown, sold and consumed in Njoro District (District Agricultural Office Njoro, 2011). However, the benefits of such foods may be limited because of lack of necessary information on health and nutrition. This study therefore sought to establish the influence of foods containing phytoestrogen on severity of perimenopausal symptoms among

women in Njoro district, Kenya. Descriptive survey research design was used to achieve the aim of the study.

1.2 Statement of the Problem

Most women start their perimenopausal phase at the age of 40 years, during which time they experience symptoms that adversely affect them physically, emotionally and cognitively. These symptoms result from hormonal imbalance in the body that leads to changes in menstrual cycle, vaginal dryness, changes in a woman's sex drive, hot flashes, insomnia, headaches, irritability, moodswing and memory loss causing frustration. Depending on severity of the symptoms, the repercussions are significant stress noted on women's health, families and marital unions in particular. Given that this is the time when these women have active life styles, including many development activities and responsibilities, these symptoms may interfere with their work related activities. This, therefore, requires the right and safe intervention measures.

For a long time, hormone replacement therapy (HRT) has been used as an intervention for the perimenopausal symptoms, but this is associated with endometrial, breast and uterine cancers, which are terminal illnesses. Foods that contain phytoestrogen can be used as safe alternative to hormone replacement therapy to address perimenopausal problem. Research that has been carried out on women in Latin America, Asia, Mediterranean lands and western countries show that, the women in these countries who consume the foods that contain phytoestrogen experience less severe perimenopausal symptoms, while some do not experience the symptoms at all. Foods these women consume are soy and soy products, beans, lentils, peas, cereals, red and yellow fruits and vegetables. Some of the foods mentioned are grown, sold and consumed in Njoro District. However, the influence that these foods have on perimenopausal symptoms has not been established among women in perimenopausal phase in Njoro district. This study therefore, sought to determine the influence of consumption of foods containing phytoestrogen on severity of perimenopausal symptoms among women in Njoro District.

1.3 Purpose of Study

The purpose of this study was to determine the influence of the consumption of foods containing phytoestrogen on severity of perimenopausal symptoms among women in Njoro District, Kenya.

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1.4 Objectives of the Study

The objectives of this study were to:

i. Establish the level of awareness of women aged between 40 and 55 years about the perimenopausal phase in Njoro District.

ii. Establish the perimenopausal symptoms experienced by women in perimenopausal phase in Njoro District.

iii. Establish the types of foods containing phytoestrogen consumed by women in perimenopausal phase in Njoro District.

iv. Establish the frequency and duration of consumption of foods containing phytoestrogen among women in perimenopausal phase in Njoro District.

v. Determine the influence of the types of foods containing phytoestrogen consumed on the severity of perimenopausal symptoms among women in perimenopausal phase in Njoro District.

vi. Determine the influence of the frequency and the duration of consumption of foods containing phytoestrogen on the severity of perimenopausal symptoms among women in perimenopausal phase in Njoro District.

1.5 Research Questions

i. What is the level of awareness of women in Njoro District about perimenopausal phase?

ii. What symptoms are experienced by women during perimenopausal phase in Njoro District?

iii. What types of foods containing phytoestrogen are being consumed by women in perimenopausal phase in Njoro District?

iv. What is the frequency and duration of consumption of the foods containing phytoestrogen by perimenopausal women in Njoro District?

v. What is the influence of the types of foods containing phytoestrogen consumed on the severity of perimenopausal symptoms among women in perimenopausal phase in Njoro District?

vi. What is the influence of frequency and duration of the consumption of foods containing phytoestrogen on the severity of perimenopausal symptoms among women in perimenopausal phase in Njoro District?

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1.6 Significance of Study

The symptoms such as hot flashes, headaches and joint pains that manifest in women going through perimenopausal phase are sometimes confused with diseases such as malaria and typhoid. The determination of the influence of foods containing phytoestrogen on severity of perimenopausal symptoms among women in Njoro District, would not only be useful to the participants (women) themselves, but also valuable to family members of these women, many organizations, and stakeholders that work with groups including the government. The study may open a channel for more detailed research on foods that can actually offer safe alternative to the women.

1.7 Assumption of the Study

 It was assumed that the women aged between the period 40 to 55 years were experiencing perimenopausal symptoms.

1.8 Scope of Study

The study focused on the influence of the consumption of foods containing phytoestrogen on the severity of perimenopausal symptoms. It also looked at the level of awareness about perimenopausal phase among women aged 40 to 55 in Njoro District, the symptoms experienced by the women during this phase, the foods containing phytoestrogen consumed by the women, frequency and the duration of consumption of these foods.

1.9 Limitation of the Study

Since non-probability sampling method was used, the findings of this study can only be generalized to women in Njoro District.

1.10 Definitions of Terms

The following were the adopted and operationalized definitions of terms:

Estrogen: A major female reproductive hormone which is actively responsible for women's body functions during her reproductive years.

Hormone Replacement Therapy (HRT): Medical treatment given in form of oral tablets to boost the low level of reproductive hormones estrogen and progesterone during perimenopause.

Influence: Action invisibly exercised upon or process of producing effects on actions, behavior and opinion. It is an interaction of two variables which could be of mere association or of a cause effect type. Influence was determined through the association of the consumption of foods containing phytoestrogen and severity of perimenopausal symptoms.

Insomnia: Sleep disorder where one has problems with sleep during the night. This condition is common in women in the perimenopausal phase.

Kegel exercise: Are a series of pelvic muscle exercise designed to strengthen the muscles of the pelvic floor; helps to control vaginal bladder muscle managing stress incontinence common of perimenopause.

Menopause: Specifically refers to the actual cessation of menstrual flow (between ages 52-60).

Osteoporosis: Disease of the bones (thinning and weakness of bones that sometimes results in fractures), a condition common in perimenopausal phase.

Perimenopause: Sometimes referred to as premenopause is a period just prior to actual cessation of menstrual flow in a woman and can begin as early as 25 years. Manifested symptoms include headache, irritability, moodswing and memory loss among others. In this study this phase was taken to be from 40-55 years.

Phytoestrogen: Plant derived estrogen, mainly found in foods such as legumes, vegetables and fruits

Post menopause: A period after the cessation of menstrual flow (60 years and above)

Premarin: Hormones in form of drugs; usually prescribed to women to control perimenopausal symptoms.

Progesterone: Female reproductive hormone necessary for preparing the uterine lining for fertilized egg. It controls the hyperactivity of estrogen.

Severity of perimenopausal symptoms: Harsh manifestations; in this case it is where a woman experiences most of the symptoms of perimenopause, and the symptoms are strong enough to interfere with her daily activities. This was measured as an index of between 0-21 and categorized into low (1-5), medium (6-10), high (11-15) and very high (16-21).

Thromboembolism: Blood clot that blocks a vessel (a condition that can cause sudden death)

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of literature on the study, acknowledging the work that has been done by other researchers in the area of perimenopause. It focuses on the issues of perimenopausal phase of life; its concept, stages, symptoms and management.

There are two methods of management; hormone replacement therapy, prescribed as medical intervention and foods that are considered as alternative to the HRT. Studies carried out on the consumption of Mediterranean type of diet; high in legumes, cereals, vegetables and fruits show positive control on symptoms of perimenopause among women in Eastern countries. The chapter also highlights the theoretical background and conceptual framework.

2.2 Concept of Perimenopause

The onset of menopause in a woman is termed perimenopause, also referred to as climacteric changes (a turning point). The perimenopausal period is a time of important physical and psychological changes in a woman's life; most women go through this stage in their 40th to 45th years but the symptoms can exhibit among women from as early as 25 to as late as 70 years (Rajeev, 2009). A woman has over 1-2 million egg sacs in her ovaries and with age the ovaries begin making less estrogen and progesterone, the two hormones required to regulate the female reproduction. This result in the production of fewer eggs and gradual slow down of women's reproduction cycle (Rajeev, 2009).

There are three stages in the transition that can start between 35-55 years; but mostly starts between ages 40 and 45 years (Beck, 2003; Harvey 2005). Early stage; this stage is marked by changes in menstrual flow, where the cycle could be short causing frequent periods or long resulting in less frequent periods. Some women are known to even skip their periods completely. Middle stage; here the periods become irregular but consistent, not skipped. Late stage; women begin skipping periods until finally they stop (Harvey, 2005). Lack of or inadequacy of the two hormones progesterone and estrogen cause hormonal imbalance resulting in perimenopausal symptoms.

Menopause is a natural phenomenon of the female body. The word menopause comes from the Greek roots, "mens" meaning monthly and "pause" meaning stop; it specifically refers to the cessation of menstrual flow and termination of fertility (Adelson, 1996; Ojeda, 1990). Cherry & Cherry (1999) defines menopause as "loss of ovarian function which is characterized by the cessation of menstrual periods". For most women the termination of fertility occurs between 45-55 years for women in western countries, and 50-52 years for others. At this phase some hormonal changes occur including the stoppage of secretion of estrogen and progesterone in the ovaries. Although the ovaries stop secreting the two hormones, the body continues to produce them in small quantities.

2.3 The Nature of Symptoms of Perimenopause

As hormone production becomes imbalanced, women experience a wide range of physical, emotional and cognitive symptoms during the perimenopausal phase. The duration of these symptoms varies from woman to woman. This transition, perimenopause period, lasts five to ten years, though the entire process can sometimes take up to thirteen years. There is normally a gradual crescendo in the beginning, peak as one approach mid transition and gradual decrescendo towards the end, as the body learns to live in harmony with its new hormonal and emotional milieu. Http://www.drnorthrup.com. More than 80% of women experience a variety of symptoms. Signs and symptoms that mark the perimenopause phase are easily seen with periodic hot flashes, mood swings and irregular menstrual period. The most prominent symptom noticed being the changes in menstrual cycle; the cycle can be short, long or even periods skipped completely. During perimenopause, periods may stop for several months and then return, and they may also increase or decrease in duration, intensity and flow. The drop in the level of estrogen during this phase causes two categories of symptoms; physiological, emotional/ cognitive symptoms (Rajeev, 2009).

2.3.1 Physiological symptoms

About a decade before becoming menopausal, changes begin in the body that set the beginning of transformation from reproduction to no reproduction; most of the changes are as a result of declining estrogen levels and this affects many organs in the body; from uterus to ovaries, fallopian tubes, urinary tract, vagina, breast and skins. Others affected are the nervous system, notably pituitary and hypothalamus, spinal cord, gastro-intestinal system (colon, pancreases and liver), the adrenaline gland, circulatory system (heart and arteries) and the skeletal system (Smith & Shimp, 2000). When blood estrogen falls, the target organs are

no longer exposed to same levels of the hormones, the body then begins to manifest some signs. However, not all women experience signs of estrogen deprivation, minority may experience excess, with one of the signs being dysfunctional bleeding due to uterus fibroids or cancerous growth of uterine lining (Henkel, 2001). Excess estrogen treatment during perimenopause is most common in women (Cataldo & Whitney, 1995). Some women will experience very severe symptoms, while some will not even notice their entry into perimenopause (Hasler, 2001; Henkel, 2001). Research show that about 50% of women go through perimenopause without showing signs, this is because of variation of binding cites in each individual woman (Henkel, 2001; Alford & Bogle, 1982). The symptoms may also occur concurrently or sequentially and may depend upon cultural and environmental factors (Wambui, 2006).

