BIOPSYCHOSOCIAL EFFECTS OF CANCER TREATMENT ON SEXUAL HEALTH AMONG CANCER SURVIVORS AT KENYATTA NATIONAL HOSPITAL

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DECLARATION

I Patrick Mwai Mwangi of registration number H56/40559/2021 hereby declare that this thesis is my original work and has not been presented in any other institution for the award of credit.

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DEDICATION

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I dedicate this work to my wife Beth and daughters Elsie and Elaine for their support and encouragement during the study.

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First, I thank the almighty God for granting me the strength, courage, wisdom, determination, and good health to complete this thesis successfully.

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ABBREVIATIONS AND ACRONYMS

ACS: American Cancer Society

CTC: Cancer Treatment Center

EORTC: European Organization for Research and Treatment of Cancer

ERC: Ethics review committee

FDG: Focused group discussion.

GLOBOCAN: The Global Cancer Observatory

HCPs: Healthcare providers

IARC: International Agency for Research on Cancer

KIIs: Key informant interview.

KNH: Kenyatta National Hospital

KNH-UoN ERC: Kenyatta National Hospital-University of Nairobi Ethics and Research Committee.

NACOSTI: National Commission for Science, Technology and innovation.

RSH: Reproductive and Sexual Health.

SPSS: statistical package for data analysis

UoN: University of Nairobi

WHO: World Health Organization.

OPERATIONAL DEFINITION OF TERMS

Biological effects of cancer treatment: In this study, biological effects were signs or symptoms associated with sexual functioning associated with sexual health including low libido, erectile dysfunction, vaginal dryness, vaginal atrophy, pain, and urine and fecal incontinence.

Cancer survivors: In this study, cancer survivors were participants aged between 18 years to 60 years who have undergone and finished any form of cancer treatment.

Psychological effects of cancer treatment: These were mental health problems experienced after cancer treatment that may negatively affect sexual health like body image, self-esteem, sexual satisfaction, and self-confidence.

Sexuality: it's an expression of thoughts, fantasies, desires, beliefs, attitudes, values, behaviors, practices, roles, and relationships related to sex and it's influenced by the interaction of biological, psychological, social, economic, political, cultural, legal, historical, religious and spiritual factors

Sexual Health: Involves being able to perform sexual functions without any physical, emotional, or social hindrances like low libido, erectile dysfunction, vaginal dryness, pain, social isolation, loss of femininity and masculinity, impaired body image and low self-esteem

Sociological effects of cancer treatment: These were social problems that arise as a result of cancer treatment and may affect sexual health like marital strain, social support, cultural isolation, and loss of employment.

ABSTRACT

The incidence of cancer is on the increase. The number of cancer survivors is also on the increase due to early diagnosis, advancement in treatment, and an increase in an aging population. Cancer treatment has significant negative effects on cancer survivors' sexual health. These effects have a long-term effect on the sexual health and sexuality of the survivors. Sexual health and sexuality are complex and sensitive topics that both healthcare providers and patients do not want to talk about. Sexual health remains a neglected topic despite the number of cancer survivors increasing in the last decade. There is a need to address this topic to bridge the gap and also address the unmet needs on sexual health among cancer survivors.

The purpose of this study was to assess the biopsychosocial effects of cancer treatment on sexual health among cancer survivors at KNH. It was a mixed study. It involved quantitative and qualitative data collection methods. Data was collected over a period of 4 weeks at KNH-CTC among cancer survivors. A modified EORTC SHQ-22 questionnaire was used to collect quantitative data from 216 participants who were systematically sampled. Two Focus Group Discussions were held where the participants were sampled randomly. The study population was patients attending cancer treatment clinics after completion of cancer treatment. Data was collected over a period of one month, Monday to Friday, using self-administered questionnaires and Focused Group Discussions. Consent was obtained from the participants before they participated in the study. Pretesting was done at the haemato-oncology clinic at KNH. The quantitative data collected was analyzed using SPSS version 28. Chi square and one-way anova analysis were also used to analyze the data. Results from the focused group discussions was used to support the quantitative data. Approval and clearance to carry out the study were sought from the KNH-UoN review and ethics board, NACOSTI, and the Kenyatta National Hospital Department of Medical Research.

Most of the participants in the study were females (69.4%) and the most reported conditions were breast cancer (30.6%) and cervical cancer (23.1%). 203 (94%) of the participants reported to have received chemotherapy as part of their treatment. 62% of the participants reported that their sexual health had been affected after cancer treatment. tiredness was the most reported biological effect by 89.2% of the participants while in psychological effects low self-esteem was the most reported by 75.5% of the participants. Males reported more biological effects (mean total of 3.58) as compared to females (mean total of 3.43). in psychological effects, an inverse observation was made, in females the mean was 4.97 compared to males mean of 4.59. a chi square test showed men (36.4%) were more anxious of sexual activity compared to women at (33.1%) after cancer treatment. further analysis showed both biological and psychological effects of cancer treatment on sexual health increased as age increased.

Cancer survivors at Kenyatta National Hospital experience biological, psychological, and sociological distress after cancer treatment that affects their sexual health and quality of life. There is need for psychosexual education to address changes in sexuality, effects of cancer treatment, sex therapy, and couple therapy as a part of post-cancer care and follow-up.

CHAPTER ONE: INTRODUCTION

1.1 Introduction

The problem statement, the study objectives, the study questions, the study justification, and the study significance are all presented in this chapter. It also provides information about the study's background.

1.2 Background of the study

Cancer is a chronic disease and a leading cause of death in middle- and low-income countries. It is projected that in the next two decades, the incidence of cancer will increase by about 70% (Ramlachan et al., 2022). In the last three decades there has been a significant increase in the survival rates of most types of cancer, and cancer in general, resulting in an increased interest among cancer survivors. The global survival rate has doubled from 24% to 50% (Quaresma., 2015).

The incidence of cancer worldwide in 2020 was 19 million cases with 1.1 million cases in Africa. There were 42,000 new cancer cases in Kenya (Sung et al, 2021 & Globocan, 2020). Cancer mortality worldwide in 2020 was 9.95 million cases, 700,000 of the cases were reported in Africa while in Kenya, there were 27, 000 deaths (Sung et al, & Globocan, 2020). The 5-years prevalent cases worldwide in 2020 were 50.5 million cases, 2.16 million (4.3%) of these cases were in Africa and 82,620 of these cases were in Kenya (Sung et al, & Globocan, 2020).

In the United States, there were 18.1 million cancer survivors at the beginning of 2019 in the United States and it is estimated this will increase to 22.1 million survivors by 2030 (Falk et al., 2020).

Most incurable cancers have become curable as a result of advances in biomedical research and cancer treatment and increase in an aging population (Ramlachan et al., 2022). Due to this, the number of cancer survivors' is on the increase (Miller et al., 2022). Sexual health is one of the greatest concerns for cancer survivors, as it affects fertility and has a distressing impact on the lives of young cancer survivors who wish to have children (Xie et al., 2022). Other effects of cancer treatment on sexual health include one's body image, identity, sexual intercourse, erectile

dysfunction, sterility, romantic and sexual attraction, and sexual thoughts and fantasies (Kartz., 2016).

Sexual health and sexuality are regarded as basic elements of human life, regardless of one's marital status. One's ability to be sexually active, have a proper sexual function and being sexually attractive are stated by cancer survivors as measures of cure from cancer. (Kowalczyk et al., 2019)

Sexual health is impacted by the interaction of various factors including spiritual, social, biological, cultural, psychological, economic, cultural and religious factors It includes one's sex, intimacy, eroticism, gender identity and roles, sexual orientation, pleasure and reproduction' (Schnitzler et al., 2023).

Cancer and cancer treatment affect sexual health both directly and indirectly. Sexual dysfunctions among cancer survivors are common yet most of them are undiagnosed and untreated. Poor sexual health cancer results in emotional and social health as well (Vegunta et al., 2022). Different modalities used for cancer treatment like hormonal therapy, surgery, radiation and chemotherapy can affect one's sexual function and sexual health. This is a negative effect of cancer treatment that most cancer survivors have to live with (Bober et al., 2016).

The majority of cancer-related sexual issues typically start with physiological harm, but they can also have an impact on a patient's coping mechanisms and the quality of their sex life. The fact that more than half of cancer patients do not recall discussing sex or fertility with their caregivers is one barrier to treatment for those who are being treated for the disease. 2019 (Schover)

It is crucial to adopt an integrative bio-psycho-social approach to comprehend and address this fundamental aspect of the experience of cancer survivors because, in addition to physiologic factors, sexuality also comprises psychological, relational, social, and cultural elements (Bober et al., 2016). Among women cancer survivors, dyspareunia, poor libido, dry vagina, low self-esteem, lack of sexual desire, and unfavorable body image were some of the identified side effects of cancer treatment. This had an impact on their sexual health and function (Dizon et al., 2014).

1.3 Problem statement

The number of cancer survivors has tremendously increased in the last decade. This is attributed to early detection of cancer, advances in cancer treatment, and increase in the aging population (Miller et al., 2022). Cancer and cancer treatment leads to distressing long-lasting adverse effects that negatively impact the survivor's sexual health (Obora et al., 2022).

Despite many cancer survivors having good prognoses, they have to live with the effects of cancer and its treatment for many years. The most commonly cited problem is sexual health. (Miller et al., 2022 & Dizon et al, 2014). Studies of cancer survivors indicate that they value sexuality as crucial in life and how it is affected should be discussed with the healthcare providers (Dizon et al., 2014). There is limited attention to sexual health during and following cancer treatment in the clinical setting. Both healthcare providers find discussing sexual health uncomfortable and as a result do not prioritize it (Lehmann et al., 2022). In Kenya, there has been few studies carried out on effects of cancer treatment on sexual health.

A study done in South Africa attributed the loss of sexual function after cancer treatment to poor quality of life and psychological well-being. Patients reported they were not provided with sexual education and counseling on the effects of cancer and its treatment (Phahlamohlaka et al., 2018). Cultural and traditional practices in African settings hindered discussions on sexual issues between cancer survivors and HCPs (Ramlachan et al., 2022).

KENYAN SITUATION

This study sought to determine the biopsychosocial effects of cancer treatment on sexual health among cancer survivors at the Kenyatta National Hospital. An understanding of these effects will help come up with interventions that will help improve the sexual health of cancer survivors in Kenya.

1.4 Research questions

1.4.1 Specific question

What are the biopsychosocial effects of cancer treatment on sexual health among cancer survivors at Kenyatta National Hospital, Cancer Treatment Center?

1.4.2 Research Questions

1. What are the biological effects of cancer treatment on the sexual health of cancer survivors at Kenyatta National Hospital?
2. What are the psychological effects of cancer treatment on sexual health among cancer survivors at Kenyatta National Hospital?
3. What are the sociological effects of cancer treatment on sexual health among cancer survivors at Kenyatta National Hospital?

1.5 study objective

1.5.1 Broad objective

To assess the biopsychosocial effects of cancer treatment on sexual health among cancer survivors attending Kenyatta National Hospital.

1.5.2 Specific objectives

1. To assess the biological factors affecting the sexual health of cancer survivors at Kenyatta National Hospital.
2. To assess the psychological effects of cancer treatment on sexual health among cancer survivors at Kenyatta National Hospital.
3. To assess the sociological effects of cancer treatment on sexual health among cancer survivors at Kenyatta National Hospital.

1.6 Justification of the study

Cancer survivors are at high risk of sexual dysfunction especially those with cancer that involves sexual and pelvic organs. Hormonal treatment also affects sexual functions in both males and females. Despite cancer treatment affecting sexual health of cancer survivors, there is lack of communication on these effects between the patients and the healthcare providers. In most settings sexual health is not incorporated to be part of cancer care to provide comprehensive care (Katz *et al*., 2022).

Identifying and understanding the reproductive and sexual health needs of cancer survivors forms an important part of planning their healthcare and survivorship care (Lisy *et al*., 2019)

Sexual health in cancer patients has been studied mostly in developed countries. Despite the increasing number of cancer survivors in Africa, few studies have been carried out. In Kenya, few studies have been carried out on sexual function in cancer patients. Sexual health is a complex topic as it not only involves sexual functions but also the psychosocial factors that may affect cancer survivors. Therefore, there is a need to look at sexual health comprehensively (Nimbi et al, 2022., Banaei et al, 2023 & Thomas et al, 2016)

This study intended to determine the biopsychosocial effects of cancer treatment on sexual health among survivors by documenting their experiences and how they affect their sexual health. Addressing potential problems during the course of the disease may give the patient and the healthcare provider the confidence to discuss such issues earlier rather than later.

1.7 Significance of the study.

This study's results will add to the knowledge and literature on the biopsychosocial effects of cancer treatment among cancer survivors in Kenya. The study may be beneficial to patients as they may open up about some of the sexual problems they have gone through and have not been able to talk about them.

The study may be beneficial to HCPs as they may get to understand the psychosocial concerns that cancer survivors experience and how they affect their sexual health. It may provide information on some barriers to quality sexual health and how to overcome these barriers.

Lastly, the findings of the study may provide information to Kenyatta National Hospital and the government of Kenya on the need for sex education for HCPs to be able to address the patient's concerns and improve the quality of sexual health among cancer survivors.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter covers literature on the sexual health of cancer survivors. The review focuses on the association of sociodemographic, biological factors, psychological, and social factors to sexual health among cancer survivors. The gaps are also identified.

2.2 Overview of sexual health

The WHO states that sexual health is more than simply the absence of disease, malfunction, or infirmity; it is a condition of physical, emotional, mental, and social well-being towards sexuality. As a result, it is crucial to understand how vital sexual health is to overall wellbeing. In order to enjoy pleasurable and secure sexual experiences free from coercion, prejudice, and violence, as well as a positive and respectful view on sexuality and sexual relationships, one must have sexual health (Schnitzler et al., 2023).

Sexual health and sexuality are complex topics. Sexual health involves physical, physiological, psychological, social, and cultural issues about sexuality (Higano et al., 2016. Sexual health is an important aspect of life for cancer survivors after cancer diagnosis and treatment for cancer and has recently become an area of concern. As a result, discussing sexual health with patients should be a regular part of dialogues before, throughout, and especially after cancer treatment. Healthcare professionals and cancer survivors should be prepared to address sexual health issues and enhance the sexual health of cancer survivors utilizing the resources at their disposal.

Sexuality is an indicator of the quality of life as it incorporates biological, psychological, and social aspects of life. Cancer survivors may suffer from sexual dysfunctions like loss of libido, poor arousal, and lack of organism and resolution (Mishra et al., 2021)

In the last two decades, the number of cancer survivors has tremendously increased. This is attributable to a rise in the elderly population as well as improvements in cancer therapy and early detection. Cancer survivors must deal with the aftereffects of the disease and its treatment, which may result in functional, physical, sexual, and cognitive impairments in addition to various psychological and financial effects related to the illness (Miller *et al*., 2022)

Cancer and cancer treatment affect cancer survivors' quality of life. This is through physical, emotional, psychological, social, and spiritual aspects. The body functions are altered, the body image changes, and sexual functioning and fertility are impaired all of which impact negatively on their sexual health (Katz, 2016).

Physical tissues required for sexual function may be harmed by malignancies of the testicles, prostate, penile, bladder, or gynecological origin, as well as by surgical procedures. Sexual functions may be hampered by hormonal alterations or changes in hormones brought on by chemotherapeutic, hormonal, or surgical treatment. Changes in body image may also lead to low self-esteem, cancer-related exhaustion, pain, or mental issues, or stresses in relationships with sexual partners, which are crucial to cancer survivors' sexual health (Lang-Rollin & Berberich., 2018)

Sexual function was associated with socio-demographic factors like the patient's age, patient's level of education, and employment status. Patient's body image, social support, and type and stage of cancer were also associated with sexual functions (Obora et al., 2022)

Early or late impacts of cancer treatment are possible. Normal tissue is not usually spared by surgical intervention, therapeutic radiation, hormone therapy, targeted therapy, or chemotherapy delivery. The majority of survivors have organ systems with improper structure and operation. Some symptoms impede or interfere with a survivor's ability to fully engage in daily duties at work, at home, in the community, or during leisure activities (Miller *et al*., 2022). These signs and symptoms are all indicators of physiologic decline and may raise the chance of developing chronic illnesses, admission to the hospital, and death. (Miller *et al*., 2022)

2.3 Cancer treatment modalities

According to Mishra et al., 2021, surgery on the reproductive system in females leads to reduced sex drive, lack of lubrication, pain during sexual intercourse, and vaginal atrophy. For male patients who underwent prostatectomy, erectile dysfunction is one of the side effects and this has a negative influence on their sexuality their sexual relations, their manhood, and their sex life. Other effects of prostatectomy were incontinence and sterility in young men (Schantz Laursen, 2017)

Surgery can have a direct effect on the anatomy of the organs like in mastectomy, hysterectomy, and prostatectomy. It can also cause changes in hormone production like in oophorectomy (Dizon et al., 2014).

Women who had undergone oophorectomy experienced reduced or no estrogen production which causes early menopause symptoms like vaginal atrophy and dryness, reduced vaginal elasticity, and vaginal thinning (Bleibel & Ngugen, 2023). Patients who had undergone colorectal cancer treatment and had ostomies as part of the treatment reported a risk of sexual difficulties than those without ostomies (Thygø et al., 2019)

According to Shankar et al., (2017), chemotherapy-related and induced menopause was associated with sexual dysfunction and sexual inactivity, especially in premenopausal women. Issues related to sexual health like sexual dysfunction affect up to 60% of cancer patients who receive chemotherapy and are rarely addressed in women as compared to male survivors (Heyne et al., 2021).

Premenopausal cancer survivors who receive hormonal therapies such letrozole and anastrozole experience menopausal symptoms, while postmenopausal cancer survivors report an increase in menopausal symptoms that also significantly impact sexual function. Males getting hormone therapy reported gynecomastia, hot flashes, night sweats, and loss of libido (Miller *et al*., 2022).

2.4 Sexual health in cancer survivors

In a study conducted on gynecological cancer survivors in a tertiary hospital in Kenya by Obora et al., 2022, 85% of the respondents had sexual dysfunction. Sexual dysfunction increases with an increase in the stage of cancer.

Sexual health in cancer survivors integrates normal sexual health and reproductive health. Sexual health problems in cancer survivors can occur before cancer diagnosis, at the time of diagnosis, or as a side effect of cancer treatment. Different cancer treatment modalities affect sexual functioning and sexual health (Barbara et al., 2017).

Female patients with gynecological cancers treated with radiation to the pelvic region experienced significant sexual problems related to vaginal agglutination, vaginal fibrosis, stenosis, and loss of lubrication (Bober *et al*., 2014). Patients of reproductive age treated with pelvic radiation suffered

from impairment of the ovaries or testes as a result of exposure to radiation which may lead to infertility or sterility (Miller *et al.,* 2022). Additionally, survivors may experience infertility, sexual dysfunction, bladder dysfunction, and low body image. Compared to survivors of other cancers, colon cancer survivors have a higher rate of sexual dysfunction, particularly among patients who have a permanent ostomy (Miller et al., 2022).

2.5 Biological Effects of cancer treatment on sexual health

In a mixed study to explore sexual functional differences between cancer survivors and controls, there was no difference in the level of sexual activity. However, both male and female cancer survivors reported dissatisfaction with their sex lives at 30.9% for males and 18.2% for females (Jackson et al., 2016). In a study carried out in Australia in 2015, participants reported reduced sexual activity, frequency, and satisfaction with all types of cancer treatments. The most reported effects of cancer treatment were vaginal dryness and erectile dysfunction (Ussher et al., 2015).

Cancer survivors seem to age faster, appear weak after cancer treatment, and may need assistance to perform activities of daily living as compared to non-cancer patients. This accelerated aging is attributed to DNA damage, stem cell exhaustion, cellular senescence, epigenetic alterations, and telomere attritions. This is associated with comorbidities and chronic organ failure and negative impact on sexual health (Wang et al., 2021).

Chemotherapies like alkylating agents in high doses and radiation to the pelvic region can affect the ovaries or testes thus affecting cancer survivors' fertility. Surgery on reproductive organs in both males and females can also cause irreversible changes that may result in infertility (Humbert et al., 2023). In a study by Nelson & Levine (2023), the prevalence of infertility in male cancer survivors was 46% and the risk factors included chemotherapies like bleomycin and alkylating agents, testicular radiation and surgery of genital tract organs.

Sexual health is negatively impacted for a long time by cancer and cancer treatments. Following cancer treatment, it's typical to experience issues with arousal, poor sexual desire, low libido, genital pain, decreased lubrication, trouble getting an erection, and painful intercourse. Young survivors who are experiencing the emergence of their psychosexual identity and romantic relationships are more likely to experience these issues (Olsson et al., 2018).

Many cancer treatment modalities result in sexual dysfunctions like treatment-induced menopause, reduced libido, and arousal, vaginal atrophy, and rigidity, infertility, and sterility. Some of these effects are short-term and others are long-term. Use of lubricants, moisturizers, dilators, pelvic floor physical therapy, and cognitive behavior therapy (Huffman *et al*., 2016)

A decrease in estrogen level is associated with vaginal atrophy and reduced lubrication in females. Radiation to reproductive organs, oophorectomy, and primary ovarian suppression lead to decreased estrogen levels (Bleibel, 2022).

2.6 Psychological effects of cancer treatment on sexual health

According to Wang & Feng, (2022), there exists a reciprocal effect between psychosocial factors and biological outcomes. Psychosocial factors affect physical and mental well-being and also practical concerns, disease recurrence, and prognosis. Emotions, perceptions, and beliefs of the cancer survivors.

In a study carried out in the USA in 2014 on cancer survivors, 90% of them reported emotional concerns after cancer treatment compared to 67% who had physical concerns. The most affected were females, young survivors, those who received radical cancer treatment, and those who did not have insurance coverage. Sexual activity, functioning, and intimacy were found to be related to sexual satisfaction in a study by Heyne et al. (2023). Cancer patients who experienced social support ($r = 0.16$, p .001), no concomitant conditions, no pain, no nausea, and no vomiting, and higher levels of sexual satisfaction.

In a study conducted in Nigeria, mastectomy caused 67.9% of women to feel insufficient as women and caused 79.0% of them to have fewer intimate relationships. Additionally, 3 years after receiving breast cancer therapy, 38.3% of participants reported being divorced or splitting up with their husbands (Ramlachan et al, 2022).

A study by Paterson et al, (2016) on women who had been treated for breast cancer identified femininity, satisfaction with appearance, socialization, and one's mental image as affected after cancer treatment, especially after surgery. Body image encapsulates the attitudes, feelings, and impressions that people have about their bodies. Other variables that may affect body image include socioeconomic status, cancer-related variables, patient partners, treatment modalities,

quality of life, and sexual function (Kowalczyk et al., 2019). Cognitive impairment, chronic fatigue, and sexual dysfunction are all possible side effects of breast cancer treatment (Miller et al., 2022).

Cancer and cancer treatment alter sexuality among cancer survivors and this plays an important role in influencing the psychological response of the survivors. The uncertainty, fears, anxiety, worries, and sadness associated with cancer affect their emotions as well as sexual health (Grassi *et al*., 2017). Many survivors are reluctant to share sexual issues and concerns, even with HCP, because doing so can lead to feelings of guilt and shame (Zangeneh et al., 2023)

2.7 Sociological effects of cancer treatment on sexual health

After cancer treatment, young cancer survivors failed to achieve biological development and this affected their sexual identity. This in turn had a negative impact on their romantic relationships. Some anticipated rejection while others were depressed (Wirtz et al., 2023). Religion and spirituality are important aspects of the lives of cancer survivors. They can help them find meaning in their illness, comfort in unforeseen dangers, and support from the community. It can also provide hope, comfort, and other emotional benefits. They can also affect mental, social, and physical outcomes all of which have an impact on sexual health (Almaraz et al., 2022)

Spirituality can be a way of consolation when faced with difficult life circumstances or experiences. Spiritual practices like prayers, scriptures, or attending religious meetings can help one cope. Others experience spiritual crossroads as they may see the disease as a punishment from God and may develop anger towards God and become distant from the religious community when faced with diseases like cancer (Nkoana et al., 2021)

In a study carried out on women in Iran, sexual desire, femininity, and attractiveness were directly related to breasts. Mastectomy led to a loss of self-concept and loss of mental body image resulting in fear of rejection, disappointment, and sexual dysfunction (Zangeneh *et al*., 2022). In Brazil, a study showed that having all body organs, especially breasts was part of their culture, and lack of or damage to these parts especially in women leads to sexual dysfunctions (Zangeneh et al.,2022). In some cultures, it was considered taboo to discuss sexual issues thus it remains a problem to many cancer survivors as they cannot discuss sexual problems with HCP, and if the HCP discussed

sexual health, they fear they would invade the patient's privacy and cause more psychological harm (Krouwel et al., 2020)

Some societies consider cancer a dangerous disease and patients may be concerned or fear their spouses may reject them. Some patients may feel inadequate or unattractive or feel they may not satisfy their spouses (Zangeneh *et al*., 2022) Cancer diagnosis in some societies is equated to death. The survivors are more concerned about their overall health, the well-being of their families, their jobs, and survival than the aspect of sexual health (Tetteh, 2017)

Cancer and its treatment affect the survivors' social and interpersonal aspects of life. The feeling of closeness in the family can be hampered by the disease process especially if there is a sense of isolation, feelings of loneliness and abandonment, problems in returning to work, or stigmatization are common issues that cancer patients report, (Grassi *et al*, 2017)

According to Higano et al, (2016), cancer survivors' partners should be included in post-treatment management, especially in patients with erectile dysfunction. The provision of care and information may be hampered as a result of the patients' reports of a lack of communication and support from HCPs on sexual health (Williams et al., 2021). Patients and HCPs lack the experience in talking about topics related to sexual and reproductive health. This is attributed to a lack of patients' awareness of treatment effects and HCPs lack of knowledge in sexual and reproductive health treatment options (Chen et al., 2022)

According to Canzona et al (2016), sexuality is a sensitive topic that most people are uncomfortable discussing. HCPs also reported being uncomfortable having sexual discussions with their patients and this may hinder the interaction between them.

According to Albers et al. (2020), healthcare professionals frequently ignore the subject or provide patients with insufficient counseling regarding the sexual implications of their disease or cancer treatment, claiming among their justifications a lack of time, knowledge, experience, and resources for support. Despite this, clinical practice and research both lack adequate training for healthcare professionals on the cultural, relational, and psychological variables affecting sexuality among cancer survivors.