Vaginal changes (dryness) and sexual behavior are some of the changes experienced due to reduced levels of estrogen, the tissues of the vagina and urethra become thinner, less elastic and drier as a result of the decline in the estrogen level. This can further result in decreased lubrication, burning sensation, itching, urinary tract infections and uncomfortable sexual intercourse. Decreased libido or gradual decline in sexual urge, the pain involved due to reduced lubrication as well as constant mood swings makes it almost impossible for a woman to enjoy sexual intercourse with their partners, or even reach orgasm (Kumar, 2009; Rajeev, 2009; Woodruff & Birren, 1993). The solution to this problem is often medical attention and there are some recommendation that includes the use of jells and creams (Beckham, 2002). Women are also advised to keep their vaginal muscle toned in shape by exercise such as kegel. Kegel exercise is a method of controlling incontinence in women after child birth. This exercise helps to control the vaginal bladder muscle preventing and managing stress incontinence common of perimenopause (Arnold, 1948; Henkel, 2001).

Hot flash is another symptom that occurs in almost all women who are going through perimenopause. It is related to body adjustment to changes in hormonal system, and is as result of dropping estrogen and progesterone levels. According to Beck (2002), it is estimated that 10-15% of women have hot flashes severely enough to interfere with their daily life. A hot flash may begin as a pressure in the head, a headache or wave of nausea, a sensation of heat then starts in the head, face, neck and spreads to the whole body. Intense sweating follows that may even soak clothes particularly, if it occurs during sleep at night. The body may suddenly feel cold as a result of a drop in body temperature and this may take minutes

and chills may take an hour to subside. Hot flashes may persist averagely for three to five years, in about 50% of women they last up to five years (Beck, 2002). Some practical tips that women can follow to manage hot flash is to eliminate substances that may act as trigger and these include hot spicy foods, caffeine and alcohol. Take plenty of water, use clothing preferably cotton which can be removed or put on during heat and chill as is convenient (Henkel, 2001).

Insomnia or Sleep disorder is also a symptom that a woman undergoing perimenopause may experience. The system of the body may be interfered with by constant feeling of weakness and fatigue, resulting in an abnormality in their sleeping patterns, such as wide awake during the night and fast sleep during the day (Beck, 2002). Heavy bleeding may also be a sign during this phase, some women may experience heavy bleeding during their periods, but in some cases bleeding may be a sign of other complications. The first sign of perimenopause is irregular menstruation, most women in this phase will experience change in their monthly cycle, and periods may suddenly stop or become lighter, irregular then stop. Other physical symptoms are palpitations (Irregular heart beat), body pains, headache, hair loss, dry eyes, lack of concentration and vulnerability to many diseases (Beck, 2002).

2.3.2 Emotional and Cognitive Symptoms

A woman going through perimenopause may have constant mood swings, she may be happy one moment and extremely sad the next; these bouts of sadness are unexplained. The sudden emotions outburst may cause intense anxiety attacks and anger; deep depression may occur (Rajeev, 2009). Memory loss is another consequence during perimenopause phase; there are changes that take place in the body that may be a cause of forgetfulness. There is the aging process and the older we get the more short term memory we lose, some symptoms like sleep disorder and fatigue can cause memory loss. However, the impact of perimenopausal changes on quality of life is related to personal and socio cultural characteristics, which can strongly influence the way in which symptoms are perceived (Kumar, 2009). While perimenopause can start in mid 20s or late 30s, most women begin noticing the symptoms in their 40s but not all women experience the uncomfortable symptoms that are associated with perimenopause. Studies suggest that there could be factors that may increase the woman's risk of suffering one or more of the symptoms (Rajeev, 2009; Hasler, 2001; Henkel, 2001). In addition, there are other factors that may contribute to the chances of suffering the symptoms of perimenopause, and these could be hereditary or those who suffer from pre-menstrual

symptoms especially if she consumes a diet that is high in animal fats and lacking in fruits vegetables and fiber, drinking too much alcohol, leading a life full of stress and tension, lacking sleep on regularly basis, and lacking regular exercise.

Going through perimenopause is a stressful time for any woman and it is difficult to accept the changes caused by the imbalance in hormone levels in the body. However, this phase cannot be avoided, but a thorough understanding of its cause, symptoms and management can help one cope with symptoms better and stay healthy (Beck,2003; Rajeev, 2009).

2.4 Perimenopausal Management

The most important thing to be understood about perimenopause is that it is not a disease and hence need no treatment. However, depending on the range and severity of symptoms perimenopause can be medically managed along with life style changes (Rajeev, 2009).

2.4.1 Hormones –Estrogen and Progesterone

These two are the major female hormones which are actively responsible for a woman's reproductive body function for the first 40 years of life. The ovaries produce estrogen and progesterone and the two hormones combine to aid the normal reproduction functions in a woman. The two hormones have effect on about 300 different tissues throughout a woman's body. Estrogen seems to have properties that protects against memory loss; they are involved in the tissues in the nervous system including the brain, the bones and the urinary tract. Estrogen appears to smooth, relax and open the blood vessels which may help blood flow in the brain. It checks and treats the uncomfortable symptoms of perimenopause. Progesterone on the other hand is necessary for thickening and preparing the uterine lining for the fertilized egg. It is very important in that it stops or prevents the hyperactivity of estrogen that may be harmful to the body, each of the two hormones is an integral part of the other, must be combined for the effective reproduction function in woman's body (Beck, 2003).

2.4.2 Conventional Management: Hormone Replacement Therapy (HRT)

Hormone replacement therapy involves remedies prescribed by medical doctors, usually in form of oral tablets to help reduce and control the symptoms of perimenopause experienced by women at this phase. A combination of estrogen and progesterone may be used to reduce hot flashes and mood swings. In addition to reducing severity of perimenopausal symptoms, HRT may help in the reduction of osteoporosis in some women, it increases the bone density,

improves balance and protects from falling. It also helps reduce cases of hip fractures among women at the perimenopausal age. But even with this, the benefits appear less than the risks. For maximum protection against osteoporosis, estrogen must be taken for life, but this prolonged exposure poses great risks (Wells & Wells 1994).

HRT however, have adverse effects. During the course of a woman's life from teenage to menopause, a woman's ovaries produce hormones known as steroidal estrogen, this type of estrogen causes the ovaries to produce eggs and enables a woman to have children. Although steroidal estrogen is essential for reproduction and protects a woman from heart and bone disease including other symptoms, the longer the woman is exposed to this naturally produced estrogen the greater the risks she will have of developing breast and ovarian cancer in her later years. The risk is further compounded when a doctor prescribes hormone replacement therapy (HRT), like premarin which contains steroidal estrogen to control the perimenopausal symptoms. Continuing with the same type of estrogen as that produced by her body may cause cancer (Cherry & Cherry, 1999).

According to Beck (2003) taking hormone replacement by pill or cream can influence the potential for side effects, she argues that, when a woman takes HRT for more than five or ten years, it may increase the risk of heart disease in a woman who has the disease. Other HRT known as selective estrogen receptor modulators (SERMS) often administered may increase the risk of thromboembolism and gallstones. A study known as Women's Health Initiative (WHI) done in 1993 examined the effects of HRT on 161, 809 women between the ages of 50-79 years in 40 different medical centers. The study found that the risk of HRT included breast cancer, heart attacks, stroke and blood clot. These findings led some physicians to revise their recommendation on HRT (Harry, 1996).

Another study carried out in July 2002 by component of WHI looked at the use of estrogen and progesterone in women who had not had their uterus removed. The study showed an increase in breast cancer. Another study carried out in March 2004 by a second component of WHI studied estrogen only therapy on women without uterus, this revealed a possible increase in the risks of stroke. Harvey (2005) notes that, although WHI suggests that HRT should not be used on prevention of chronic diseases, many physicians still prescribe them for short term treatment of moderate to severe hot flashes and other perimenopausal

symptoms. Estrogen must be taken for life. The daily methods means taking one estrogen and one progesterone pills together each day for 365 days a year (Wells & Wells, 1994).

2.4.3 Dietary Management: Consumption of Foods Containing Phytoestrogen

Due to the side effects of HRT, diet is now being considered as one of the safe alternatives to perimenopausal problems (Beckham, 2002; Hasler, 2001). However, studies indicate that older population shows limited nutritional knowledge (Posner & Levine, 1991). Inadequate nutritional knowledge, coupled with cultural heterogeneity, affluence and modernity have contributed to the rapid changes in African diets and lifestyles. Modernization has paved way to new food habits and falsified perception that some traditional African diets are inferior and unacceptable, consequently being replaced with highly refined processed foods (K'Okul, 1991). Sweet potatoes and Soy are some traditional vegetable foods which offer natural protection against problems associated with perimenopause and its complications, but are no longer common in local diets (Pamplona, 2006; K'Okul, 1991).

2.4.4 Recommended Foods for Perimenopausal Phase

Plant hormone phytoestrogen present in soy, potatoes, peas and yams contain isoflavons that have a gentle, safe and highly beneficial effect on the body (Beckham, 2002). Phytoestrogen has both estrogenic and anti-estrogenic action in human; they offer a source of estrogen and increase level of sex hormones and also help to decrease free and active hormone level by competitive blockage, hence decreasing hormone dependant tumors (Beckham, 2002; Beck, 2002). Low level of estrogen results in manifestation of varied perimenopausal symptoms. There is also an increased loss of calcium from the bones consequently leading to development of osteoporosis. Isoflavons boosts body estrogen when the natural secretions are depleted, thereby easing the symptoms of perimenopause as well as helping calcium absorption by bones (Shaw, 2001; Mindy, 2009). Eating soy can increase estrogen levels when they are low, but will not boost them unnecessarily. Soy beans are also high in Vitamins E and lecithin. These are soy natural anti oxidants that work to prevent heart disease (Omoni & Aluko, 2005).

Successful studies carried out on hot flashes and isoflavons have used isoflavons amounting from 40 to 80 milligrams per day in approximately three months duration to reduce incidences and or severity of hot flashes. (Cherry & Cherry 1999; Beck, 2003; Grayson, 2002). There is however, a consensus statement that the safety of isoflavons at specific

amounts has not been established, since these estrogens attach to the same receptors that pharmaceutical hormones act on, possibility do exist that these too could affect the same breast tissues and heart health (Beck, 2003; Beckham, 2002). To receive potential health benefits it is preferable to obtain isoflavons from whole foods. For instance, approximately 25grammes a day of Soy protein in Soy foods provides approximately 50 milligrams a day of isoflavons. According to Cherry & Cherry (1999), the women in Asia, Latin America, and Mediterranean Lands consume 30-50 milligrams of Isoflavons daily, compared to 2-4 milligrams of isoflavons by women in the United States of America (USA).

Isoflavons rich foods include Tofu, Soy milk, instant beverages soy powder, soy fiber, soy flour and textured soy protein (Omoni & Aluko, 2005). Other foods include, cow peas, lentils mature seeds, peanuts and peas, yams, sweet potatoes, chick peas, lima beans and kidney beans; beans are rich in phytoestrogen. According to (Beck, 2003), ½ Cup of beans should be consumed three to four times weekly. These local foods were once African staple diets however, with proliferation of the western culture in the community, these foods are no longer consumed as regularly as they used to be (K'Okul, 1991).

Lignans are other classes of phytoestrogen that can help in active treatment of perimenopausal symptoms (Beckham, 2002). Its major dietary source is flaxseed especially flaxseed oil (Smith & Shimp, 2002). Others are whole grain cereals particularly breakfast cereals such as oats, wheatabix, cornflakes and whole meal bread (Rajeev, 2009; Cherry& Cherry 1999).