2.8 Theoretical framework

In this study, the theoretical framework is grounded on Roy's adaptation model. This framework was adopted from a model on sexual satisfaction in a study conducted in South Korea on sexual satisfaction on patients with stomas. This affected their sexual activities and satisfaction (Park & Kim, 2009)

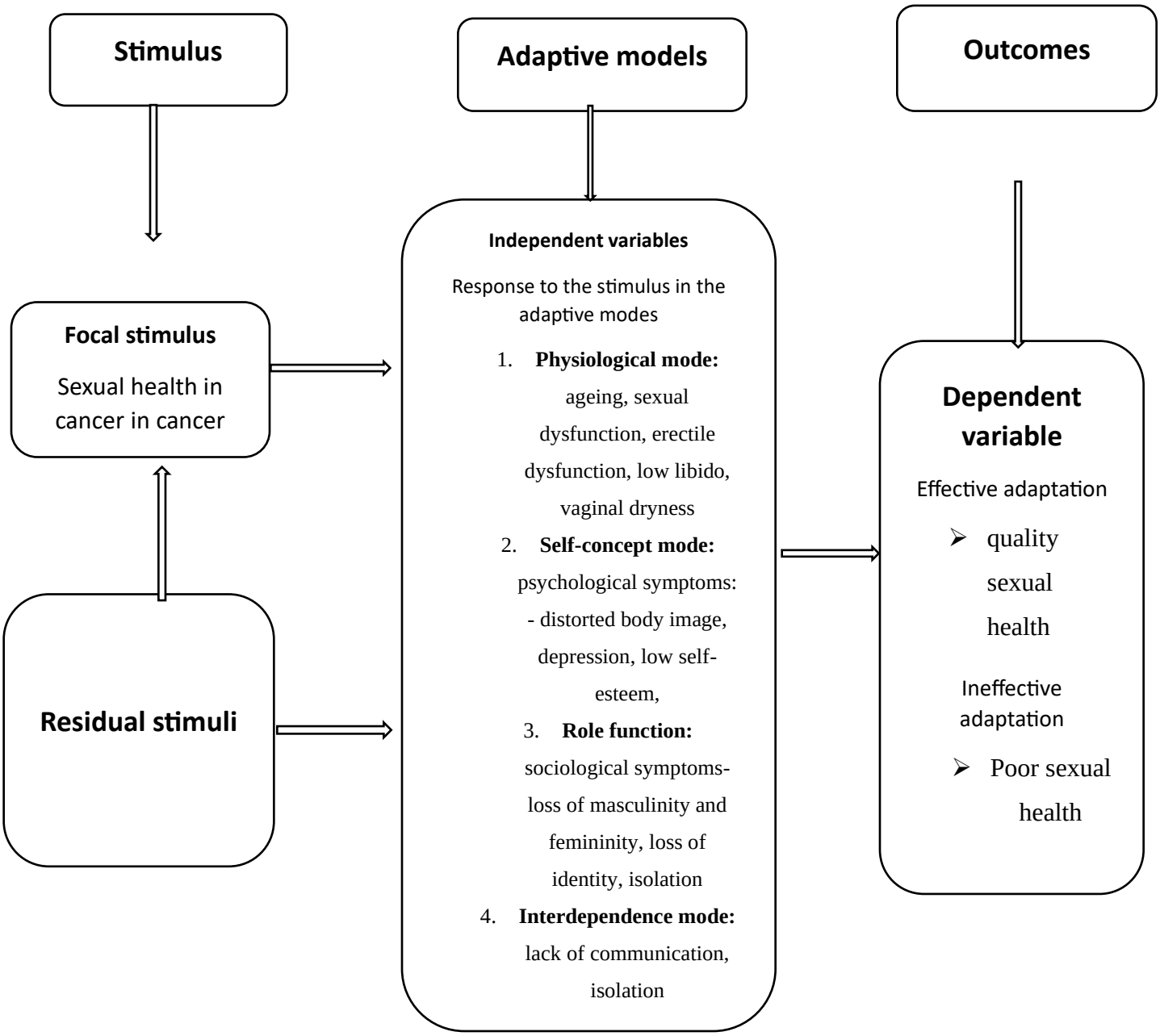

Figure 1: Theoretical framework (adapted from Howard-Anderson et al., 2012)

2.9. Conceptual framework

It shows the interrelationship between the different study variables in this study.

2.9.1 A model of Biopsychosocial (BPS) effects on sexual health.

In order to provide patients with complete care and therapy, the biopsychosocial model considers the interaction of biological, psychological, and social components. The management of the patient by a multidisciplinary team is necessary for this strategy to be effective. (Nimbi et al., 2021). The biopsychosocial model, considered the gold standard in sexology, provided the conceptual basis for this study.

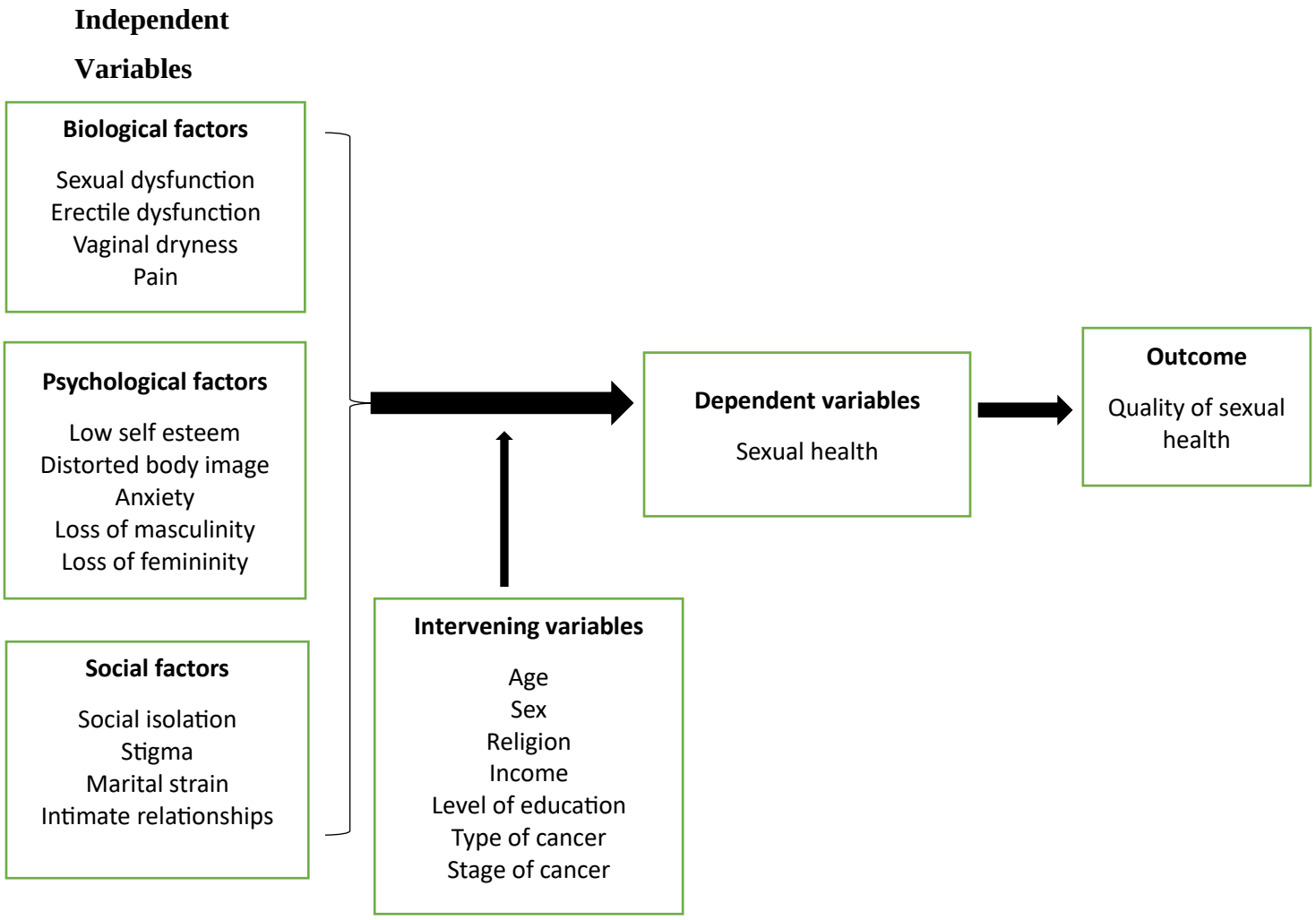

Figure 2: Conceptual framework

According to the cancer survivor adaptation (CSA) paradigm, getting used to being a cancer survivor is a lifelong process with three interdependent parts. According to Naus et al. (2009), personal context includes cancer survivorship as well as individual traits in the biological, psychological, and social domains. Cancer survivors can improve their quality of life by using Roy's adaptation model to assist them deal with the challenges that arise as a result of their diagnosis and treatment, according to Ursavaş et al (2016).

Roy's adaption model will be applied in this investigation. Roy's adaption model offers holistic care by taking into account a person's physiologic mode, self-concept mode, role function mode, and interdependence mode. Because a person is constantly interacting with their environment, this model serves as an illustration of the biopsychosocial model. According to Ursavaş et al. (2014), physiologic side effects from cancer treatment are mostly responsible for the psychosocial impacts that cancer survivors endure. Sexual health will be the main contextual stimulus, while all other internal or external stimuli that can have an impact on the survivors' sexual health will be the focal stimulus.

2.10 Study variables

2.10.1 Independent variables

The biological, psychological, and societal consequences of cancer treatment on survivors' sexual health are the independent variables in this study. Low libido, lethargy and exhaustion, erectile dysfunction, pain during sex, amenorrhea, vaginal dryness, and urinary and fecal incontinence are among the biological impacts of cancer treatment on sexual health. Sexual satisfaction, anxiety, altered body image, low self-esteem, and loss of masculinity and femininity are just a few of the psychological repercussions of cancer treatment on sexual health. The urge to have children after cancer treatment, marital conflict, and gender-based violence are some sociological impacts of cancer therapy that were examined in this study.

2.10.2 Dependent variable

Sexual health is the dependent variable in this study. It depends on the changes in independent variable which in this study are the biological, psychological and sociological effects of cancer treatment among cancer survivors.

2.10.3 Intervening variables

The type of cancer and the stage of the disease, the type of cancer treatment (surgery, chemotherapy, radiotherapy), the time since the end of cancer treatment, the level of income, and the level of education are all influencing factors in this study. It has an impact on the correlation between an independent variable and a dependent variable.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter includes the research methodology. Outlined in this chapter are the study design, area of study, study population, determination of the sample size, sampling method used, how the data was collected, tools used to collect data, how the collected data was interpreted, and presented, and the ethical considerations during the study.

3.2 Study design

The study used a mixed method design to examine cancer survivors who visited Kenyatta National Hospital's adult oncology outpatient clinic. This was a mixed study. Both quantitative and qualitative designs of data collection were used to collect data in this study. This design was chosen because it allowed for data collection from a sizable subject pool and comparisons between various groups.

3.3 Study area

The study was carried out at Kenyatta National Hospital, Cancer Treatment Center. As the largest referral hospital in East and Central Africa, Kenyatta National Hospital provides patients from East, Southern, and Central Africa with high-quality, specialized medical care. It serves as both a teaching and referral hospital for different universities and medical colleges. It is situated at Upper Hill area, about 3.5 kilometers west of Nairobi's central business center, and is easily reachable by both public and private transportation. It has more than 6,000 employees. It was established as a 40-bed native civil hospital in the year 1900. Currently, the hospital has a bed capacity of 2400, and annually, it treats 800,000 outpatients in addition to the 950,000 patients it admits. Over 50 wards, 82 intensive care beds, 24 outpatient clinics, 26 theaters, and an Accident & Emergency department are all present at the facility.

The adult oncology outpatient clinic at KNH, CTC is a comprehensive cancer treatment facility. An average of 550 patients are reviewed every month. The clinic is operated by consultant radio-oncologists from KNH and UoN, medical registrars from UoN, medical officers, nurses (including

pain and palliative care), social workers, nutritionists, medical records officers, and patient navigators.

It was a suitable area for the study as it offers most treatment modalities including surgery, chemotherapy, radiotherapy, brachytherapy, hormonal therapy, targeted therapy, and palliative care to cancer patients and survivors. The average number of cancer survivors reviewed in a month at CTC is between 450- 600 in a month.

3.4 Study population

The study population was cancer survivors aged between 18-55 years attending the adult outpatient clinic at KNH, Cancer treatment center. These population was chosen because they were within the reproductive age group. These were patients who had completed cancer treatment either surgery, chemotherapy, radiotherapy and hormonal treatment or combinations. The patients were attending their scheduled clinics for review.

3.5 Selection of participants

The participants for the study were selected using the following criteria:

3.5.1 Inclusion criteria

1. Patients aged 18 years to 55 years.
2. All patients aged 18 to 55 years who consented to participate in the study
3. Patients who could comprehend the purpose of the study

3.5.2 Exclusion criteria

1. Those who did not give consent.
2. Those aged less than 18 years and over 55 years.
3. Those who were too sick to participate or answer questions

3.6 Sample size determination

Fisher formula was used to calculate the sample size for the study by estimating the minimum sample size at a 95% confidence interval, Fisher et al, 1998.

$$n = \frac{Z^2 pq}{d^2}$$

Where:

n = the sample size where the population is greater than 10,000

z = standard deviation at the desired confidence interval. In this study, it will be taken at 95%. Z value- 1.96.

p = proportion of the population with the desired characteristic. Since the prevalence of cancer survivors in Kenya is unknown, p will be 0.5.

q = proportion of the population with the undesired characteristics. q= 1-p, which is 100-50=50%.

d= degree of precision, which will be taken at 5%

Substituting figures in the above equation

$$n = \frac{Z^2 pq}{d^2}$$

$$n = \frac{1.96^2 \; x \; 0.5 \; x \; 0.5}{0.05^2}$$

$$n = 384.16 \approx 384$$

The following table (1) shows the number of patients who visited the CTC outpatient clinic for review after receiving cancer treatment between March 2022- October 2022

Table 1: Number of outpatients who visited KNH-CTC clinic March – October 2022

Month	March	April	May	June	July	August	September	October
Male	137	133	185	147	170	160	190	243
Female	329	333	402	372	402	376	453	366
Total	466	466	587	519	572	536	643	609
Average	33	29	37	31	36	28	38	41

Source: CTC outpatient linac patients registry.

On average there were 466-643 patients reviewed per month between March and September 2022. The monthly average patients' number was 501.

Since the number of cancer survivors visiting KNH per year is less than 10, 000, the sample size was calculated using the Yamane (1967) formula

$$n_f = \frac{n}{1 + \frac{n}{N}}$$

Where:

nf: the desired sample size when the population is less than 10,000

n: the desired sample size when the population is more than 10,000

N: the study population

$$n_f = \frac{384}{1 + \frac{384}{501}}$$

n_f = 216.38

n_f = 216

The calculated sample size was 216 participants.

Therefore, 216 participants were recruited to participate in the study. For the focused group discussion, simple random samling was used to recruit the participants.

3.7 Sampling procedure

3.7.1 Quantitative study

The study targets were cancer survivors attending CTC adult's outpatient clinic. A systematic sampling procedure was used to sample participants where every alternate participant was approached to participate. This sampling procedure was used because the study population was assumed to have the same characteristics. The researcher identified participants after they registered for review. Systemic sampling was used to select the 2nd participant at the health

information desk which was arrived at by dividing the average population seen in one month which is 549/226 (the sample size) = 2

Each participant who was eligible to participate in the study was approached and the purpose of the study explained to them. After consent to participate in the study, the participants were issued with the questionnaire. They were given time to fill the questionnaire. Those with questions were encouraged to ask or seek clarification. For those who were not able to read or write the researcher and the research assistants assisted them to fill in the questionnaire. This was done as the participants awaited to be reviewed by the physician. This process was repeated until the desired sample size was achieved.

For the qualitative study, a simple random sampling technique was used to select the participants. Ten numbers were written from number one to ten. The participants then choose the numbers randomly and those who choose even numbers were selected as participants for the Focus group discussion. The study and the study procedure were explained to them including a recording of the interview and those who consented were recruited to participate in the focus group discussion.

3.8 Data collection

3.8.1 Data collection tool

Quantitative information was gathered via a self-administered questionnaire. Both open-ended and closed-ended questions were included in the study. The questionnaire was divided into four sections: section 1 contained demographic information about the patients, section 2 contained questions about the biological effects of cancer treatment, section 3 contained questions about the psychological effects of treatment, and section 4 contained questions about the social effects of cancer treatment on the survivors' sexual health. A modified version of the EORTC SHQ-22 survey was used. Eortc.org was asked for permission to utilize the questionnaire, and permission was granted.

EORTC SHQ-22 is a questionnaire that was developed to assess sexual health issues experienced by cancer patients and survivors. Patients and HCPs from 13 countries with different backgrounds were involved in developing the questionnaire which has 22 items. The questionnaire may help

patients present their sexual concerns, help in addressing sexual problems from cancer and its treatment, and also improve the communication between patients and HCPs (Greimel et al., 2021)

For the respondents who do not speak English, the tool's English version was used and translated into Kiswahili. The researcher and the research assistants administered the questionnaire to people who are illiterate.

For the FGD two groups were selected, and simple random sampling was used to select participants after they were registered. The one-hour discussion was held before the patients were reviewed by the doctor. The researcher used the prepared questionnaire to help guide the discussion.

3.8.2 Research assistants

Two nursing students were recruited as research assistants. They were recruited before the pretesting was done. They were taken through the contents of the questionnaires to help them understand the objectives of the study. They received instruction on the questionnaire's content as well as how to distribute it to the participants. They were also taught on the rights of the patients and how they would be observed. One research assistant helped in sampling the patients after registration and issuing questionnaire to those who could fill them on their own while the other assisted in filling in the questionnaire to those who could not read and white on their own. The researcher received help from one of the assistants throughout the focus group sessions.

3.9 Data collection procedure

Data was gathered from Monday through Friday, 8 am to 12 pm, during clinic review days on working days for a period of four weeks. Data collection involved using a questionnaire and Focus Group Discussions. The questionnaire was divided into four sections. The participants who agreed to participate in the study and who could read and write in either English or Kiswahili were given the questionnaire by the researcher and the research assistants. The researcher and the research assistant conducted interviews with people who provided consent but who were illiterate and filled out the questionnaire. The questionnaire took roughly 10 minutes to complete. The participant-filled questionnaires were then collected from them and given to the researcher to keep safe while awaiting data to be processed.

3.10 Data Management Plan

3.10.1 Data management and analysis

At the conclusion of each day of data collection, questionnaires were checked to make sure they had been filled out completely. Version 28 of the SPSS statistical package was used for data analysis. Pie charts, tables, and bar graphs were used to illustrate the descriptive data. The associations between socioeconomic demographic traits and the biological, psychological, and social consequences of cancer therapy on sexual health were examined using chi square and one-way Anova analysis.

To gain understanding of the significance of patients' experiences as described by the participants, qualitative data from FGD was employed. Together with the notes made during talks, the collected audio data was translated into English, and the transcripts were reviewed for accuracy and completeness.

3.10.2 Data storage

The questionnaires were kept in a cupboard under lock and key. All the other data was stored in password-protected computers and flash drives to ensure confidentiality and was only available to the primary researcher and the statistician.

3.11 Quality assurance

3.11.1 pretesting, validity and reliability

Approval of the study tool was sought from the research and ethics committee. The study tool was pretested at the adult haemato-oncology clinic. 10% of the population (22 participants) were selected to fill out the questionnaire. This was used to determine its appropriateness for the study. The questionnaire was adopted from EORTC SHQ-22which is a standard questionnaire used to test for sexual health.

Pretesting was done in clinic 23 where patients with blood cancers were reviewed as they had the same characteristics as participants being reviewed at CTC. A questionnaire was administered to

22 participants (10% of the total expected participants) this was used to test for reliability and validity.

3.12 Ethical considerations

The Department of Nursing Sciences at the University of Nairobi granted the researcher's request for authorization to conduct the study. By submitting an application and presenting the study plan to the KNH-UoN ethical review board, permission was obtained to proceed with the study. Besides, the researcher sought permission from NACOSTI and the management of Kenyatta National Hospital to access the study participants at the cancer treatment center, authorization to perform the study was granted.

The rights of the participants and the anticipated advantages of the study were explained to them. Each participant was given a voluntary informed consent form by the researcher before being enrolled in the study. Participants were not subjected to any threats or rewards. All questionnaires, interview notes, transcript printouts, and audio recordings were kept in a cabinet that was locked with a key, and the computer's research data was kept protected by a password. Before taking part in the study, the participants in the study were made aware that there were no dangers and the potential advantages of the study findings. On the permission form, the supervisor's and the ethical review committee members' contact information was listed in case the participants felt their rights were violated during the study. Questions from the participants were welcome, and satisfactory responses were given. Before the participants signed the consent forms, the researcher and the research assistants questioned them over the information given to make sure they understood the study. After the participants completed the questionnaire, the researcher received comments and suggestions to make sure the participants' questions and concerns were addressed.

The researcher assured the participants that there would be no conflict of interest with this study. The ability to leave the research procedure at any moment was likewise guaranteed to the participants. By making sure that all study participants, without exception, would get any prospective advantages, justice was protected. By exercising necessary care in considering their opinions and ensuring that they were free to select whether or not to engage in the study without hindrance, respect for the participants was ensured. The results of the study will be shared with

the hospital and presented at scientific conferences so that many cancer survivors may benefit from the findings of this study.

3.13 Expected outcomes

The study was expected to generate evidence on the biopsychosocial effects of cancer treatment on the sexual health of cancer survivors attending Kenyatta National Hospital. This will help to improve sexual health and the general quality of life among cancer survivors.

3.14 Dissemination of study findings

This Thesis and final research results will be submitted as part of the requirements for the attainment of a Master of Science in Nursing (Oncology). Feedback will be given to Kenyatta National Hospital, CTC. The study findings will also be shared with the UoN School of Nursing. A manuscript of the study will be written and presented for publishing. The findings will also be presented at scientific conferences and symposiums.

3.15 Study limitations and delimitations.

Since the study was conducted at the Kenyatta National Hospital, which is a national referral hospital, the results may be generalized to represent all cancer survivors. The study was a cross-sectional design, and the causal association between the variables was not determined. Some participants declined to participate in the study due to the sensitivity of the topic.

The study delimitations included the study objective to assess the biopsychosocial effects of cancer treatment on sexual health among cancer survivors attending Kenyatta National Hospital, Cancer Treatment Center, the study questions, study variables, study population and the inclusion and exclusion criteria. This allowed only participants who were eligible to participate in the study.

CHAPTER FOUR: RESULTS

4.1 Introduction

This study was conducted at Kenyatta National Hospital-Cancer Treatment Center to assess the biopsychosocial effects of cancer treatment on sexual health among cancer survivors. Based on the study's aims, the findings are presented in this chapter. In accordance with the objectives of the study, the results are provided in four sections. A total of 216 participants, representing a response rate of 100% were questioned. Seven out of ten participants representing a 70% response rate participated in the FGD. Tables, bar graphs and pie charts are used to display descriptive statistics. Additional analysis was conducted using Chi square and one-way Anova. The FGD narratives were used to bolster the quantitative data.

4.2 Socio-demographic characteristics of the study participants

Of the 216 study participants, most were female 69.4%(n=150) while the rest 30.6% (n=66) were males (Figure 3).

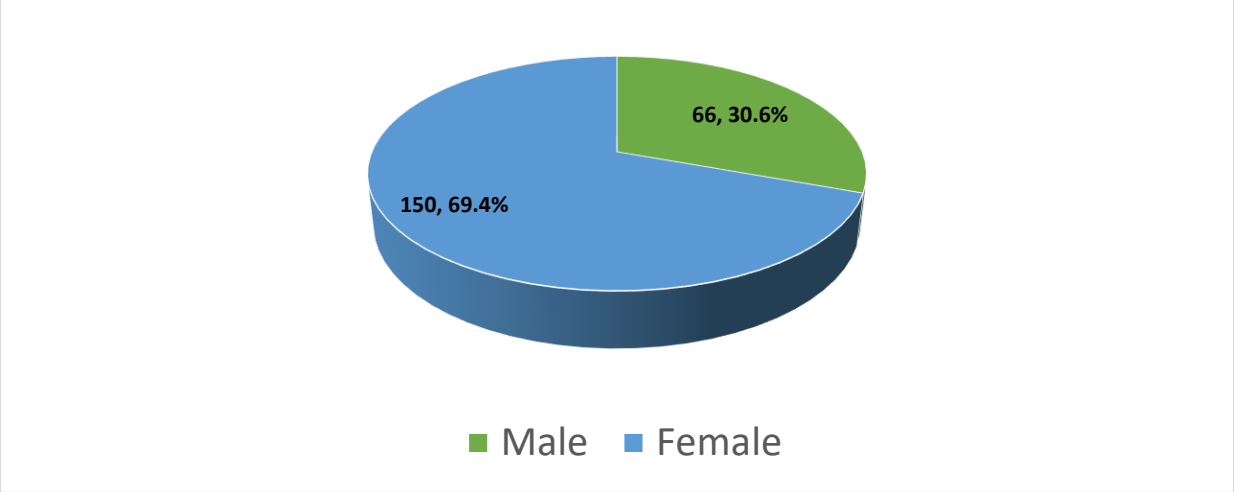

Figure 3: Study participants

Most of the participants, 40.7% (n=88) were aged between 41-50 years, and many of them were protestants by faith 40.7% (n=88). Most of the participants 52.8% (n=144) had secondary-level education and most of them were unemployed 65.7% (n=142). The majority 60.8% (n=45) of those employed earned Ksh 10,001 -25,000 as presented in table 2 below.

Table 2: The socio-demographics of study participants.

Variable	**Categories**	**n (%)88,**
Sex	Male	66 (30.6)
	Female	150 (69.4)
	Total	216 (100.0)
Age	<= 30 years	10 (4.6)
	31 - 40 years	42 (19.4)
	41 - 50 years	88 (40.7)
	51+ years	76 (35.2)
	Total	216 (100.0)
Religion/denomination	Protestant	88 (40.7)
	Catholic	82 (38.0)
	Anglican	21 (9.7)
	Muslim	14 (6.5)
	SDA	6 (2.8)
	Orthodox	2 (0.9)
	Jehovah witness	2 (0.9)
	E.A.P.C	1 (0.5)
	Total	216 (100.0)
Education	Primary	58 (26.9)
	Secondary	114 (52.8)
	College	38 (17.6)
	University	6 (2.8)
	Total	216 (100.0)
Employment	Unemployed	142 (65.7)
	Employed	66 (30.6)
	Self-employed	8 (3.7)
	Total	216 (100.0)
Income	Less than Ksh 10,000	6 (8.1)
	Ksh 10,001 - 25,000	45 (60.8)
	Ksh 25,001 - 50,000	20 (27.0)
	>Ksh 50,000	3 (4.1)
	Total	74 (100.0)
Note: E.A.P.C, East Africa Pentecostal Churches; SDA, Seventh-day Adventist Church		

Table 3: FGD participants socio-demographic characteristics

Participant	Age in years	Gender	Marital status	Diagnosis	Treatment modality	Years after cancer treatment
P1	50	Female	Married	Ca cervix	Chemotherapy Radiation	7 years
P2	46	Female	Widow	Ca cervix	Chemotherapy Radiation	3 years
P3	41	Female	Married	Ca cervix	Chemotherapy Radiation	1 year
M1	54	Male	Married	Ca esophagus	Chemotherapy Radiotherapy	3 years
M2	49	Male	Married	Metastatic fibrosarcoma	Surgery Chemotherapy	4 years
M3	39	Male	Married	Gastric ca	Surgery Chemotherapy	10 months
M4	43	Male	Married	Ca lungs	Surgery Chemotherapy	2 years

4.3 Clinical characteristics of study participants.

Many 30.6% (n=66) of the participants in the study had been diagnosed with breast cancer and cervical cancer 23.1% (n=50) respectively (table 4). Many of the participants 55.1% (n=119) in the study did not know the stage at which the cancer diagnosis was made 38.0%(n=82) of the participants had stayed over 3 years since the completion of cancer treatment as presented in Table 5.

Table 4: The distribution of the study participants by diagnosis

Diagnosis	**n (%)**
Ca breast	66 (30.6)
Ca cervix	50 (23.1)
Ca esophagus	16 (7.4)
Nasopharyngeal ca	6 (2.8)
Ca colon	6 (2.8)
Gastric ca	4 (1.9)
Ca vulva	4 (1.9)
Ca thyroid	4 (1.9)
Ca rectum	4 (1.9)
Ca lung	4 (1.9)
Others	52(24.1)
Total	216(100)

Table 5: Cancer stage at diagnosis and the duration since completion of cancer treatment

Variable	**Categories**	**n (%)**
Cancer stage at diagnosis	Stage 1	8 (3.7)
	Stage 2	30 (13.9)
	Stage 3	48 (22.2)
	Stage 4	11 (5.1)
	Don't know	119 (55.1)
	Total	216 (100.0)
The duration since completion of cancer treatment	Less than 6 months	39 (18.1)
	7 months-12 months	42 (19.4)
	1-2 years	53 (24.5)
	More than 3 years	82 (38.0)
	Total	216 (100.0)

The most common cancer treatment modality among the participants was chemotherapy at 94% (n=203) with cisplatin being the most commonly recalled by the patients at 41.7% (n=11) as presented in Figure 4 and Figure 5 below, respectively.