Table 1

Contents of soy and soy products

Soy food	Quantity served	Isoflavon content (mg)
Roasted soy nuts	1/4cup(60 ml)	40-50 mg
Green soy beans(uncooked)	½ cup (125 ml)	70 mg
Soy flour	¼ cup (60ml)	37 mg
Tofu	½ cup (125 ml)	27 mg
Soy milk	1 cup (250 ml)	24 mg
Soy proteins powder	28 gm	28 mg

Source: Beck, 2003

Complex Carbohydrate containing foods such as milk, cereal or a slice of toast provide the brain with amino acid called Tryptophan. The brain uses Tryptophan as a building block to manufacture serotonin, a brain chemical that facilitates sleep, improve mood, diminish pain and reduce appetite. These carbohydrates give energy, balance blood sugar greatly reducing fatigue (Pamplona, 2000 b; Beck, 2003; Ludington & Diehl, 2001).

Unrefined complex carbohydrates are richly found in whole meal bread, brown rice and whole pasta (spaghetti, macaroni vermicelli), beans and pulses. Essential fatty acids are found in nuts, grape seed, linseed, egg yolk, dairy products and fish oil. Boron is a trace element that boosts estrogen levels to that of replacement therapies (Beckham, 2002). Rich food sources in Boron include Soy beans, beetroot, Cabbage, cucumber, carrots, sweet potatoes, lettuce, cauliflower, turnip greens, onions and wheat. Fruit sources are pears, tomatoes, oranges, almonds, grapes, dates, peaches, raisin and apples. The vitamins essential during this phase are; Beta-carotene, the B Vitamins, Vitamin C and Bioflavonoid and Vitamin E.

Beta- carotene have anti-oxidant effects, they decrease bad cholesterol LDL in the blood. Food sources are palm oil, yellow, green, red and orange vegetables (carrots, pumpkins, sweet potatoes). Five or more serving of vegetables and fruits a day is recommended (Grayson, 2002). Vitamin B especially, pantothenic acid relieves insomnia, irritability and nervousness (Beckham, 2002). Foods that provide this vitamin include whole grain cereals mostly maize, millet and sorghum.

Vitamin C and bioflavonoid strengthens bones, decrease water retention and hot flashes. They also increase capillary strength. (Kirschman & kirschman, 1996). Foods rich in vitamin C are fruits such as lemons, passion fruits, oranges, pawpaw, mangoes, lime, grapefruit and water melon. Other foods are green leafy vegetables, cabbage, broccoli, cauliflower, turnip green and vegetable salad. Include at least one of these each meal daily. These foods help to fight increased risks of heart disease (Rajeev, 2009; Cherry & Cherry, 1999).

Vitamin E is required in exceptionally high amounts (up to 1200 IU daily) during perimenopause. It is a significant anti-oxidant; its supplements have been used to reduce night sweats, nervousness, insomnia, backaches, dizziness, shortness of breath, drying of vaginal lining and heart palpitations in many women (Kirschman & Kirschman, 1996;

Woodruff & Birren, 1983). Foods rich in vitamin E include wheat germs, whole grain cereals dried pulses. Others are fruits and vegetables such as avocado, spinach, broccoli, vegetable oils and seeds (Kirschman & Kirschman, 1996).

Dietary calcium is needed for the protection against bone disease Osteoporosis. Calcium intake should be increased to maintain calcium balance (Beckham, 2002). It is suggested that life-long dietary habits of three servings of calcium rich foods daily may be important than estrogen treatment in maintaining bone structure (Kirschman & Kirschman, 1996; Whitney & Rofles, 1993). A deficiency of calcium can cause headaches, insomnia, irritability and nervousness (Kirschman & Kirschman 1996). Rich food sources include milk and milk products, cooked dry beans, soy beans and their products, whole grain cereals such as maize, millet and sorghum, others are green leafy vegetables.

Dietary fiber helps reduce bloating and flatulence, lowering bad cholesterol LDL, it modifies the level of sex hormone by increasing gastrointestinal mobility. Fiber alters acid metabolism and interrupts enterohepatic circulation preventing estrogen uptake causing increased estrogen excretion. Over 150 studies show that people who eat large quantity of fruits and vegetables which are rich sources of fiber are up to 50% less likely to develop cancer than those who eat small amounts (Beckham, 2002). Recommended soluble fibers are found in rice, beans .oats and fruits.

Water is required for transportation of nutrients to the cells and other vital processes in the body. Women suffering from hot flashes should take a lot of water to maintain body temperature (Henkel, 2001). The amount recommended is six to eight glasses of water daily (Ludington & Diehl, 2002).

2.4.5 Nutritional Supplements and Herbal Therapy

Herbal remedies are used to treat symptoms of perimenopause. Such herbs as liquorice, red clover alleviate hot flashes (Kirschman & Kirschman 1996). Black cohosh products improve vaginal tissues of Perimenopausal women to some degree as pharmaceutical estrogen. Sage contains small quantities of phytoestrogen that helps in reducing night sweats and hot flashes in Perimenopausal women (Beckham, 2002). The above herbs may not be readily available to Kenyan women, but locally available herbs such as Rosemary, garlic, onion used in food preparation are useful in alleviating specific perimenopausal symptom (Kirschman & Kirschman 1996). Nutritional supplements such as vitamin E, vitamin B12 are prescribed for

easing hot flashes, lessening depressive symptoms and relieving joint pain. Studies show that vitamin B12 promotes sleep especially in people with sleep disorder. The recommended dietary daily intake is 2.4 micrograms. Food sources are beef, poultry, fish, eggs and dairy products (Beck, 2003; Rajeev, 2009).

2.4.6 Foods to Avoid During Perimenopause

It is important to avoid or eliminate foods that can trigger or worsen symptoms. A glass of alcohol every other day can raise estrogen levels, prevent heart diseases and guard against bone diseases osteoporosis in older women. However, more than six drinks are harmful. Toxins in alcohol prevent bones from absorbing maximum nutrients from food. Smoking reduces estrogen levels in the body. Avoid caffeine containing foods since they block receptors in nerve cells causing higher sensitivity to pain, increasing anxiety with reduced protection against oxygen deficiency and hot flashes (Kirschman & Kirschman 1996). These substances are diuretics and with carbonated drinks lower the amount of calcium the body takes from foods (Pamplona, 2000 b). Other foods to avoid are highly spiced foods, hot beverages like coffee, tea, dark chocolate, fatty foods and refined processed foods; these trigger hot flashes and affect the quality of sleep (Rajeev, 2001; Beck, 2003; Kirschman & Kirschman 1996).

Refined carbohydrates cause fluctuation of blood sugar, and when blood sugar levels drop, stress hormones adrenaline is released and symptoms such as, irritability, anxiety, crying spells, excessive sweating, depression, fatigue, lack of concentration and forgetfulness results (Beckham, 2002). Animal fats are a rich source of saturated fats that are linked to heart disease (Ludington & Diehl, 2001). These are high in proteins which can lead to leaching of calcium from bones causing kidney stones and gout. Sugar should be limited as well, this is because it causes moodswing, and fluctuating energy levels; decreases good cholesterol(HDL) thus increasing the risk of heart disease (Pamplona, 2000 b).

2.5 Exercise during Perimenopause

Diet coupled with regular exercises provides additional preventive measures. Studies show women with moderate exercise report improved immune function as compared to sedentary women; walking for 30 minutes for four days over a period of twelve (12) weeks can significantly reduce blood pressure (Beckham, 2002). Regular exercises improve bone

density (Henkel, 2001). Walking, step aerobics or any other enjoyable activity adjusted to own requirement is adequate (Ludington & Diehl, 2001).

2.6 Theoretical Framework

The study was based on Whelan's two theories of Perimenopause: The theory of estrogen decline and stage of life theory:

2.6.1 The theory of 'estrogen declines'

Estrogen is one of the vital hormones a woman requires for the body functions. Elizabeth Whelan, the proponent of this theory, indicates that mental function is rather dependent on circulating hormone levels and their interaction on the central nervous system. Estrogen receptors appear in large numbers in limbic areas (memory and emotional behavior), estrogen also assists nerve growth, nerve repair and general neural activity. With declining levels of estrogen during perimenopause, attention, concentration, verbal and spatial memory and long or short term memory are some of the cognitive functions that may be affected. Irritability, mood swings, anxiousness, depression, feelings of helplessness or feeling of worthlessness may surface during perimenopause, which according to this theory could be due to estrogen loss.

2.6.2 "Stage of life" theory

This theory asserts that the external life events and other peripheral stresses a woman may be experiencing during perimenopause are actually to blame for mental inconsistencies and not perimenopause itself. Significant life events such as empty nest, aging or ill family members, career pressure /demands/changes, financial pressures/demand, spouse or partner issues are believed to affect a woman's moods and behaviors. Combination of these theories may play a role in explaining the causes of mental and emotional inconsistencies observed during perimenopause (Whelan, 1994).

2.7 Conceptual Framework

This figure explains different variables in relation to the objectives

Independent
variable

Dependent variable

| Consumption of foods that contains Phytoestrogen
• Types consumed
• Frequency of consumption
• Duration of consumption | • Ignorance of perimenopausal phase
• Cost of food
• Food preparation
• Level of education
• Income | Severity of perimenopausal Symptoms (intensity, frequency, duration)

• Vaginal dryness
• Hot flashes
• Insomnia
• Irritability
• memory loss |

Moderating Variables

Figure 1. Conceptual framework model on the influence of foods containing phytoestrogen on perimenopausal symptoms

The conception from figure 1, is derived from own conceptualization.

The conceptual framework explored the influence among the main variables of the study. The consumption of foods containing phytoestrogen, that is, the types of foods consumed, frequency and duration of consumption, has a direct influence on the severity of perimenopausal symptoms. However, this relationship can be moderated by factors like ignorance about perimenopausal phase, cost of food and food preparation. Other factors include level of education, income. These factors were inbuilt in the study and were investigated alongside the main variable.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

This chapter outlines the methodology or research procedures used in this study; Both Quantitative and Qualitative research methods were used, it covers research design, study location, population of the study, sampling procedures and sample size, instrumentation, data collection procedures, organization and analysis of data.

3.2 Research Design

The research design was descriptive survey. This is because the researcher intended to determine the current status of the respondents without manipulating the situation. According to Mugenda and Mugenda(2003), a descriptive survey determines and reports the way things are. Similarly, Kathuri and Pals (1993) calls them status studies. They further note that surveys are important and can be used in exploring the status quo of two or more variables at a given point in time. The design allows for the use of interviews for more in depth information from the respondents. Surveys are important in research, they allow the collection of a large sample of data from sample population in a highly economically way (Saunders, Lewis & Thornhill, 1997) and are useful in describing the characteristics of a population.

3.3 Study Location

The study was conducted in Njoro District of Nakuru County. Njoro District consists of four divisions; Njoro, Lari, Mauche and Mau Narok. The total area is approximately 702.1km2, and is situated northwest of Nakuru town. In 2009, the district had a population of 178,180 with an annual growth rate of two point six per cent (GOK 2009). The location of the study was purposively selected since it is an agricultural area where foods that contain phytoestrogen such as beans, sorghum, peas, soy beans are grown, and consumed by the population. Sweet potatoes are grown on a small scale but mostly imported from other parts of the country. Other phytoestrogen containing foods not grown but sold in the area are pea nuts, groundnuts and fruits.

3.4 Population of Study

The accessible population was women in perimenopausal age in Njoro District, with a sampling frame of nine thousand two hundred and twenty nine (9229) (GOK, 2009).

3.5 Sampling Procedure and Sample Size

Purposive and Snowball sampling techniques were used to select the respondents. Snowball is a non-probability sampling technique that is used by researchers to identify potential subjects or respondents in studies where subjects are hard to locate. This type of sampling technique works like chain referral. After observing the initial subject, the researcher asks for assistance from the subject to help identify people with a similar trait of interest (Castilo, 2009). After purposively identifying a few initial respondents, the researcher sought for their assistance to help identify others of similar traits. Those who were identified in turn identified others until the researcher got the number required.