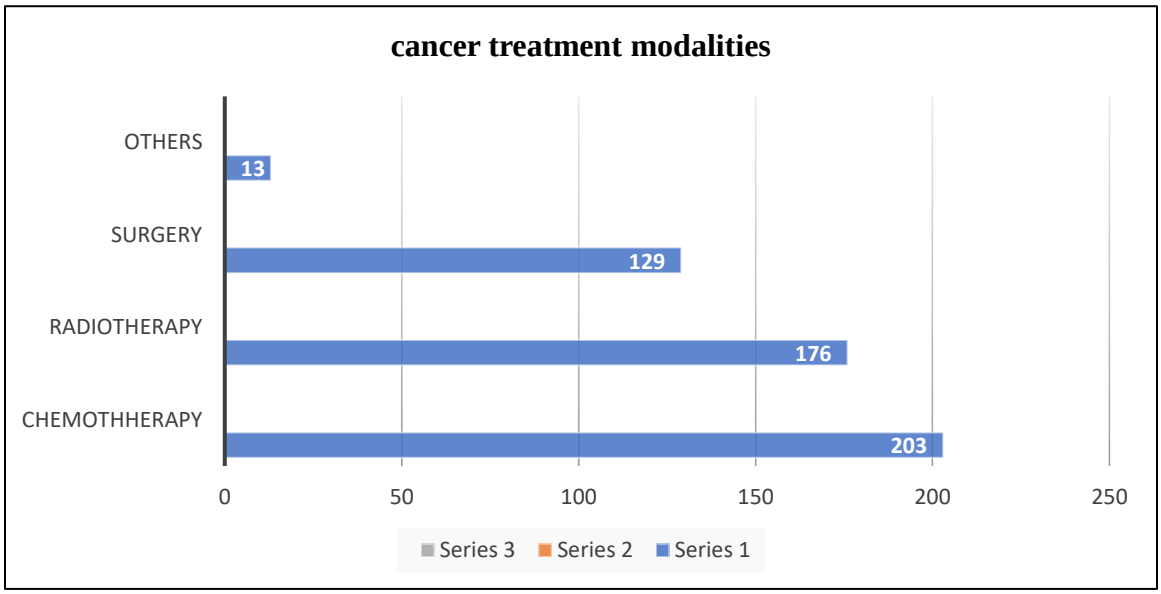

Figure 4: Cancer treatment modality

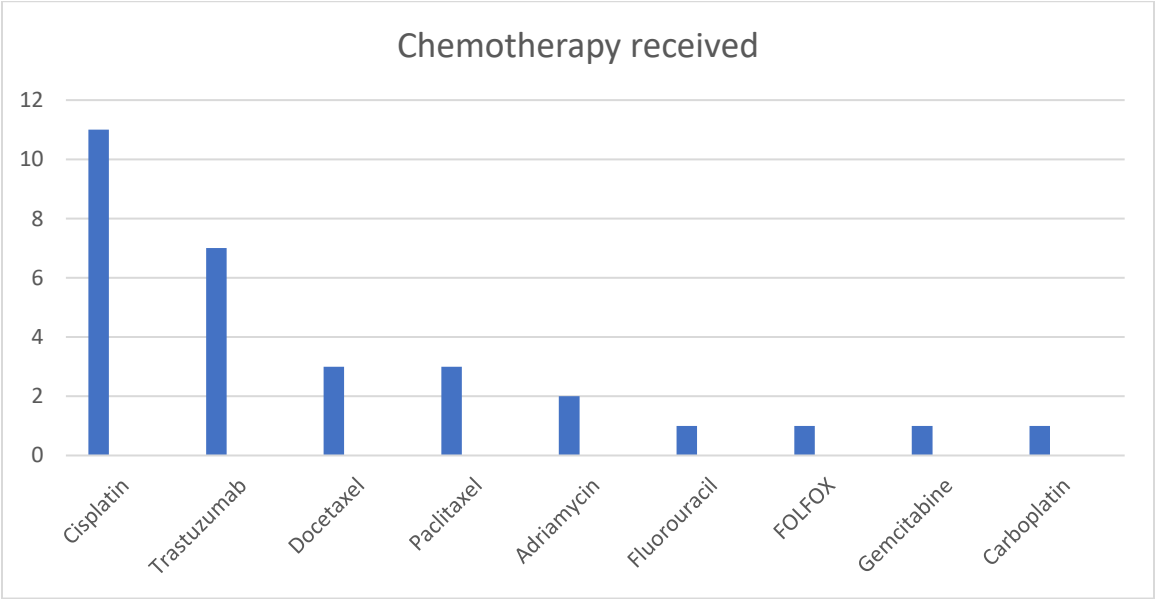

Figure 5: Distribution of the study participants by type of chemotherapy

4.4. Effects of cancer treatment on sexual health

Most 62%(n=134) of the participants in the study reported cancer treatment had affected their sexual health and 68% (n=146) of the participants reported not having had a discussion with their healthcare providers about sexual health (Figure 6 and Figure 7).

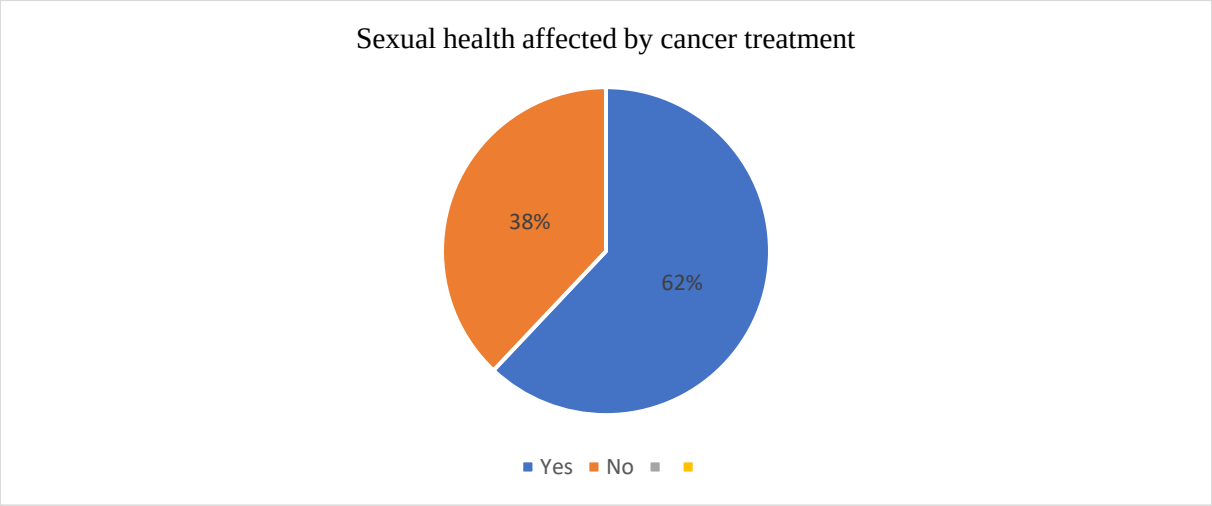

Figure 6: If cancer and cancer treatment has affected the study participants' sexual health

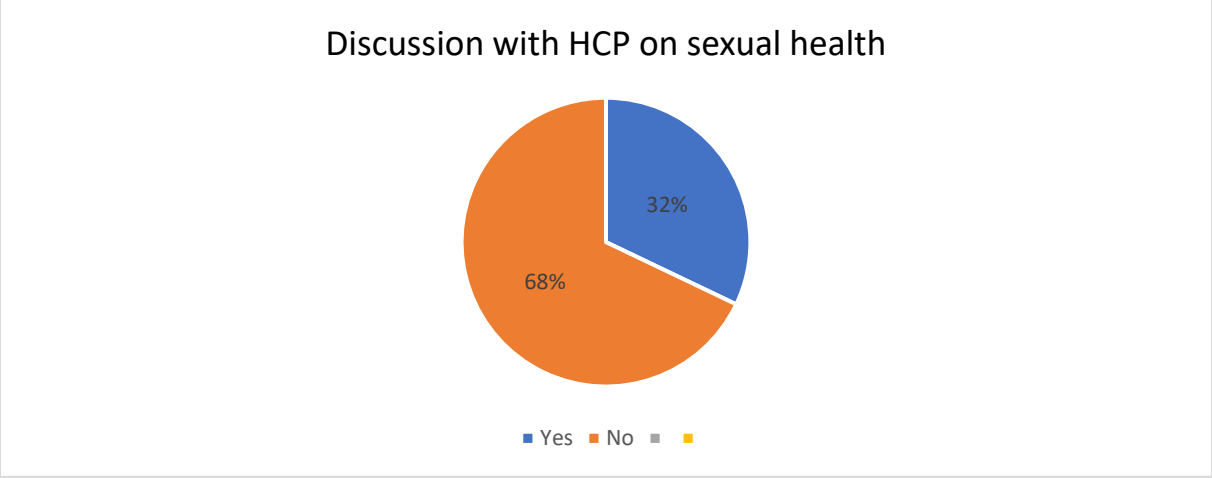

Figure 7: If the study participant had ever had a discussion with their healthcare providers about their sexual health.

4.5 Biological Effects of cancer treatment on sexual health

4.5.1 General biological effects

Most of the participants 66.2% (n=143) in the study reported that their sexual activity had been affected after cancer treatment. fatigue and tiredness were the most reported biological effects by 89.8% (n=194) of the respondents, low libido by 63.8% (n=136) of the respondents' and reduced sexual desire reported by 59.4% (n=126) of the respondents (Table 6)

Table 6: The biological effects of cancer treatment on sexual health

Parameter	**Status**	**n (%)**	**Mean (SD)**
Has your sexual activity been affected by cancer treatment?	No	73 (33.8)	0.6620 (0.47)
	Yes	143 (66.2)	
	Total	216 (100.0)	
Have you experienced low libido after cancer treatment?	No	77 (36.2)	0.6385 (0.48)
	Yes	136 (63.8)	
	Total	213 (100.0)	
Has your sexual desire decreased after cancer treatment?	No	86 (40.6)	0.5943 (0.49)
	Yes	126 (59.4)	
	Total	212 (100.0)	
Have you achieved orgasm after cancer treatment/?	No	142 (81.1)	0.1886 (0.39)
	Yes	33 (18.9)	
	Total	175 (100.0)	
Have you experienced fatigue and tiredness after cancer treatment?	No	22 (10.2)	0.8982 (0.30)
	Yes	194 (89.8)	
	Total	216 (100.0)	
Have you experienced mood changes after cancer treatment?	No	119 (56.4)	0.4360 (0.50)
	Yes	92 (43.6)	
	Total	211 (100.0)	
Have you suffered from urine or fecal incontinence after cancer treatment?	No	188 (87.9)	0.1215 (0.33)
	Yes	26 (12.1)	
	Total	214 (100.0)	
Overall mean score			0.5145 (0.24)
Note: No = 0; Yes = 1			

4.5.2 Male-specific biological effects

Erectile dysfunction was reported by 43.3% (n=29) of male participants in the study while 18.5% (n=12) of them reported having experienced a lack of ejaculation after cancer treatment (Table 7).

Table 7: The male-specific biological effects of cancer treatment on sexual health

Parameter	**Status**	**n (%)**	**Mean (SD)**
Have you experienced erectile dysfunction?	No	38 (56.7)	0.4328 (0.50)
	Yes	29 (43.3)	
	Total	67 (100.0)	
Have you experienced a lack of ejaculation after cancer treatment?	No	53 (81.5)	0.1846 (0.39)
	Yes	12 (18.5)	
	Total	65 (100.0)	
Overall mean score			0.3169 (0.40)
Note: No = 0; Yes = 1			

4.5.3 Female-specific biological effects of cancer treatment on sexual health

The most reported female specific biological effect by female participants in this study was vaginal dryness at 37% (n=54), pain during sex was reported by 24.2% (n=50) and amenorrhea at 32.2% (n=48) and after cancer treatment (Table 8).

Table 8: The female-specific biological effects of cancer treatment on sexual health

Parameter	**Status**	**n (%)**	**Mean (SD)**
Have you experienced pain during sex after cancer treatment?	No	157 (75.8)	0.2416 (0.43)
	Yes	50 (24.2)	
	Total	207 (100.0)	
Have you had monthly periods after the completion of cancer treatment?	No	101 (67.8)	0.3222 (0.47)
	Yes	48 (32.2)	
	Total	149 (100.0)	
Have you experienced vaginal dryness?	No	92 (63.0)	0.3699 (0.48)
	Yes	54 (37.0)	
	Total	146 (100.0)	
Overall mean score			0.2574 (0.32)
Note: No = 0; Yes = 1			

Statements quoted from FDG that supported the biological effects of cancer treatment.

"Whenever I have sex, I feel like I have lost energy, the more I have sex or it lasts longer, the weaker I become. Thus, I fear having sex regularly" M1

"After every session of chemotherapy, I experienced loss of appetite and fatigue for 2 weeks. My sexual activities were also affected because I was always weak. I lost sexual desire and would only go for one round. It would take me a week to have another erection" M2

"I was told by the doctor to have sex regularly to remove the dead sperm due to chemotherapy treatment. I was worried about having sex after my abdominal surgery. I had to change the sex style. I was weak, had no power, I had sex once a week and I had to conserve energy for it"M3.

4.6 Psychological Effects of cancer treatment on sexual health

Most of the participants reported that their sexual satisfaction had been affected after cancer treatment 62.8% (n=135). The most reported psychological effect after cancer treatment among the participants in the study was low self-esteem at 75.5% (n=163), followed by low self-confidence at 72.6% (n=156) and 50.5% (n=108) of the participants felt less sexually attractive after cancer treatment. the overall mean score of psychosocial effects on sexual health was 0.543 (Table 9)

Table 9: The psychological effects of cancer treatment on sexual health

Parameter	Status	n (%)	Mean (SD)
Has your sexual satisfaction been affected after cancer treatment?	No	80 (37.2)	0.6279 (0.48)
	Yes	135 (62.8)	
	Total	215 (100.0)	
Have you experienced low confidence in yourself after cancer treatment?	No	59 (27.4)	0.7256 (0.45)
	Yes	156 (72.6)	
	Total	215 (100.0)	
Are you happy with your body image after cancer treatment?	No	103 (47.7)	0.5232 (0.50)
	Yes	113 (52.3)	
	Total	216 (100.0)	
Do you experience low self-esteem after cancer treatment?	No	53 (24.5)	0.7546 (0.43)
	Yes	163 (75.5)	
	Total	216 (100.0)	
Have you felt less sexually attractive after cancer treatment?	No	106 (49.5)	0.5047 (0.50)
	Yes	108 (50.5)	
	Total	214 (100.0)	
Have you felt ashamed of your appearance before your spouse or partner after cancer treatment?	No	123 (56.9)	0.4306 (0.50)
	Yes	93 (43.1)	
	Total	216 (100.0)	
Have you felt less masculine or feminine after cancer treatment?	No	111 (52.4)	0.4764 (0.50)
	Yes	101 (47.6)	
	Total	212 (100.0)	
Have you felt worried for your partner concerning your sexual activities after cancer treatment?	No	125 (58.7)	0.4132 (0.49)
	Yes	88 (41.3)	
	Total	213 (100.0)	
Have you ever felt anxious or worried about sexual activity after cancer treatment?	No	122 (57.0)	0.4299 (0.50)
	Yes	92 (43.0)	
	Total	214 (100.0)	
Overall mean score			0.5435 (0.25)
Note: No = 0; Yes = 1			

4.6.1 Other feelings experienced by the participants affecting their sexual health

Fear of disease recurrence was reported by 21.3%, general body pains (17%), anxiety of pain during sex (6.4%), fear of being separated from the partner (6.4%), and concerns about fertility and scars from cancer (4.3%) were the most reported additional feelings that the participants reported to affecting their sexual health.

Participants from the FGD reported the following statements in support of the psychological effects.

"I have no sexual desire even when I see a beautiful woman, it all goes away" M1

"I lost sexual appetite; I even sometimes forget I am a man because I don't have erections" M2

"At times it is embarrassing when you cannot have an erection. It makes you feel less of a man. I sometimes avoid sex, I make myself busy, ignore my wife, or pretend to be asleep for fear of not being able to perform. I have to spread having sex after 3 to 4 days when I have saved some energy for sex. I have to prepare for it" M3

4.7 Sociological effects of cancer treatment on sexual health

Majority of the participants were married 80.6% (n=174) and only 2.3% (n=5) of them reported having children after cancer treatment. Some of the participants reported to have had pressure to have children after cancer treatment 15.3% (n=33) most of which was from their spouses or partners 65.6% (n=21). Some participants reported their partners or spouses had engaged in extra-marital affairs and attributed this to cancer diagnosis 15.9%% (n=33) as presented in Table 10.

Table 10: The distribution of sociological factors reported by participants

Variable	Categories	n (%)
If the study participant is married	No	42 (19.4)
	Yes	174 (80.6)
	Total	216 (100.0)
If the study participant has had children after cancer treatment	No	211 (97.7)
	Yes	5 (2.3)
	Total	216 (100.0)
If the study participant has had pressure to have children after cancer treatment	No	182 (84.7)
	Yes	33 (15.3)
	Total	215 (100.0)
The source of pressure to have children after cancer treatment	Partner/ spouse	21 (65.6)
	Family members	11 (34.4)
	Total	32 (100.0)
If the study participants' spouse/partner has had an extra-marital affair after cancer treatment	No	175 (84.1)
	Yes	33 (15.9)
	Total	208 (100.0)

Most of the participants were satisfied with the relationship with their partners/ spouses at 74.4% (n=151) with 46.2% (n=97) of them reporting to have experienced sexual problems after cancer treatment. Some of the participants reported having experienced marital strain 32.4% (n=69) after cancer treatment with 12.1% (n=26) reporting having suffered from gender-based violence as shown in Table 11 below

Table 11: The distribution of the study participants by experience of marital strain, anxiety to perform sexually, gender-based violence after cancer treatment, satisfaction with partner, and sexual problems

Variable	Categories	n (%)
If the study participant has experienced marital strain after cancer treatment	No	144 (67.6)
	Yes	69 (32.4)
	Total	213 (100.0)
If the study participant has experienced anxiety on failure to perform their sexual functions after cancer treatment	No	141 (65.9)
	Yes	73 (34.1)
	Total	214 (100.0)
If the study participant has suffered from gender-based violence after cancer treatment	No	189 (87.9)
	Yes	26 (12.1)
	Total	215 (100.0)
If the study participant is satisfied with the relationship with their partner	No	52 (25.6)
	Yes	151 (74.4)
	Total	203 (100.0)
If the study participant has experienced sexual problems with their partner(s) after cancer treatment	No	113 (53.8)
	Yes	97 (46.2)
	Total	210 (100.0)

The statements made during the FGD, which are quoted below, support the findings about how cancer therapy affects sexual health.

"I was worried when the doctor told me not to have a child within 1 and a half years of completion of treatment because the child could have issues. We had planned to have more children. I was advised not to get my wife pregnant. I thank God my wife was there with me" M3

"I had one child, then he died. Soon after I was diagnosed with cancer of the cervix. I knew there was a problem. After treatment, I have not had monthly periods. I know I may not get another child. My husband says it is ok but I know it is not. whenever we have sex, I do not enjoy it. I only think of not being able to get another child" P1

"After cancer treatment, I occasionally have pain during sex, I lost sexual desire but as a lady, I must fulfill my husband's desires. Even if there is pain, I have to persevere" P3

4.8 Relationship between socio-demographic factors and the biological, psychological, and sociological effects of cancer treatment

4.8.1 Sex versus biological, psychological, and social effects of cancer treatment

Of the 7 biological effects of cancer treatment that were common to both males and females, males (mean = 3.58, SD = 1.70) had a higher mean for the total biological effects experienced compared to females (mean = 3.43, SD = 1.64). However, an unpaired samples t-test revealed no statistically significant difference between the males and females, t (214) = 0.607, p = 0.54 (Figure 8).

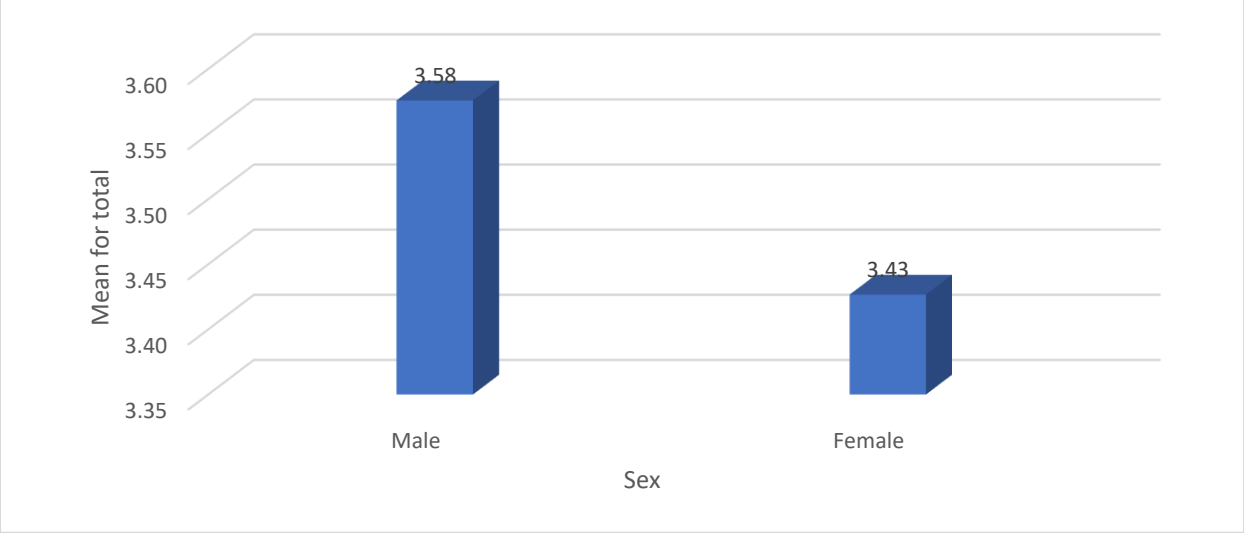

Figure 8: Mean total biological effects

Regarding psychological effects, an inverse observation was made in females (mean = 4.97, SD = 2.31) reported more psychological effects than males (mean = 4.59, SD = 2.22). The difference between males and females was, nonetheless, not statistically significant, t (214) = -1.135, p = 0.26 (Figure 9).

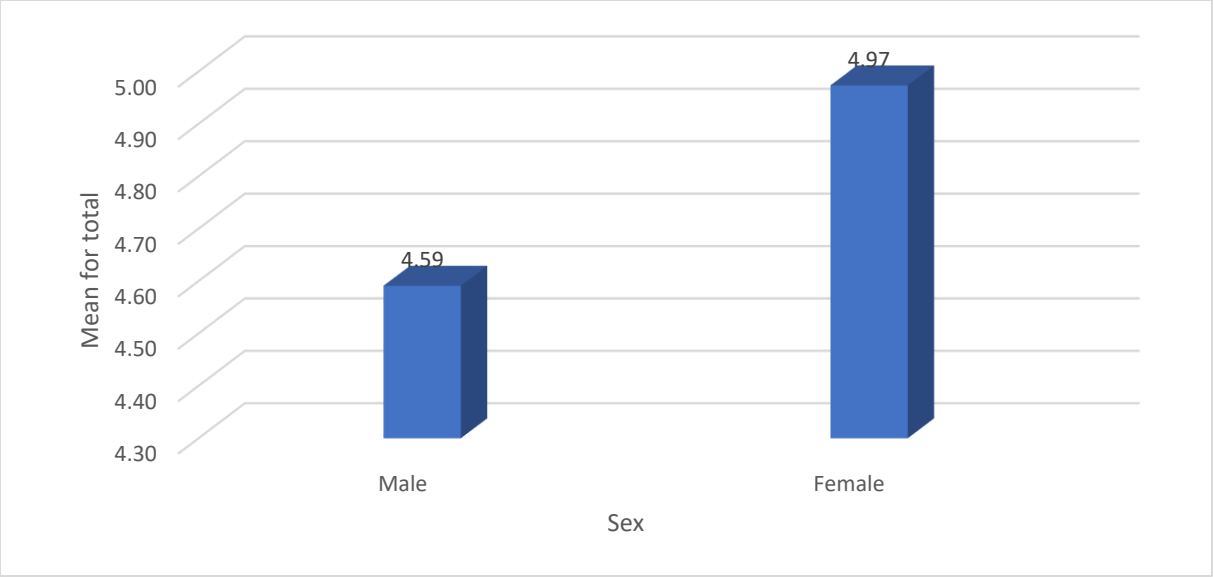

Figure 9: Mean total psychological effects

Considering the study participants' experience of anxiety regarding failure to perform their sexual functions after cancer treatment as a sociological effect, it was observed that more males at 36.4% (n=24/42) reported anxiety compared to females at 33.1%(n=49/99). A Chi-Square test showed no statistically significant association between sex and experience of anxiety, $\chi 2$ (1) = 0.215, p = 0.64 (Figure 10).

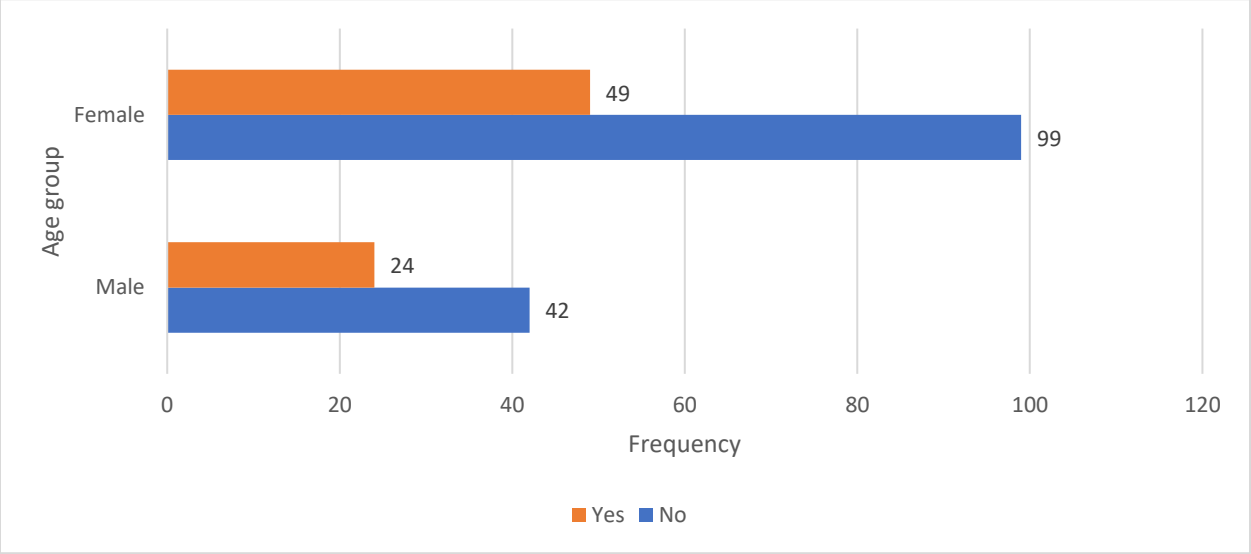

Figure 10: Relationship between sex and anxiety to perform sexual functions

4.8.2 Age versus biological, psychological, and social effects of cancer treatment

It was observed that as age increases, more biological effects are experienced by the study participants (Figure 11). Further analysis with a one-way ANOVA test revealed no statistically significant difference between the categories of age, F (3) = 1.522, p = 0.21.