This method was useful for this study because perimenopause is a sensitive issue and many women would not readily open up and freely admit that they are in this phase of life. But after an explanation by the researcher during the interviews, the women opened up and shared freely. The requirement for one to be selected was that they must have at least secondary level of education and this is because the interviews were being conducted in English. However, this was not the reality on the ground as some of the women of this age had not gone to school. The researcher therefore had to be flexible and for some women the interviews were conducted in Kiswahili. A sample of 118 women aged 40-55 years was obtained from Njoro District; this sample was large enough for the researcher to arrive at correct data analysis and interpretation. It was selected based on recommendation that, for a survey research, there should be at least 100 participants in each major sub-group.(Kathuri & Pals,1993).Eighteen (18) respondents were added to cater for attrition. The age bracket of 40-55 was chosen because most women start experiencing symptoms at the age of 40.

The women who participated in the focus group discussions were 20, drawn from those who had been interviewed in the four divisions; Njoro, Mauche, Lari and Kihingo. Initially, the selection of the Focus Group Discussion participants was to be done using simple random sampling, but this was not appropriate on the ground among the interviewed women. Purposive sampling was therefore used to select those who were outgoing and seemed to be more open-such participants are likely to participate in open group discussions than

conservative individuals. The recommended number of the focus group participants is between eight and twelve people. This is because when the number is too small, the information gathered may not be adequate, and when too large, some members may not participate (Escalada, 2010). There were two groups with ten participants in each group. This gave each member an opportunity to participate and freely share their experiences.

3.6 Instrumentation

The study applied two methods to collect data; these were interview schedule and focus group discussion. The methods were combined to complement each other and were adequate to collect data for the study. Appropriate items in the instruments that is, questions were developed to capture the content and generate data on variables so as to meet the objectives of the study. An interview schedule is an outline of closed and open ended questions that forms a basis for and guides the interviewing process; it provides a structure that aids in obtaining the necessary information (Kathuri & Pals, 1993). Since an interview is an oral exchange between the interviewer and the interviewee, it provided an option of elaborating or clarifying items after they were presented. The respondents were interviewed individually.

3.6.1 Validity

Validity of an instrument is how accurate the instrument is in obtaining the data it intends to collect (Mugenda &Mugenda 2003). Validity indicates the degree to which the instrument measures what it is supposed to measure (Kothari, 1990). To ensure precision, relevance and content validity of the instrument, the tools were subjected to critical evaluation by specialists in community development research and supervisors. Discussions were held with peers and two other experts in applied community development studies department, who went through the instruments to evaluate contents. Their suggestions were used to make necessary adjustments and to improve the same before embarking on data collection.

3.6.2 Reliability

Reliability refers to the consistency that an instrument demonstrates when applied repeatedly under similar conditions (Kathuri & Pals, 1993). In order to establish if the interview schedule would yield same results at different occasions, the reliability of the instrument was ascertained. It was pretested in Elburgon Division of Molo District with women from similar age group. Elburgon division was purposively selected because of the similarity, availability

and accessibility of the agricultural products as in Njoro District. A sample of 20 women aged between forty and fifty five years was considered sufficient (Mugenda & Mugenda, 2003; Borg & Gall, 1989). Respondents were selected using purposive and snowball sampling methods because the same method was to be used in the main study. The reliability of the instrument was estimated using Cronbach's alpha coefficient which is a measure of internal consistency (Fraenkel & Wallen, 2000). A reliability coefficient of 0.87 was found and it was above the recommended 0.7. A high coefficient implies that there is consistency among items measuring the concept of interest (Mugenda & Mugenda, 2003). Adjustments were made to improve on the construction and flow of items.

3.7 Data Collection Procedure

The researcher visited Njoro District after obtaining approval from Egerton University Graduate School and a research permit from the National Council for Science & Technology (NCST) obtained to undertake the study. An official request was made from the District Commissioner (DC) Njoro, to access the women.

The researcher arranged and visited all four divisions of the district to meet the women respondents. The area sub-chiefs were contacted for permission on the ground. The women were met and interviewed individually, and before this was done, the intention of the research was explained fully to participants by the researcher. This was to help the few who could not understand English and to remove suspicion that could hinder the free release of information. The questions that were asked during the interviews included the various foods containing phytoestrogen consumed by the women.

Focus group members met on respective days for discussions. Focus group discussion is a form of qualitative research in which a group of people are asked about their perception, opinion, beliefs and attitudes towards a product, service, concept, advertisement, idea or packaging. Questions are asked in an interactive group setting where participants are free to talk to other group members. The questions are open- ended designed to gather opinions that are outside the scope of prepared questions. Focus groups provide opportunities for disclosure among similar others in a setting (Escalada, 2010). Before the discussions commenced, each member filled her details on a registration form which had a number. They were then given tags that showed only the number and this number corresponded to that on the registration form. There was a time of introduction, and during the discussions each

member quoted her number before contributing. The groups held discussions guided by a set of questions directed by the interviewer, and the purpose of these focus group discussions was to give in-depth information as members interacted and shared freely. A tape recorder was used to record the information but before using the recorder, a clear explanation was given to the participants and their consent to use the recorder sought. The groups held discussions in Store Mbili on 22 July, 2012 and Ng'ondu (outside Egerton Gate) on 29 July, 2012 at an interval of one week, on Sunday afternoons. The participants chose the time and venue as they felt Sunday afternoons were freer, Store mbili and Ng'ondu more convenient for them. Discussions provided an atmosphere where these members became aware of their common challenges and were able to come up with some suggestions of reaching and helping their friends and peers who come to them with their experiences. The discussions took two hours each.

3.8 Data Analysis

The data obtained through interview schedule was checked for correctness and coded. Coding of responses was based on scale of measurement for each item on the schedule. The data analysis was done using Statistical Package for Social Sciences (SPSS) version 17.0.

The descriptive statistics of frequencies, means, standard deviation, range and percentages were determined in analyzing the objectives of the study. The inferential statistics of spearman's rank rho (r_s) correlation coefficient and Chi-square test were used to analyze the influence of types of foods containing phytoestrogen consumed on the severity of perimenopausal symptoms and the influence of the frequency and duration of consumption of foods containing phytoestrogen on the severity of perimenopausal symptoms. The tests were carried out at 0.05 level of significance. The summary of data analysis is given in Table 2. Data from the focus group discussions were transcribed, thematic areas identified and was included in the study.

Table 2
Data Analysis Summary

Research Question	Independent Variable	Dependent Variable	Statistical Analysis
What is the level of awareness of women in Njoro District about perimenopause phase?			Percentages Means, Median, Standard deviation
What symptoms are experienced by women during perimenopausal phase in Njoro District?			Frequency, percentages, means
What types of foods containing phytoestrogen are being consumed by women in perimenopausal phase in Njoro District?			Frequency, percentages, means
What is the frequency and duration of consumption of the foods containing phytoestrogen by perimenopausal women in Njoro District?			Frequency, percentages Means, Median, mode
What is the influence of the types of foods containing phytoestrogen consumed on the severity of perimenopausal symptoms among women in perimenopausal phase in Njoro District?	• Types of foods containing phytoestrogen	Severity of perimenopausal symptoms • Low, Medium • High Very high	Spearman's correlation
What is the influence of frequency and duration of the consumption of foods containing phytoestrogen on the severity of perimenopausal symptoms among women in perimenopausal phase in Njoro District?	• Frequency of consumption • Duration of consumption	Severity of perimenopausal symptoms • Low, Medium • High	Spearman's correlation Chi-Square

CHAPTER FOUR

RESULTS AND DISCUSSSION

4.1 Introduction

This chapter presents results and discussions on the influence of foods containing phytoestrogen on perimenopausal symptoms. The chapter is divided into seven sections: (i) socio-economic characteristics of the respondents, (ii) level of awareness of perimenopausal symptoms, (iii) symptoms experienced by perimenopausal women, (iv) types of foods containing phytoestrogen consumed by perimenopausal women, (v) frequency and duration of consumption of foods containing phytoestrogen, (vi) influence of consumption of foods containing phytoestrogen on the severity of perimenopausal symptoms, (vii) influence of frequency and duration of consumption of foods containing phytoestrogen on the severity of perimenopausal symptoms.

4.2 Socio-economic Characteristics of the Respondents

This section covers the socio-economic characteristics of the respondents. The aspects covered included: marital status, age of respondents, number of the respondent's children, occupation, level of formal education and income levels.

4.2.1 Marital status of the respondents

The marital status of the women interviewed is summarized in Table 3. The marital status of the women may affect the income and the social wellbeing of the women. This may have an indirect input on the perimenopausal problems experienced by the women, which in turn may affect the relationship of these women with their spouses.

Table 3
Marital Status of the Respondents

Marital status	Frequency	Percent
Married	93	79
Never married	6	5
Divorced	6	5
Widowed	11	9
Separated	2	2
Total	118	100

The majority (79%) of the respondents in the study were married, 9% were widowed, 5% were divorced, 5% were single and 2% were separated.

According to Wambui (2006) and Henkel (2009), changes and symptoms experienced during perimenopause are likely to affect the women's relationships including marital relationship. This was evidenced in the study as many of participants reported strained sexual relationships in their marriages: One woman stated '' I hate that thing called sex, I feel my husband bothers me, in fact I have moved out of our bedroom, I sleep in the children's bedroom.'' Another woman reported ''I don't have interest in sex nowadays, but my husband doesn't understand, he forces me to have sex with him; he even beats me up when I refuse. I don't know what to do, I stay in this home because of my children.'' Yet another had to say ''I have lost interest in that 'thing' and when my husband approaches me and I say no, he beats me up and forces me to have sex with him, he even accuses me of having an affair outside.' These sentiments imply that, if not managed well, perimenopause period can create disharmony in marital relationships or can be a trying moment for married couples. Once a relationship is affected negatively in the home, this will be reflected outside including work output.

4.2.2 Respondents Age Distribution

The age of women is an important factor as the onset of the perimenopause symptoms are related to age. The age distribution of the women who were interviewed for this study is given in Figure 2.
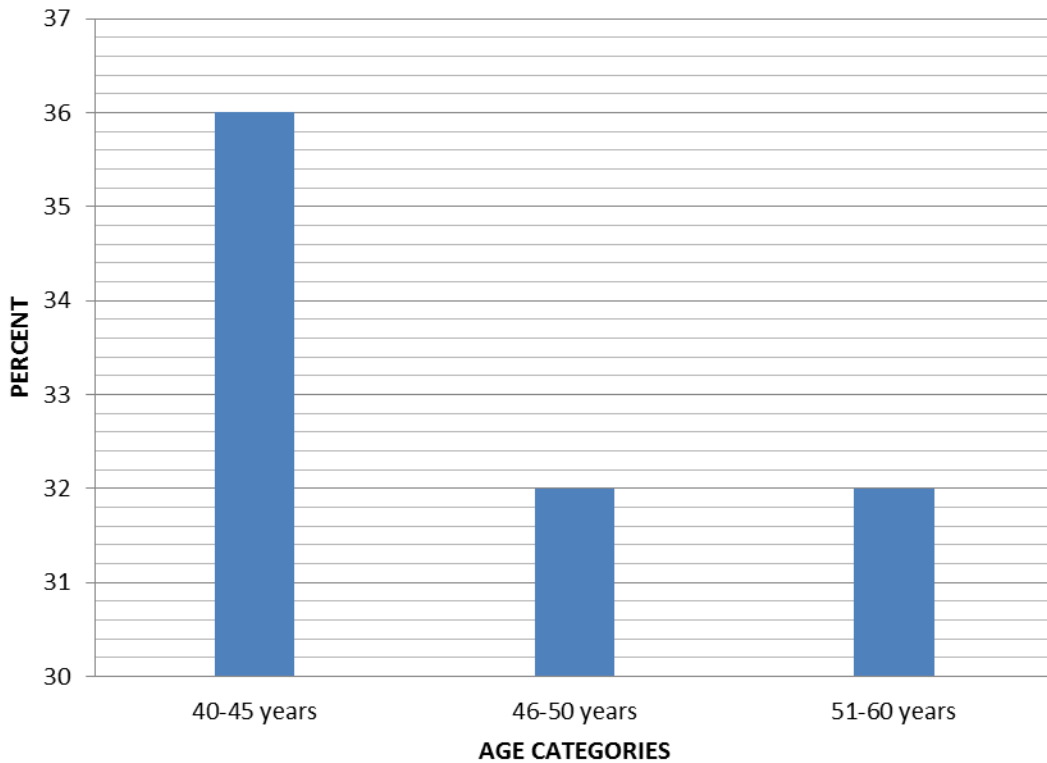
Mean 47.57, se 0.433, median 47, mode 54, minimum 40 maximum 55

Figure 2. Age Categories of the Respondents

The minimum age of the respondents in the study area was 40 years and the maximum was 55 years with a mean 47.57 (±0.433) years. The majority of the respondents (36 %) were in the 40 to 45 years category, followed by the 46 to 50 years category (32 %), and then the 51 to 55 years category (32%) as shown in Figure 2.

4.2.3 Age women first noticed changes in menstrual cycle

The age at which the women first noticed changes in their menstrual cycle was of interest to this study in that it marks the time of their transition stage. This age was determined by asking the respondents when they first started to notice change in their menstrual cycle, the results are given in Table 4.

Table 4

Age of the Onset of changes in the Menstrual Cycle

Age	Frequency	Percentages
40s	71	60.2
30s	35	30.5
50s	7	5.1
20s	5	4.2

The findings showed that majority of women 60.2% noticed the changes in their 40's while 30.5% started to experience the changes in their 30's. 5.1% started manifesting in their 50's and finally 4.2% started in their 20's. This is in agreement with Rajeev (2009) and Mandenhall (2009) who said that, most women start to experience the symptoms of perimenopause at the age of 40, but these symptoms can also manifest as early as 25 to as late as 70 years. The transitional perimenopause period lasts five to ten years, though the entire period can sometimes take up to thirteen years. http//www.drnorthrup.com

4.2.4 Number of the respondents' children

The number of children that were under the care of the women was significant to this study as it affected the kind of foods the women could afford and also the frequency in taking the phytoestrogen containing foods. This data was obtained by asking the women the number of children they had. The number of children belonging to the respondents is given in Table 5.

Table 5
Number of Children Belonging to the Respondents

Number	Frequency	Percent
No children	3	2.5
1-2 children	13	11.0
3-4 children	57	48.3
5-6 children	29	24.6
7-10	14	12.7
Above 10	1	0.84
Total	118	100.0

Mean 4.4; SE 0.219; median 4, mode 4, minimum 0 and maximum 16

The majority of the women (48 %) had between 3 and 4 children, while 25 % had between 5 and 6 children, 14 % had between 7 and ten children,11 % had between 1 and 2 children, 3 % had no children and 0.8% had 16 children as shown in Table 5.

It is evident that a portion of the women (13.6%) had more than 7 children, a number that was considered too high for the women to take care of and also consume enough of the phytoestrogen containing foods. This was a common phenomenon encountered during the Focus Group Discussions where the women reported that they could not afford to eat the phytoestrogen containing foods more often when they had also to feed a large number of children.

4.2.5 Occupation of the respondents

The main occupation of the surveyed women is given in Table 6. The occupation one is engaged in determines the income one gets and in most situations the type and kinds of foods one eats.

Table 6
Type of Occupation Undertaken by the Respondents

Occupation	Frequency	Percent
Self employed		
Farmer	39	33.1
Business	23	19.5
Tailoring	2	1.7
Formal employment		
Teacher	19	16.1
Civil servant	12	10.2
Working in University(clerks)	8	6.8
Cook in school	2	1.7
Nursing	1	0.8
Technologist	1	0.8
Secretary	1	0.8
Others		
Housewives	10	8.4
Total	118	100

The respondents identified eight (8) different types of activities that they were engaged in to earn a living, these included Farming, teaching, tailoring, civil servants, clerks, Timber sales, shopkeepers and housewives (Table 6). Their activities were grouped into three: (i) *self employment* accounting for 54.3 % of the respondents, where the women were engaged in business, farming, tailoring (ii) *formal employment* accounting for 37.2 % of the women. The formal activities included employment in the university as clerks, civil service, nursing, and secretarial and (iii) *others*, which included housewives.

The majority of the respondents (33 %) were engaged in Farming, while 20 % were engaged in Business, 16 % were teachers, 10 % were civil servants, 10% were working in the University and 8 % housewives. These findings show that women were engaged in diverse occupations hence the results of the study reflected the experiences of women in perimenopausal stage from various occupational contexts.

4.2.6 Level of formal education

The highest level of formal education that was attained by the women is given in Table 7. The individual's perception and understanding of issues is affected by the level of education one has attained, a fact this study considered.

Table 7

Highest Level of Education Attained by the Respondents

Level of formal education	Frequency	Percent
None	3	3
Adult education	1	1
Primary	33	28
Secondary	36	30
Post secondary training (college)	27	23
University	18	15
Total	118	100

The majority of the respondents (30 %) had attained secondary level of education, while 28 % had attained primary level of education 23 % had received post secondary training and only 3 % were illiterate (had not received any type of formal schooling) thus the majority of the respondents had attained some form of formal education (Table 7).

The study had originally proposed to use participants who had attained the secondary level of education and above, this was not the reality on the ground as some of the women aged 40 years and above in the communities of interest had not gone to school. This forced the researcher to practice flexibility in order to realize the number of respondents required for the study. It is, however, important to note that those respondents who had primary level of education and those who were illiterate could understand and relate to questions that were being asked with regard to perimenopausal phase.

4.2.7 Respondents monthly income

The monthly income levels of the respondents in this study are represented in Table 8. Income was included in this study as it has a bearing on the types of foods consumed by individuals.

Table 8

Monthly Income of the Respondents

Income Categories (K.Shs)	Frequency	Percent
0-5000	40	33.9
5001-10000	16	13.6
10000-15000	14	11.9
15000-20000	9	7.6
Above 20,000	34	28.8
Total	118	100

The households whose income was in the category of 0- 5,000 shillings were 34 %, while those earning between 5001-10000 were 14 %; between 10,000 – 15,000 category were 12 %; the 15,000- 20,000 category were 8 % and finally the above 20,000 income category were 29 %. It is important to note that the income reported by the respondents was net income and not gross income. Although the net income showed that the majority of the women had the capacity to purchase foods containing phytoestrogen, the responses showed that it was difficult for them to purchase these foods especially those who were not growing them, since there were other financial obligations to be met.

4.3 Level of Awareness among Women of Premenopausal phase

The objective number one of the study was to determine the level of awareness among women aged 40 and 55 years about the premenopausal phase.

The women were asked questions about perimenopausal phase to gauge their knowledge and awareness of the condition. The questions that were asked included questions on the knowledge of perimenopause, the type of symptoms experienced, and the type of action taken by the respondents.

Knowledge of Perimenopause phase (Condition)

The knowledge of perimenopause phase among the women was gauged by the use of the question; "Did you have prior knowledge of perimenopausal symptoms?" The responses by the women to the question are given in Figure 3.
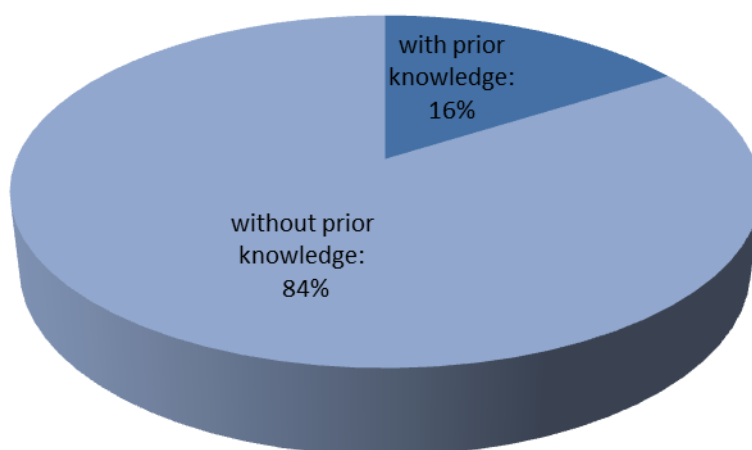
Figure 3. Knowledge of perimenopause

The women who had prior knowledge of what perimenopause was, accounted for 16% of the sample population. The source of their knowledge was the doctors whom they had visited; church fellowships and friends. The majority of the women had no idea what the term perimenopause was although they were experiencing and exhibiting the symptoms.

The lack of knowledge about perimenopause among the women was also reported during the Focus Group Discussions conducted in the study location. One woman asserted "I have never heard of it but you made me understand I am going through it" (FGD, 29 July 2012;

Ng'ondu). Another one explained "I had not even heard of it, I did not know until you came, this is when I knew I am going through it."(FGD, 22 July 2012; Store Mbili). These sentiments were common among the women. This affirms the assertion by Cherry & Cherry (1999) that most women are ignorant about this phase of life although they may be experiencing the symptoms associated with it.

Women Perceptions on Perimenopause Symptoms

Women had various perceptions about the symptoms they were experiencing. In answer to the question "What did you perceive the symptoms you were experiencing to be"? , eight different answers were given by the women as shown in Table 9.

Table 9
Perception of the Women on Perimenopausal Symptoms

Responses	Frequency	Percent
I was sick	53	44.9
Bewitched	8	6.8
Don't know	26	22.0
Going through menopause	19	16
Effects of contraceptives	2	1.7
Was normal	5	4.2
After effects of giving birth	2	1.7
Thought was pregnant	3	2.5
Total	118	100.0

Among the women who did not know about the perimenopause phase, 44.9% thought it was sickness, 22% didn't know what was wrong with them, 6.8% thought they were bewitched, 4.2% thought it must be something normal, 2.5% thought they were pregnant, 1.7% thought it was the result of using contraceptives, 1.7% thought it was the after effects of giving birth. Only 16% thought they were going through menopause. As shown in table 9, the women had different perceptions about perimenopausal symptoms and some sought medical help. This revealed some level of ignorance, and is in agreement with Cherry &Cherry (1999) that, because of the ignorance about perimenopausal phase, many women seek medical attention assuming that the symptoms experienced are as a result of some other ailments.

Action taken by the Women

The action taken by the women undergoing perimenopause and the response they received was also used to gauge their knowledge of the condition they were experiencing. Three questions which included: (i) did you see a Doctor for the symptoms you were experiencing? (ii) Did the doctor explain to you the condition of your problem? (iii) Were you given drugs for the complaints you had? were asked. The responses to these questions are given in Table 10.

Table 10

Action Taken and Response Received from Experts (Multiple Response in %)

Women Response	Percent
Visited a doctor	41
Doctor explained condition	8
Given drugs	23

Due to lack of knowledge on what they were experiencing, 41% of the women visited a health officer seeking treatment and 23% were given drugs. Only 8% were given an explanation about their condition. This implies that many doctors or health experts do not explain to the women about their condition further leaving them in a state of ignorance.

4.4 Perimenopausal Symptoms Experienced by the Women

This section relates to the study objective Number Two which was to establish the perimenopausal symptoms experienced by women during the perimenopausal phase. Data on types of perimenopausal symptoms and the number of symptoms experienced by women were used to address this objective.

4.4.1 Types of Perimenopausal Symptoms

The respondents were able to identify some of the different perimenopausal symptoms they were currently experiencing. The symptoms are listed in Table 11.