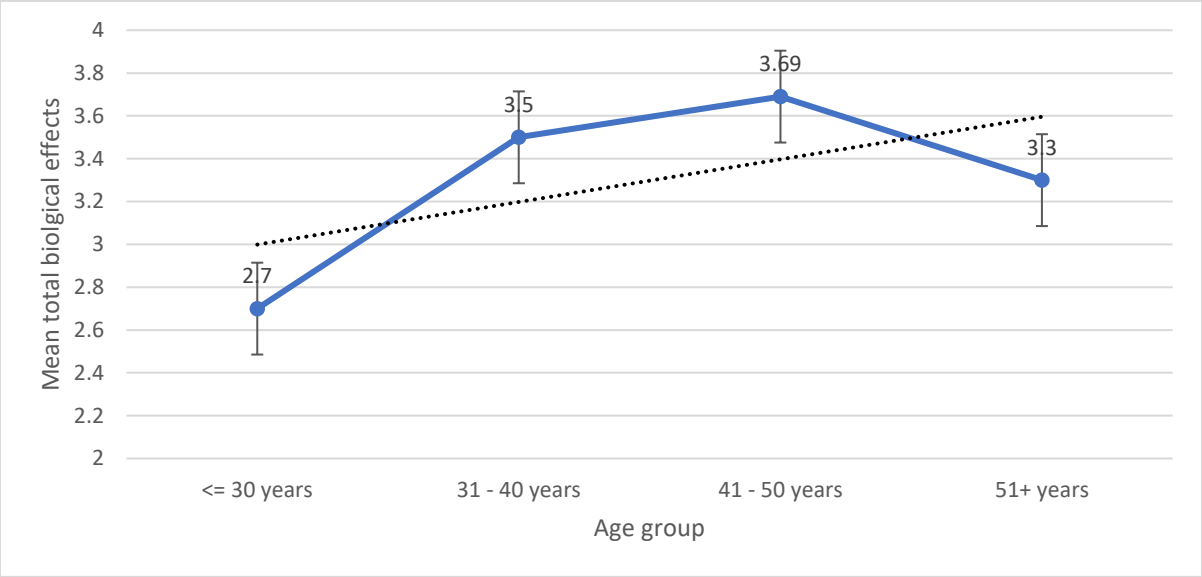

Figure 11: Relationship between age and biological effects of cancer treatment

In a similar manner, the psychological effects of cancer treatment also increased with age (Figure 12). Further analysis with a one-way ANOVA test revealed a statistically significant difference between the categories of age, F (3) = 3.228, p = 0.02.

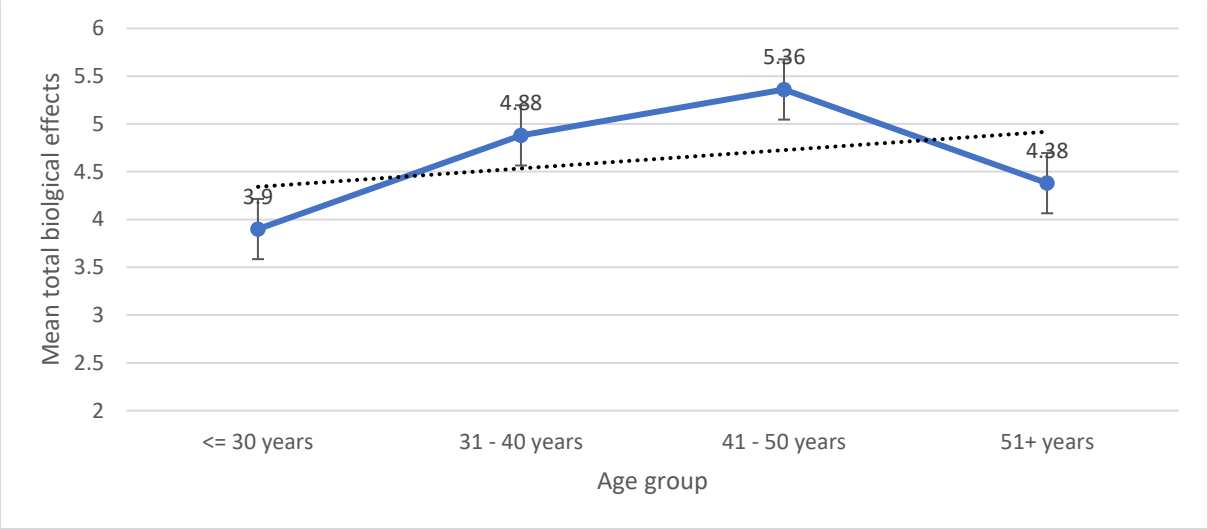

Figure 12: Relationship between age and psychological effects of cancer treatment

Considering the study participants' experience of anxiety regarding failure to perform their sexual functions after cancer treatment as a sociological effect, there was no statistically significant association between age and sociological effects of cancer treatment, $\chi 2$ (3) = 0.795, p = 0.85 (Figure 13).

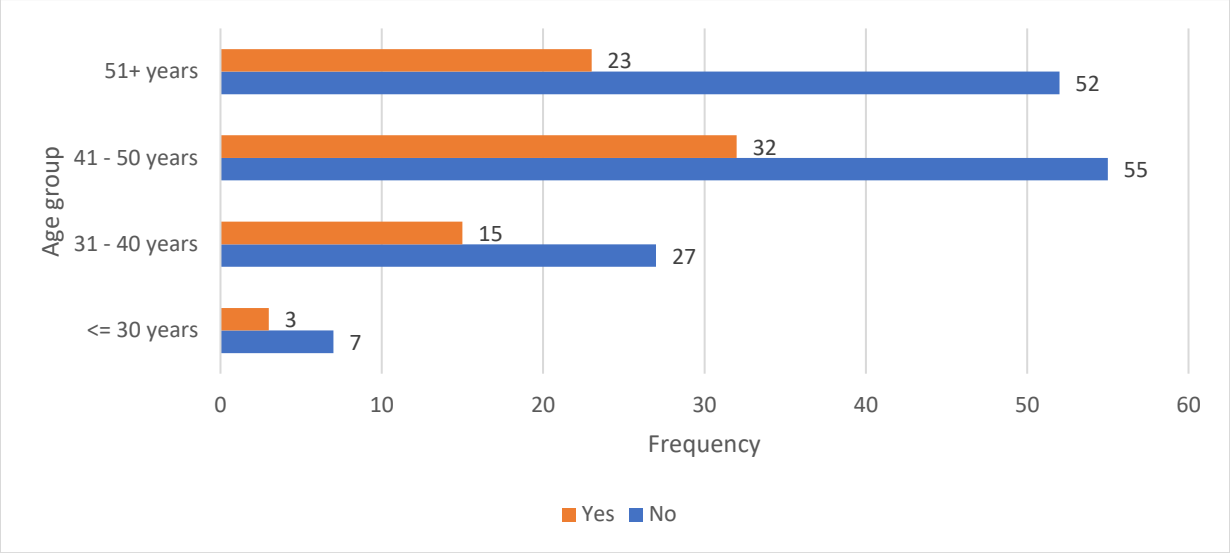

Figure 13: Relationship between age and anxiety to perform sexual functions.

CHAPTER FIVE: DISCUSSION, CONCLUSION, AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Introduction

One measure of life satisfaction is sexuality. Most cancer survivors experience sexual health issues as a result of their cancer treatment; however, this issue frequently goes untreated, which negatively affects the survivors' quality of life. This study at Kenyatta National Hospital-Cancer Treatment Center examined the biopsychosocial impact of cancer treatment on sexual health among cancer survivors. On the basis of the research questions, this chapter discusses significant findings from the study.

5.1.2 Socio-demographic factors and clinical characteristics

In this study, females were the majority of the participants at 69.4% (n=150). Most of the participants were aged 41-50 years representing 40.7% (n=88). The most reported cancers were breast cancer at 30.6% (n=66), cervical cancer at 23.1%(n=50), and esophageal cancer at 7.4%(n=16) among the participants in the study. These results are in line with the Kenya Globocan 2020 report where breast cancer (16.1%), cervical cancer (12.4%), prostate cancer (8.1%) and esophageal (7.1%) cancer are the most common cancers in Kenya for both sexes. In Kenya, women are diagnosed with breast cancer at a much younger age as compared to developed countries. The mean age of cancer diagnosis in Kenya is 40-49 years while in the USA its 62 years (Gakunga et al., 2019).

Many participants, 55.1% (n=119) in this study did not know the stage at which the cancer was diagnosed. Most (38%) of the participants had completed cancer treatment over 3 years ago. Majority of the participants 94% (n=203) reported having received chemotherapy, 81.5% (n=176) had undergone radiotherapy and 59.7% (n=129) had undergone surgery. Cisplatin at 41.7% (n=11) and trastuzumab at 29.2%(n=7) were the most reported chemotherapy received by the participants in the study. Surgery, chemotherapy, and radiotherapy are the most commonly used modalities for cancer treatment either as single agents or in combination. Surgery may cause adhesions, pain, or sensory problems, radiotherapy may lead to vaginal dryness, stenosis, pain, and altered body image all of which had an effect on the sexual health of cancer survivors (Shankar et al., 2020).

Chemotherapy was found to compromise nerves and blood vessels that control erection with a combination of cisplatin with bleomycin or a vinca alkaloid reporting an increased effect on sexual health (Voznesensky et al., 2016). In this study, cisplatin was the most reported used chemotherapy among the participants and could explain why most of the participants reported effects on their sexual health.

5.1.3 Effects of cancer treatment on sexual health

Most of the participants in the study 62% (n=134) reported that their sexual health had been affected after cancer treatment. The most commonly reported sexual effects experienced by the participants in the study were low libido, pain during sex (21.0%), fatigue affecting sex (16.1%), erectile dysfunction (8.9%), and amenorrhea (8.1%)

Cancer treatment can lead to low libido and genital atrophy in both males and females. Men can experience a lack of ejaculation and erectile dysfunction. Pain, vaginal dryness, and pain are reported in most women after cancer treatment (Ramlachan et al., 2022). In a similar study conducted in Australia, patients who had advanced gynecological cancers experienced sexual disorders regardless of the treatment modality used. These included low libido, bleeding, and pain during sex also patients who received chemoradiation, their sexual health was more affected than patients who underwent surgery alone (Carr, 2015).

Majority 67.9% (n=146) of the participants reported not having been taught by HCPs about sexual changes expected changes after cancer treatment. In a study by Obura et al. (2022), sexual dysfunction is rarely assessed by HCPs despite being a common side effect of cancer treatment that has a negative impact on the sexual health of cancer survivors.

A study conducted on Canadian HCPs and African nurses concurs with the findings of this study, the results showed that both groups were uncomfortable discussing sexuality with the patients. The African nurses reported stigma and cultural barriers in regard to conversation on sexual health (Maree & Fitch., 2018).

5.1.4 Biological effects of cancer treatment on sexual health

Most of the participants 66.2% (n=143) reported that their sexual activity had been affected after cancer treatment. fatigue and tiredness were the most reported to affect sexual activity at 89.8% (n=194), then low libido at 63.8% (n=136), and reduced sexual desire at 59.4% (n=126). In a study by Bober &Varela 2014, chemotherapy-induced fatigue was reported as a major contributor to low libido and reduced sexual desire among cancer survivors. Cancer treatment causes sexual health problems among cancer survivors. Different treatment modalities like surgery, chemotherapy, and radiotherapy each has a varying side effect. In men, it can lead to erectile dysfunction and lack of ejaculation while in females it can lead to dyspareunia, vaginal dryness, and amenorrhea (Ramlachan et al., 2022).

In males, erectile dysfunction was reported by 43.3% (n=29) and 18.5% (n=12) reported a lack of ejaculation. These were the most reported male specific effects of cancer treatment. In a similar study conducted in the U.S.A. among male cancer survivors, 49% of them experienced erectile dysfunction and 30% reported lack of orgasm and ejaculation problems. They also reported suffering from hypogonadism, backaches, and hot flashes (Yumura et al., 2022). In a study carried out in South Africa on prostate cancer survivors, they reported failure to achieve erections, lack of ejaculations and orgasms, and ejaculatory pain which led to a feeling of sexual inadequacy (Phahlamohlaka et al., 2018)

In females, 32.2% (n=48) reported amenorrhea after completion of cancer treatment while 37% (n=54) reported experiencing vaginal dryness, 24.2% (n=50) of the female participants reported experiencing pain during sex. A study by Ljungman et al 2018 reported similar findings, cancer survivors reported sexual dysfunctions after cancer treatment related to biological factors. Males reported erectile dysfunction, low libido, and lack of ejaculation. Vaginal dryness, dyspareunia, amenorrhea, and low libido were reported by female survivors. These sexual dysfunctions have been linked to different cancer treatment modalities like surgery, chemotherapy, and radiotherapy. In a study by Shankar et al (2020) in India, 32.9% of the participants reported experiencing dyspareunia, and 9.4% experienced vaginal dryness.

5.1.5 Psychological effects of cancer treatment on sexual health

Most of the participants 62.8% (n=135) reported that their sexual satisfaction had been affected after cancer treatment. The most reported psychological effect after cancer treatment among the participants in the study was low self-esteem at 75.5% (n=163), followed by low self-confidence at 72.6% (n=163) and 50.5% (n=156) of the participants felt less sexually attractive after cancer treatment. From this study's findings, cancer treatment led to many psychological problems that affected both male and female cancer survivors. most participants reported a loss of sexual satisfaction, low self-confidence, and low self-esteem, impaired body image while others reported being ashamed of their appearance before their spouses or partners.