Table 11

Perimenopausal Symptoms Experienced by the Women (Multiple response in %)

Peri menopause symptom	Frequency	Percent
Memory problems (Loss of memory)	100	85
Changes in the menstrual cycle	99	84
Sudden change of moods	88	75
Hot flash	86	74
Lack of sleep at night	83	70
Easily Irritated	81	69
Fear of sex	66	56

n = 118

The symptoms most frequently experienced by the women included memory loss (85%), change in menstrual cycle (84%), sudden mood changes (75%), hot flashes (74%), lack of sleep at night (insomnia) (70%), being easily irritated (69%) and fear of sex (56%). The reported changes in menstrual cycle varied for the women with 42% experiencing skipped periods, 39% having short light periods, 36% experiencing heavy bleeding and 9% having long and less frequent periods.

These symptoms were confirmed during the Focus Group discussions. When asked whether they would freely share what they went through, some of the women had the following to say; one woman said; "there are things you don't want, you don't want to tell people, you get hot flashes" another one stated, "if you talk about what you are experiencing you get rejected.''

4.4.2 Number of Symptoms Experienced by Individuals

The number of perimenopausal related symptoms experienced by each individual was analysed and summarized in Table 12. The number of perimenopausal symptoms an individual experiences varies among different women and it was important for this study to determine whether the phenomenon was true for this group.

Table 12

Number of PM symptoms experienced by the respondents

Number of perimenopausal symptoms	Frequency	Percent
1	2	1.7
2	2	1.7
3	5	4.2
4	10	8.5
5	9	7.6
6	9	7.6
7	18	15.3
8	13	11.0
9	30	25.4
10	15	12.7
11	5	4.2
Total	118	100.0

Mean 7.3, median 8, mode 9

Table 12 shows that the majority of the respondents, 76% experienced more than six of the symptoms, while 24% experienced less than six symptoms.

The data shows that the number of perimenopausal symptoms experienced by the respondents varied among the women studied. This is in agreement with Rajeev (2009) and Mandenhall (2009), who stated that during this phase, the perimenopausal symptoms are experienced in different degrees by different women.

4.5 Types of Phytoestrogen containing Foods Consumed by the Respondents

This section relates to the study objective Number Three which sought to establish the type of foods containing phytoestrogen consumed by the women in perimenopausal phase. The foods containing phytoestrogen are important in alleviating the symptoms of perimenopause and this study was interested in finding out the types of these foods consumed by the women. The different food items containing phytoestrogen that were consumed by the perimenopausal women is given in Table 13.

Table 13

Type of food items and the percentage of pre-menopausal women consuming them (multiple response in %)

Type of foods	Frequency	Percent
Cabbages	116	98
Carrots	114	97
Onions	114	97
Tomatoes	113	96
Beans	112	95
Peas	109	92
Kales	108	92
Sweet potatoes	102	86
Oranges	100	85
Spinach	97	82
Mangoes	93	79
Groundnuts	88	75
Pears	79	67
pumpkins	71	60
Lentils	68	58
Pawpaw	63	53
Cucumber	51	43
Cowpeas	32	27
Soy drink	22	19
Weetabix	17	14
Cauliflower	15	13
Peanuts	11	9
Broccoli	11	9
Corn flakes	11	9
Oat meal	7	6
Soya beans	2	10
Soy flour	2	10
Soy milk	1	5
Soy meat	-	0

n=118

The different food items containing phytoestrogen were grouped into six groups as follows: (i) Soy products (that included soy beans, flour, milk and meat), (ii) Pulses (beans, peas, lentils, and cowpeas), (iii) nuts (peanuts and groundnuts), (iv) commercially processed cereals (oatmeal, cornflakes and weetabix), (v) vegetables (cabbage, carrots, kales, and sweet potatoes) and (vi) fruits (tomatoes, oranges, pears, pawpaw and mangoes).

The different food groups were not consumed equally by the women. The ones highly consumed by the women were vegetables followed by fruits and the pulses. The vegetables and pulses were highly consumed because they were readily available in the farms where most of the women grow them in their gardens. The women who do not grow the vegetables can access them cheaply from the market. Fruits are imported from other parts of the country, but are equally affordable. The least consumed foods were the commercially processed cereals. The main reason given by the women for the non-consumption of these foods was that they were expensive and they could not afford to buy them often. The other reasons given by some women were that they did not know these foods and yet others did not know how to prepare them. This affirms what Posner and Levine (1991) say that older population shows limited nutritional knowledge.

The other least consumed foods were soy and soy products and the nuts. The reason given for not consuming soy and soy product is that they did not like the taste and did not know how to prepare them. The women argued that if they knew their nutritional benefits they would have made an effort to consume them. The reason for not consuming the nuts was the price yet nuts are quickly gaining popularity with some of the women even now consuming them as snacks. Some of these (groundnuts/peanuts) are imported from other parts of the country and they are available and affordable as one is able to buy a small packet at 5 to 10 shillings. Sweet potatoes are also consumed. They are grown in small scale in the study location and the rest are imported from other parts of Kenya.

4.6 Frequency and Duration of Consumption of Phytoestrogen Containing Foods

This section corresponds to the study objective Number Four which was to establish the frequency and duration of the consumption of foods containing phytoestrogen among women in perimenopausal phase in Njoro District. It was important to establish this as the number of times and the length of time these foods are consumed have a direct influence on the perimenopause symptoms. Cherry & Cherry (1999) stated that the women in Eastern Countries eat these foods throughout their lives; hence they do not experience severe perimenopause symptoms. La Marca (2010) also explains that foods containing phytoestrogen consumed from childhood would protect against the perimenopausal symptoms.

4.6.1 Frequency of Consumption

The frequency of consumption of foods containing phytoestrogen by the women was operationalized as the number of food items consumed over a given period of time. This was developed as an index by combining the sum of all the scores for the different food items consumed multiplied by the number of times a food item was consumed in a week by the women. The descriptive statistics of the developed index are given in Table 14.

Table 14

Frequency of Consumption of Phytoestrogen Containing Foods by Women

Index scores	Frequency	Percent
1-10	3	2.5
11-20	53	44.9
21-30	45	38.1
31-40	13	11.0
41-50	2	1.7
51-56	2	1.7
Total	118	100.0

Mean 22.23, median 21, mode 19

The resulting index, frequency of consumption ranged between 5 and 56 with a mean of 22. The index can be explained in the following manner: (i). Low frequency as an index score of between 1 and 20, (ii) medium frequency as an index score of between 21 and 40. (iii). High frequency as an index score of between 41 and 56. Based on this description, the majority of women (49%) had a consumption frequency that can be described as medium frequency, 47% had low frequency and 4% had high frequency.

4.6.2 Duration of Consumption

The duration of consumption was operationalized as the length of period one had been consuming the phytoestrogen containing foods since they were born. The variable was developed from the women responses to the question "since when have you been consuming the phytoestrogen containing foods?" The answers to this question are given in figure 4.
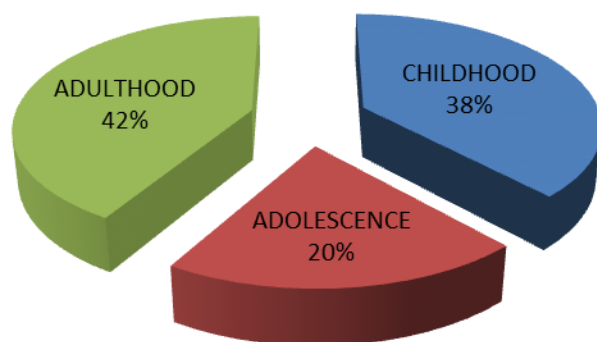
Figure 4. Duration of consumption by the women of the phytoestrogen containing foods

Figure 4 shows that the majority of the perimenopausal women in Njoro (42 %) started consuming the phytoestrogen containing foods when they were adults, while 38 % of them started consuming the foods from when they were young children and the remaining 20 % of the women started consuming the phytoestrogen containing foods when they were in their adolescent stage.

4.7 Influence of the Type of Foods Containing Phytoestrogen on the Severity of Perimenopausal Symptoms

This section refers to the study objective number five which was to determine the influence of the type of foods containing phytoestrogen consumed on the severity of perimenopausal symptoms among women in Njoro District. The analysis of the data first looked at the degree of severity of the symptoms experienced by the perimenopausal women and then compared the symptoms to the types of foods containing phytoestrogen that were consumed by the women.

4.7.1   Severity of perimenopausal symptoms experienced

The degree of severity of the premenopausal symptoms in women was based on an index, which measured the number of times a symptom (indicator) occurred per week. The index was determined by multiplying the number of times a particular symptom (indicator) occurred per week to each woman. All the indicators were then added together to form the index. The index scores ranged between 0 indicating that there were no perimenopausal symptoms to 21 indicating that the symptoms were very high or at the maximum severity. The mean was 9.30 (± 0.456) with a standard deviation of 4.955 and a mode of 6 and a

median of 9. The reliability of the index based on Cronbach's alpha was 0.87. The number and percentage of women and their corresponding index scores for the degree of severity of the symptoms are given in Table 15.

Table 15

The Index of Severity of Symptoms in a Week in Pre-Menopausal Women

Degree of severity of symptoms	Frequency	Percent
None	3	2.5
Low (1-5)	27	22.9
Medium (6-10)	42	35.6
High (11-15)	32	27.1
Very high (16-21)	14	11.9
Total	118	100.0

Mean 9.3, median 9.0, mode 6,

The majority of the women 36% had medium level of severity of the symptoms (index of 6-10) while 27 % had high level of severity (index of 11-15), and 23 % had low levels of severity of the symptoms (1-5), and finally 12 % had very high levels of the severity of the symptoms (16-21) as given in Table 16.

The same method was used to gauge the degree of severity of the perimenopausal symptoms in a month. The index was determined by multiplying the number of times a particular symptom occurred per month to each woman. All the scores for the indicators were added to form an index. The index ranged between 0 indicating that there were no symptoms to 21 indicating that the perimenopausal symptoms were very high or at the maximum severity within a given month. The mean of the index was 11.05 (+/-0.7) with the standard deviation of 6.224 and mode of 2 and median of 12. The descriptive statistics and the scores for the index, number and the corresponding percent of the affected women are summarized in Table 16.

Table 16

The Index of Severity of the Symptoms in Pre-Menopausal Women in a Month

Degree of severity of symptoms	Frequency	Percent
None	3	2.5
Low (1-5)	27	22.9
Medium (6-10)	42	35.6
High (11-15)	32	27.1
Very High (16-21)	14	11.9
Total	118	100.0

Mean 11.05, median 12, mode 2,

The majority of women, 36%, experienced medium level of severity of symptoms (index 6-10) while 27% expressed high level of severity of symptoms (index 11-15), and 23% had low level severity of the symptoms (1-5) and finally 12% had very high levels of severity of the symptoms(16-21). These results are in agreement with the conclusions made by Hasler (2001) and Henkel (2001), that some women will experience very severe symptoms while others will not even notice their entry into perimenopause.

The consistency in the reliability of the index based on Cronbachs alpha (0.87 for the week and 0.88 for the month) indicates that the severity of the perimenopausal symptoms was not affected by the length of time. These results agree with what Wambui (2006) found out that the symptoms may occur concurrently or sequentially.

4.7.2 Influence of type of foods on the severity of perimenopausal symptoms

The influence of type of foods containing phytoestrogen on the severity of perimenopausal symptoms was determined using Spearman's rho (r_s) rank correlation coefficient. This is a non-parametric method that has no restrictions on normality of the data (Mugenda & Mugenda, 2003). It was appropriate because the sample was not a normal sample. This was a special group of women who were selected using snowball method of sampling, and the variable changed to interval scale. The relationships were compared between the different type of food groups and the severity of the perimenopausal symptoms in women within a week and a month. The correlation matrix for the type of foods consumed by the women and the severity of the perimenopausal symptoms is given in Table 17.

Table 17

Correlation Matrix between the Type of Foods and the Severity of the Perimenopausal Symptoms

Type of foods consumed	Severity of symptoms per week	Severity of symptoms per month	Total severity of symptoms
Total food items consumed	-.115*	-.123*	-.127*
Soya group	-.070*	-.062*	-.070*
Pulses group	-.086*	-.064*	-.079*
Nuts group	-.177*	-.276[*]	-.247[*]
Cereals group	-.011*	-.111*	-.071*
Vegetable group	.007*	-.009*	-.002*
Fruits group	-.128*	-.060*	-.096*

* Correlation is significant at the 0.05 level

The type of foods consumed had an influence on severity of perimenopausal symptoms; irritability, memory loss, vaginal dryness, insomnia and hot flash. The value of Spearman's rho (r_s) correlation coefficient was negative (-) which was statistically significant ($p \leq 0.05$).

The implications of these results is that the more the consumption of food items containing phytoestrogen the less the severity of the perimenopausal symptoms. The nuts were found to have a higher influence ($r_{s\ =}$ -0.247) on severity of perimenopausal symptoms. The vegetable group was consumed more by the women but was found to have a lower influence (r_s= -0.002) on the severity of perimenopausal symptoms. This is likely to be caused by the cooking methods used by the women. The nutrients in the vegetables can be destroyed by overcooking and the women in the study location confirmed that it was normal (or culturally correct) for them to overcook the vegetables. In order for the foods to be effective in controlling the perimenopausal symptoms, a combination of various types of foods is necessary, so that they may complement each other to provide the required benefits. This is in line with what Cherry & Cherry (1999) says that women in Eastern countries experience less severe perimenopausal symptoms because they consume a Mediterranean type of diet which features a combined high intake of vegetables, legumes, fruits and cereals.

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4.8 Influence of the Frequency and Duration of Consumption of Foods Containing Phytoestrogen on the Severity of Perimenopausal Symptoms

This section corresponds to the sixth objective of the study which was to determine the influence of the frequency and duration of consumption of phytoestrogen containing foods by the women on the severity of perimenopausal symptoms. The objective was divided into two different types of analysis, one involving the frequency (section 4.8.1) and the other the duration (section 4.8.2) of consumption of the phytoestrogen containing foods by the women.

4.8.1 Influence of frequency of consumption of phytoestrogen containing foods on severity of the perimenopausal symptoms

The relationship between the frequency of consumption of the foods containing phytoestrogen and the severity of the perimenopausal symptoms was determined using Spearman's rho (r_s) rank correlation coefficient.

The variable used for the frequency of consumption of foods containing phytoestrogen was the index developed in section 4.7.1 of this thesis, while the variable used for the severity of the perimenopause symptoms was the index developed in section 4.7.2 and referred to as the severity of symptoms per week and per month. The correlation matrix between the severity of the symptoms and the frequency of consumption is given in Table 18.

Table 18

Correlation between Frequency of Consumption of the Food Items Containing Phytoestrogen and the Severity of Perimenopausal Symptoms in Perimenopausal Women

	Severity of symptoms per week	Severity of symptoms per month	Total severity of symptoms	Total frequency food items consumed
Total severity of symptoms per week	1			
Total severity of symptoms per month	.758[*]	1		
Total severity of symptoms	.922[*]	.951[*]	1	
Total frequency food items consumed	-.031*	-.094*	-.117*	1

* Correlation is significant at the 0.05 level

It was found that the frequency of consumption of foods containing phytoestrogen was inversely related to severity of perimenopausal symptoms. The value of Spearman's rho (r_s) correlation coefficient was negative (-0.117) and was statistically significant ($p \leq 0.05$). This implies that the higher the frequency of consumption of the phytoestrogen containing foods the lower was the perimenopausal symptoms experienced by the women.

4.8.2 Influence of the duration of consumption of foods containing phytoestrogen on severity of the symptoms

The influence of the duration of consumption of the phytoestrogen containing foods by the women on the severity of the perimenopausal symptoms was determined using descriptive statistics and the chi-square test for independence. The analysis used the variable discussed in section 4.6.2, duration of consumption of phytoestrogen containing foods, and section 4.7.1, severity of perimenopausal symptoms.

The results are given in Table 19.

Table 19

Cross-tabulation of the duration of consumption and the severity of symptoms

Severity of symptoms (categories)	Duration of consumption of foods						Total	
	Childhood		Adolescence		Adulthood			
	No	%	No	%	No	%	No	%
Low (1-5)	27	22.9	0	0	0	0	27	22.9
Medium (6-10)	13	11.0	15	12.7	1	0.8	29	24.6
High (11-15)	4	3.4	8	6.8	33	28.0	45	38.1
Very high (16-21)	1	0.8	1	0.8	15	12.7	17	14.4
Total	45	38.1	24	20.3	49	41.5	118	100

 The women started consuming foods containing phytoestrogen at various stages in their lives, 38% started consuming these foods during childhood, 20% during adolescence and 42% during adulthood.

For women who started consuming the phytoestrogen containing foods from childhood, majority (33.9 %) experienced low to medium levels of severity of symptoms, while for women who started consuming phytoestrogen containing foods from their adulthood, 40.7 % experienced between high and very high levels of severity of perimenopausal symptoms.

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These results indicate that the severity of the symptoms is affected by the duration one had been consuming the phytoestrogen containing foods.

The influence of the duration of consumption of foods containing phytoestrogen on severity of perimenopausal symptoms was determined using chi-square test. A chi-square test for independence for three (3) different categories (childhood, adolescence and adulthood) which signified the duration of use of the phytoestrogen containing foods, showed that the three periods were significantly related to different levels of severity of perimenopausal symptoms (chi-square 104.830, df = 6, p $\leq$ = 0.05). It can therefore be concluded that the longer the duration of consumption of phytoestrogen containing foods the less the severity of the perimenopausal symptoms in women. These findings are in line with Cherry and Cherry (1999)'s arguments that, women in Eastern countries consume these foods throughout their lives and so do not suffer much perimenopausal symptoms as others do. Similarly, La Marca (2010) also points out that phytoestrogen rich diet started in childhood would be able to protect a woman from perimenopausal disorders.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1. Introduction

This chapter contains the summary, conclusions drawn and recommendations of the study. Suggestions for further research are also included.

The purpose of this study was to determine the influence of the consumption of foods containing phytoestrogen on perimenopausal symptoms among women aged 40-55 years in Njoro District. The study utilized the descriptive survey design and one hundred and eighteen (118) women were sampled through snowball sampling technique. Interviews and focus group discussions were used to collect the primary data from the targeted sample. Data was analyzed using both descriptive and inferential statistics.

5.2. Summary of the Study Findings

5.2.1 Socio-economic Characteristics of the Respondents

The study found that the majority of the respondents (79%) were married, the rest were widowed, divorced, separated or single. Majority of the respondents were in the age category of 40-45. Most of these women (60.2%) noticed the changes in their menstrual cycle in their 40's, while others in their 50s and a few in their 20s. The number of children born to each ranged from none to 16 with majority (48.3%) having between 3 and 4 children. The women had various types of occupation including self employment (54%), formal employment and a few housewives. Most of them had achieved some formal level of education. The majority had at least some monthly income that they indicated enabled them to get the foods for consumption.

5.2.2 Level of Awareness of Perimenopausal Phase among Women in Njoro District

The study indicated that the level of awareness about perimenopausal phase was low among women in Njoro District. Most women (84%) indicated they had no knowledge of perimenopausal phase. Due to lack of this knowledge, many women perceived the symptoms during this phase as arising from sickness (44.9%) leading them to seek medical attention. Others perceived the symptoms as arising from witchcraft, pregnancy, contraceptives and effects of child birth.

5.2.3. Perimenopausal Symptoms Experienced by the Women

The women were able to identify some of the symptoms they were experiencing with most of them experiencing memory loss, changes in menstrual cycle, mood swings, hot flashes and lack sleep at night. The number of symptoms experienced by the women ranged between 1 and11 with the average number being 7. Majority (76%) of the women experienced more than six of the symptoms. The findings showed that the number of perimenopausal symptoms experienced varied among the women.

5.2.4. Types of Phytoestrogen Containing Foods consumed by the Respondents

It was established that the foods containing phytoestrogen were consumed by the women in Njoro District. The foods were grouped into six groups: Soy and soy products including soy beans, soy flour, soy milk and soy meat; Pulses including beans, peas, lentils and cow peas; Nuts including peanuts and groundnuts; Commercially processed cereals including oatmeal, cornflakes and weeterbix; Vegetables including cabbages, carrots, kales and sweet potatoes; and Fruits including pears, mangoes and oranges. The most consumed categories were vegetables, fruits and pulses while the least consumed categories were commercially processed cereals, soy products and nuts as they were expensive and the respondents did not know how to prepare them particularly the soy products.

5.2.5. Frequency and Duration of Consumption of Phytoestrogen containing Foods

The study showed that the frequency of consumption, which was operationalized as the number of food items consumed over a given period of time, ranged between 5 and 56. This was divided into three categories of low, medium and high frequencies. The majority of the woman (49%) had a medium consumption of phytoestrogen containing foods, while 47% and 4% had low and high frequency of consumption respectively. The duration of consumption of foods containing phytoestrogen also varied among the women with majority of them having started consuming the foods at adulthood. The others started during their adolescent stage and in childhood.

5.2.6 Influence of the type of Foods containing Phytoestrogen on the Severity of Perimenopausal Symptoms

In this study severity was measured using an index which measured the number of times a symptom occurred per week and per month. In both cases the study found that foods containing phytoestrogen had significant influence on the severity of perimenopausal

symptoms among women in Njoro district.This influence was,however,dependant on the frequency of consumption of phytoestrogen containing foods such that the more the women consumed these foods, the less was the severity of perimenopausal symptoms. The duration of consumption of these foods also had an influence on the severity of perimenopausal symptoms. The longer the period that the women had consumed foods containing phytoestrogen, the less severe were the perimenopausal symptoms experienced.

5.3. Conclusion

From the study findings, the following conclusions were made:-

Women in Njoro District experience perimenopausal phase. However, many are ignorant or are not aware of this phase, leading them to attribute various causes to the symptoms experienced during this phase. Some visit medical facilities seeking for answers, however, their situation is not improved as the health providers they visit do not explain to them their situation. Hence there is need for awareness creation to the women about the perimenopausal phase. When women are aware of what is going on with their bodies, they are likely to control the emotions created at this stage, thus improving their relationships with members of their families and other members of the community.

From the study findings, it can also be concluded that the foods containing phytoestrogen have an influence on perimenopausal symptoms. However, the frequency and duration of consumption of these foods will influence the severity of perimenopausal symptoms experienced by the women. Further a combined consumption of various types of foods containing phytoestrogen is necessary if these foods are to effectively reduce severity of perimenopausal symptoms. The implication is that in creating awareness among women about the importance of foods containing phytoestrogen in reducing the severity of perimenopausal symptoms, it is important that the frequency of consumption as well as the time one starts consuming these foods is stressed. This will empower women to take control over their lives during this difficult phase in their lifespan.

5.4. Recommendations

1. Perimenopause period is a phase of life that is inevitable hence there is need for a deliberate awareness creation about this phase. This can be done by health institutions, churches and in schools.

2. Support groups forum for women should be formed and the women encouraged to join them so that they can share their experiences with others. The government through ministry of agriculture should encourage farmers to grow and consume foods containing phytoestrogen.

3. Health professionals, social workers and nutritionists should educate the women on the value of consuming and properly cooking the foods containing phytoestrogen. This can be done to women groups and women visiting the health facilities.

5.5 Suggestion for Further Research

1. More study should be done on foods that can actually replace the hormones administered in form of drugs especially the soy and soy products and the nuts.

2. This study can be replicated in other areas of the country.

3. More Studies should be carried out on the exact quantity that should be consumed and frequency of consumption, so as to effectively control the perimenopausal symptoms.

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APPENDICES

APPENDIX A

INTERVIEW SCHEDULE FOR PERI-MENOPAUSAL WOMEN

(FOR WOMEN 40-55 YEARS)

SECTION A: PERSONAL DATA   RESPONDENT

NUMBER_____

                    NAME OF DIVISION_____

1. Which year were you born? _____

.

2. Marital status

    A. Married   ( )

    B. Single   ( )

    C. Divorced   ( )

    D. Widowed   ( )

3. Do you have children?

       Yes ( ) No ( )

4. If the answer is yes, how many children do you have?

    A. Male_____

    B. Female_____

5. When did you give birth to your last born child?_____

6. What is your level of education?

    A. Secondary   ( )

    B. College   ( )

    C. University   ( )

    D. Other_____

    7. Have you any occupation?   Yes ( ) No ( )

If yes specify…………………………………………………………………………..

8. What is your income bracket per month? (Please put a tick on the most appropriate).

Between 0-5000( ), 5001-10,000 ( ) 10001-15000( ), 15001-20000( ) 20001 and above( ).

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SECTION B: PERIMENOPAUSE EXPERIENCE

9. Have you ever heard the word perimenopause before? Yes ( ) No ( )

10. If the answer to question 10 is yes, please explain briefly what you know about perimenopause? ....

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

In the following question please answer YES or NO and if your answer is yes state how often

11. Have you ever experienced any of these symptoms?

Perimenopausal symptoms	Yes	No	Number of times			Comments
			Very often	Often	Less often	
Hot Flash. Do you experience sudden sensation of heat which spreads throughout the body, then followed by chills?						
Do you have problems with sleep at night?						
Do you get easily irritated?						
Do you have problems with your memory						
Do you experience heavy sweating at night that sometimes soaks your clothes?						
Have you lost interest or fear of sexual intercourse with your partner? Why?_____ How does this affect your relationship with your spouse?_____						
Do you suffer from sudden mood changes that are unexplained?						
Are you experiencing some crying spell without explanation?						

12. Have you experienced some changes in your menstrual cycle?   Yes ( ) No ( )

If yes indicate changes that you have experienced.

    A. Short and light periods   ( )

    B. Heavy bleeding   ( )

    C. Skipped period   ( )

    D. Long and less frequent periods ( )

13. At what age did you start noticing these changes?

    A. 20's ( )

    B. 30's ( )

    C. 40's ( )

    D. 50's. ( )

14. Do these symptoms interfere with your daily activities?

    Yes ( )   No ( )

If yes briefly explain how...

……………………………………………………………………………………………….

15. When the symptoms were occurring, did you suspect you were experiencing perimenopause? Yes ( ) No ( )

16. Since you started experiencing these changes has this affected the way you relate with others within and outside your family?

    Yes ( ) No ( )

17. If yes to what extent has it affected your relationships?

  A. Not badly   ( )

  B. badly   ( )

  C. very badly   ( )

  D. Others specify………………………………………………………………………….

18. What thought crossed your mind when you first experienced these changes?

  A. I am very sick   ( )

  B. I am bewitched ( )

  C. I don't know   ( )

  D. Others specify………………………………………………………………………….

19. Have you visited a doctor as a result of the changes you are experiencing? Yes ( ) No ( )

20. If yes were there any drugs prescribed for you?

   Yes ( ) No ( )

21. Did the doctor explain to you what the drugs will treat?

   Yes ( ) No ( )

 If no did the doctor explained to you what is wrong?

22. Have you ever been admitted to hospital as a result of these changes?

   Yes ( ) No ( )

If yes what can you say about your health?

23. Do you remember your mother going through such changes?

   A. Yes   ( )

   B. No   ( )

   C. Don't know ( )

24. Do you know any other way by which these symptoms can be managed?

   Yes ( ) No ( )

If yes, please explain………………………………………………………………………..
…………………………………………………………………………………………………

25. Do you lead a life full of pressure or tension?

   Yes ( ) No ( )

26. In your opinion what do you think has contributed to this pressure or tension?

    A. Empty nest   ( ) B. Financial pressure ( )

    C. Ill family members ( )   D. Career pressure   ( )

    E. Spousal issues.   ( ) F. Others specify………………………………………

SECTION C: FOODS CONSUMED

27. From the food list below, please indicate how often you consume each of the following food items in the last six months (put a tick where appropriate)

Key: 5-Daily, 4-Twice a week, 3- Once a week, 2-Ocaasional, 1- Never

Food Item	Quantity	5	4	3	2	1
Soy beans, Soy milk, Soy flour, Soy drink, Soy meat,						
Pulses, Beans, Peas, Lentils, Cowpeas						
Nuts; Pea nuts, ground nuts						
Breakfast cereal: oatmeal, cornflakes, wheetabix						
Vegetables: Cabbage, Carrots, Kales, Sweet potatoes.						
Cucumber, Onions, Broccoli, Cauliflower						
Fruits: Tomatoes, Oranges, Pears, Pawpaw, Mangoes						

28. If you are not consuming any of the above, what are your reasons?

    A. Expensive   ( )

    B. Not Available ( )

    C. Do not know how to cook   ( )

    D. Do not know the foods. ( )

    E. Others specify……………………………………………………………………….

29. For how long have consumed these foods?

   From childhood.( ) adolescence . ( ) adulthood. ( )

   At what level of adulthood did you start consuming the foods?

30. Are these foods available in this area?   Yes ( ) No ( )

31. Do you have a problem with the preparation of these foods? Yes ( ) No ( )

32. Are you involved in any kind of exercise? Yes ( ) No. ( )

 If yes, what type? ....

How often? Once a week ( ), Twice a week ( ), Thrice week ( ), More than thrice a week ( ), Occasionally ( ).

APPENDIX B: FOCUS GROUP GUIDING QUESTIONS

Have you heard of Perimenopause Stage of life?

What do you think it is and what does it entail?

How do you feel about it?

What are the cultural perceptions of Perimenopause?

What are the changes / symptoms women experience during this stage? How do they deal with these changes of Perimenopause?
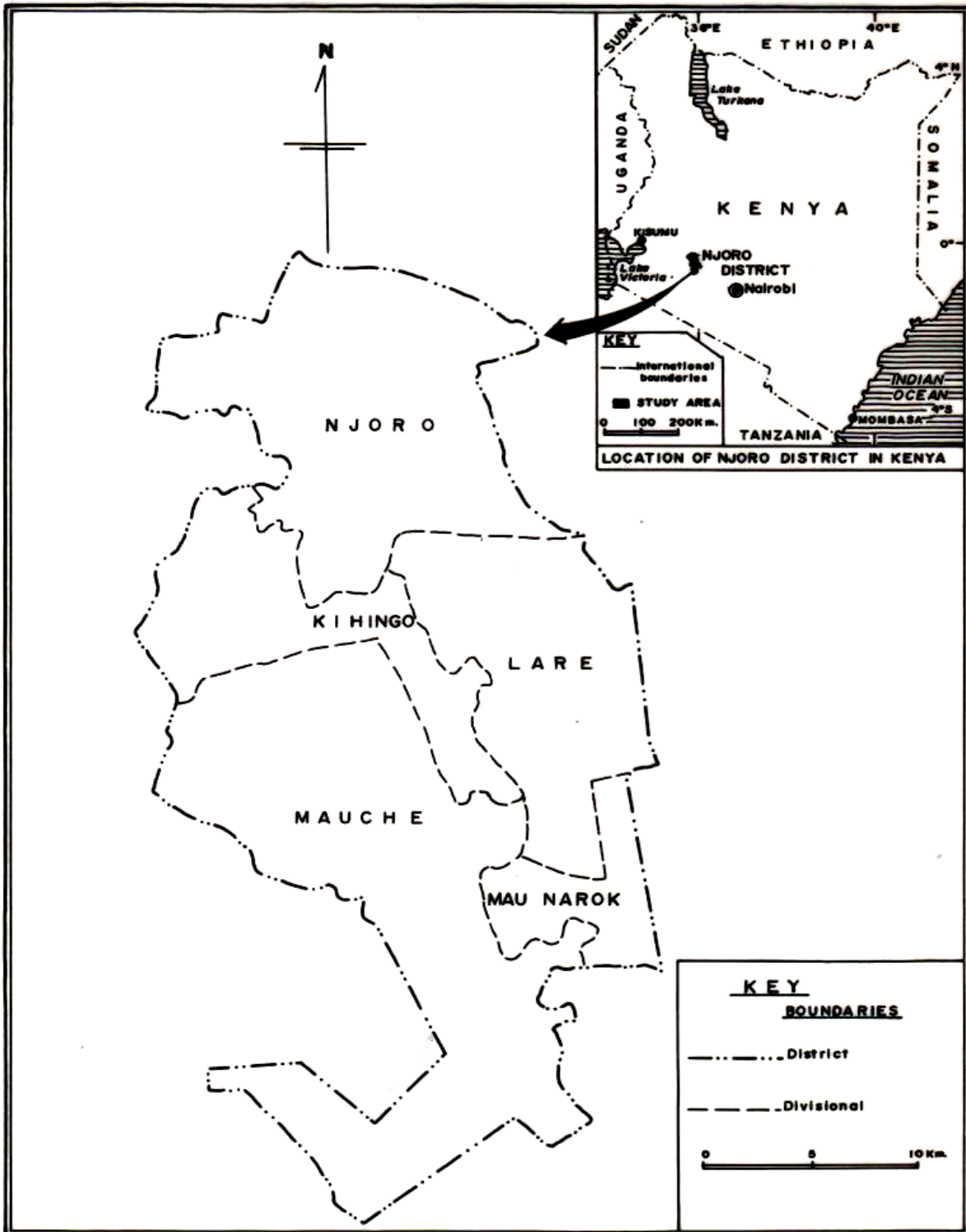
Do women feel at ease discussing perimenopause and its underlying symptoms?

Are there particular foods that when consumed can help in managing the changes and symptoms?

Is information about perimenopause available and accessible?

END

APPENDIX C: MAP OF STUDY LOCATION

Source: Geography Department, Egerton University.

APPENDIX D: RESEARCH PERMIT

PAGE 2

THIS IS TO CERTIFY THAT:
Prof./Dr./Mr./Mrs./Miss/Institution
Damaris Adoyo Achar
of (Address) Egerton University
P.O.Box 536-20115, Egerton.
has been permitted to conduct research in

Location
Njoro   District
Rift Valley   Province

on the topic: Influence of the consumption of
foods containing phytoestrogen on severity of
perimenopausal symptoms among women in
Njoro District, Kenya.

for a period ending: 31st May, 2013.

PAGE 3
Research Permit No. NCST/RCD/12A/012/17
Date of issue   18th December, 2012
Fee received   KSH. 1,000

Applicant's   Secretary
Signature   National Council for
                     Science & Technology

CONDITIONS

1. You must report to the District Commissioner and the District Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit.
2. Government Officers will not be interviewed with-out prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2)/ four(4) bound copies of your final report for Kenyans and non-Kenyans respectively.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice

REPUBLIC OF KENYA

RESEARCH CLEARANCE
PERMIT

GPK6055t3mt10/2011   (CONDITIONS-see back page)

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