In a similar study carried out in the U.S.A. in 2019 sexual dysfunction in male cancer survivors had a negative effect on their body image, self-sexual belief, and their mental health (Twitchell et al., 2019). In a study carried out in Kenya on patients with gynecological cancers, the participants reported disease reoccurrence, body shame, negative body image, guilt, and lack of sexual desire as some of the psychological effects experienced by the participants (Obora et al., 2022)

Many cancer patients suffer from sexual dysfunction regardless of the cancer treatment they receive. This has a negative impact on their quality of life. Most cancer survivors reported dissatisfaction with their sexuality, loss of intimacy, shame and guilt, and anxiety, (Wang and Feng., 2022).

Other self-reported psychological feelings by the participants were fear of disease recurrence (21.3%), body pains (17%), and anxiety to perform during sex (6.4%). In a study by Ljungman et al., 2018, they found that negative body image, lack of sexual satisfaction, and feelings of being less masculine or feminine are some of the other psychological factors related to cancer treatment. These leads to low sexual interest thus negatively affecting sexual health in cancer survivors.

Anxiety to perform during sex, less sexual satisfaction, and impaired body image were some of the psychological effects that cervical cancer survivors suffered from in a study carried out in India (Shankar et al., 2020). This is in line with the findings of this study.

In this study, participants from FGD said that not being able to perform sexually made them feel less of a man. “At times I have to pretend I am busy or asleep as I know I will not have an erection” M3.

5.1.6 Sociological effects of cancer treatment on sexual health

The findings of this study, most of the participants 80.6% (n=174) were married with 74.4% (n=151) of the participants being satisfied with their relationship with their partners/ spouses. Despite this 46.6% (n=97) of the participants reported having experienced sexual problems after cancer treatment. Some of the participants 32.4% (n=69) reported to have experienced marital strain after cancer treatment with 12.1% (n=26) reporting to have suffered from gender-based violence. In this study, I did not specify the type of gender-based violence. In a study by Mejri et al (2023), intimate partner violence among cancer survivors was at 24.8% and there was no difference between men and women.

In a related study on breast cancer survivors conducted in Nigeria, 61.7% of the female participants reported being married, while 38.3% said they had split up with their wives or partners three years after receiving cancer treatment. This demonstrates there was marital conflict following cancer treatment. 80.8% of the participants had not had a discussion with HCPs on the effects of cancer treatment on sexual health after cancer treatment. Most cancer survivors are not educated on potential sexual changes to expect after cancer treatment and end up not receiving the needed support. A survey done in the Netherlands indicated that 65% of the respondent's needed information about sexuality after cancer treatment even if the cancer did not involve sexual organs (Wang and Feng., 2022).

In a study carried out in the U.S.A., cancer survivors reported they did not receive information on sexual health after cancer treatment. it was associated with HCPs not receiving enough training on how to deal with sexual health issues and most HCPs were uncomfortable communicating sexual health topics with the patients (Bober & Varela, 2012)

Given that most cancer survivors do not receive any communication in regards to sexual health from the HCPs, most result in their own methods of coping. Some of the coping mechanisms to overcome the sexual health challenges practiced by the participants were avoiding sexual activities (18.9%), eating a balanced diet (12.6%), use of herbal medication (12.6%), and being single or quitting the relationship at (9.5%). In a similar study on Malay women cancer survivors, they reported avoidance of sexual intercourse, reduced sexual frequency, passive sex, use of lubricants or gels, wearing prostheses and reconstructive surgery as ways of coping with the effects of sexual health after cancer treatment (Che ya et al., 2023).

5.2 Conclusions

The study's findings lead the researcher to the following deductions. After receiving cancer treatment, cancer survivors at Kenyatta National Hospital experience biological, psychological, and societal discomfort that impairs their quality of life and sexual health. Cancer treatment has biological side effects that cancer survivors experience, including dyspareunia, low libido, diminished sexual desire, exhaustion, erectile dysfunction, irregular periods, dry vagina, and urine and feces incontinence. They also experience psychological side effects that have an impact on their sexual health, such as decreased sexual satisfaction, low self-esteem and confidence, altered body images, and thoughts of being less masculine and feminine. Social pressure to have children after cancer treatment, gender-based violence, separation and divorce, and marital conflict were among the sociological effects reported by cancer survivors.

5.3 Recommendations

The study's suggestions are as follows in light of the findings that cancer survivors have biopsychosocial problems that have an impact on their quality of life:

The need of psychosexual education in post-cancer care and follow-up to address sexuality changes, cancer treatment side effects, sex therapy, and couple therapy. Create forums to encourage cancer patients, HCPs, and survivors to talk about intimacy, sexuality, and sexual health after receiving cancer treatment. Provide a department where patients can be sent to a psychosexual psychotherapist for counseling. The hospital to arrange talks with patients and ongoing medical education for healthcare professionals on sexual health. A national policy incorporating sexual health into comprehensive cancer care management should also be developed to address the effects of cancer treatment on sexual health among cancer survivors.

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APPENDICES

Appendix i: Informed Consent Explanation.

Title of the study: **Effects of cancer treatment on sexual health among cancer survivors at Kenyatta National Hospital Cancer Treatment Center.**

Researcher: PATRICK MWAI MWANGI, Master of Science in Nursing (Oncology)

Institution of study: University of Nairobi, P.O. Box 30197-00400 Nairobi.

Introduction

I am a student at the School of Nursing Sciences, University of Nairobi pursuing a Master of Science in Nursing (Oncology). I'm conducting a study entitled: Biopsychosocial effects of cancer treatment on sexual health among cancer survivors at Kenyatta National Hospital Cancer Treatment Center. The study will be conducted at Kenyatta National Hospital, Cancer Treatment Center. The study will seek to determine the biopsychosocial effects of cancer treatment on sexual health among cancer survivors. To achieve this, the study will look at the effects of different cancer treatment modalities on cancer survivor's sexuality.

The research will help in improving the management of sexual health among cancer survivors. You are free to ask any question or clarification at any time. You can also decline to participate in the study or withdraw at any point if you wish not to proceed.

Purpose of the study

This study will seek to determine the effects of cancer treatment on sexual health among cancer survivors. Identifying the effects of cancer treatment on the participant's biological, psychological, and social aspects will be important as they contribute to sexual health.

Risks

There will be no physical or economic risk for participation in the study. Some questions may be asked that may require you to disclose personal or sensitive information and this may trigger negative feelings. If this happens and you feel you need assistance please don't hesitate to ask.

How you answer questions will not in any way influence or affect how you receive care at the clinic.

Benefits

There will be monetary benefits for participating in the study. The results of the study will however be useful in improving the provision of sexual health and education and also improve the survivor's experiences in the future.

Confidentiality

All the information you provide in the study will be confidential. Your name will not be required in any form. All the materials used during this study will be kept in a cupboard under lock and key and will only be accessed by the researcher. Password-protected computers will be used to store all the data from the study.

Voluntary participation

The information you provide will be confidential. This is a voluntary exercise and you can withdraw at any point during the study with no repercussions. The treatment and management you receive from the hospital will not be influenced by your participation in the study.

Compensation

I will not be able to provide you with any payment or gift for being in the research, but I will appreciate your participation.

Sharing results

The results of this study will be presented at scientific conferences or academic forums. The results may also be published in academic and scientific journals.

Contact persons

1. Principal Investigator
   PATRICK MWAI MWANGI
   TEL: 0729041323

2. Supervisors
   Dr. Irene Mageto

   Senior Lecturer, Department of Nursing

   University of Nairobi

   P.O. Box 20723, Nairobi

3. Dr. Emmah Matheka
   Senior Lecturer, Department of Nursing

   University of Nairobi

   P.O. Box 20723, Nairobi.

4. The chair,
   KNH-UON Ethics committee
   P.O. Box 20723, Nairobi.

Appendix ii: Maelezo ya kibali cha kushiki utafiti

Mada ya utafiti: utafiti juu ya matokeo/dalili ya mwili, kiakili na kimaisha

Mtafiti: PATRICK MWAI MWANGI, manafunzi wa mwaka wa pili kutoka chou kikuu cha Nairobi, shahada ya uzamili katika uuguzi wa saratani.

Taasisi ya utafiti: chou kikuu cha Nairobi sanduku la posta 30197-00400, Nairobi.

Utangulizi

Mimi ni mwanafunzi katika chou kikuu cha Nairobi. Nasomea shahada ya uzamili katika uuguzi wa ugonjwa wa saratani. Ninafanya utafiti kuhusu athari ya matibabu ya saratani kwa afya ya ngono, baada ya matibabu ya saratani. Utafiti huu utafanywa kwa manusura wa ugonjwa wa saratani katika hospitali ya Kenyatta ambao wamemaliza matibabu ya saratani. Lengo kuu la utafiti huu ni kuboresha huduma wanayoipata wagonjwa wa saratani na pia kuimarisha afya yao ya ngono.

Kusudi ya Habari hii ni kukupa maelezo kuhusu utafiti ambayo itakuwezesha kufanya uamuzi sahihi juu ya kushiriki. Wewe unauhuru kuuliza maswali ili kufafanuliwa jambo lolote kuhusu utafiti huu.

Kusudi ya utafiti

Utafiti huu utaamua athari ya matibabu ya saratani kwa afya ya ngono. Kutambua athari hizo kutasaidia kuimarisha afya ya ngono ya manusura wa saratani na pia kuimarisha afya yao kwa kijumla.

Hatari

Hakutakuwa na hatari ya kiuchumi au kimwaili ya kushiriki katika utafiti huu. Itakuchukua muda wa dakika kumi na tano wa muda wako kujibu maswali. Maswali mengine yatahitaji wewe kufichua taarifa za kibinafsi ambazo zinaweza kusababisha hisia za wasiwasi. Ikiwa hii itatokea,

Mimi ni mwanafunzi. Napenda kuwakaribisha kushiriki katika utafiti wa utafiti. Ili uhakikishe kwamba unaelewa maana ya kushiriki katika utafiti huu, tafadhali soma habari katika fomu hii ya kibali kwa uangalifu, (au nitakuisomea) ikiwa kuna jambo lolote usiloelewa katika hili fomu ya ridhini tafadhali nipe na nitaelezea.

Lengo la utafiti

Madhumuni ya utafiti huu ni .Hii itachukua muda wa dakika 15 za muda wako. Ikiwa unakubali kushiriki katika utafiti, nitawauliza maswali.

Utaratibu wa kujifunza

Ikiwa unakubali kushiriki katika utafiti wa utafiti utaulizwa na uchunguzi mkuu au msaidizi wake kwa njia ya siri. Jina lako halitarekodi kwenye swali la maswali.

Faida na hatari za kushiriki katika utafiti

Hakuna hatari ikiwa unahusika katika utafiti. Wewe ni huru kuuliza swali lolote. Hatuwezi kuandika jina lako kwenye fomu ya kukusanya data na tutaweka maelezo ambayo unatupa siri; majibu yako hayatatumiwa dhidi yako, lakini tu kwa madhumuni ya uchunguzi wa utafiti.

Fidia

Hatuwezi kukupa malipo yoyote au zawadi kwa kuwa katika utafiti, lakini sisi tutafurahia ushiriki wako. Kujitolea

Hakuna adhabu au kupoteza faida ikiwa unashindwa kushiriki au kuamua kuacha kama hii ni ya hiari. Uamuzi wako hautatumiwa dhidi yako ikiwa unaamua kushiriki katika utafiti. . Utafiti hauhusishi mafuatilio yoyote.

Ikiwa una swali lolote kuhusu jinsi utafiti huu umendelezwa,tafadhali wasiliana na mtafiti mkuu katika

1. Mtafiti mkuu
   PATRICK MWAI MWANGI
   Simu: 0729041323

2 Wasimamizi
   Dr. Irene Mageto

   Senior Lecturer, Department of Nursing

   University of Nairobi

   P.O. Box 20723, Nairobi

3 Dr. Emmah Matheka
Senior Lecturer, Department of Nursing
University of Nairobi
P.O. Box 20723, Nairobi.

4 Mwenyekiti,
KNH-UON Ethics committee
P.O. Box 20723, Nairobi.

Appendix iii: Consent form

I have been informed of the nature of the study being undertaken and the potential risks explained to me. I also understand that my participation is voluntary and my decision to participate or not to participate will not affect my treatment at this facility in any way. I also understand that I can choose to withdraw my participation at any time without any consequences. My participation in the study has been adequately addressed by the investigator and have been assured that my details will be kept confidential. I hereby consent to participate in the study.

Participant's signature (or thumbprint) _____ Date _____

I confirm that I have clearly explained to the participant the nature of the study and the contents of this consent form in detail and the participant has voluntarily volunteered to participate in the study without undue pressure or coercion.

Investigators signature _____ Date_____

Appendix iv: Fomu ya shaha

Ikiwa unakubali kushiriki katika utafiti tafadhari weka ishara hapa chini.

Mimi nakubali kushiriki katika utafiti huu. Nimetabulishwa kuhusu utafiti unaofanywa na pia nimeelezwa hatari zake. Pia nimeelezwa kuwa kushiriki kwangu ni kwa hiari na uamuzi wa kushiriki au kutoshiriki hakutaadhiri matibabu ninayo pokea. Naweza pia kujiuzuru kuendelea na utafiti wakati wowote bila maelezo. nimehakikishiwa kuwa maelezo yangu ya kibinafsi nataarifa hazitahifadhiwa kwa siri. Ninadhibitisha kwamba wasiwasi wangu wote juu ya ushiriki wangu umeshughulikiwa vya kutosha na mchunguzi. Pia nimeulizwa maswali ili kuhakikisha ufahamu wangu wa taarifa iliyotolewa

Sahihi ya mshiriki(au alama ya kidole)_____Tarehe _____

Ninathibitisha kwamba nimeelezea wazi kwa mshiriki hali ya utafiti na maudhui ya fomu hii ya ridhaa kwa undani na mshiriki kwa hiari bila shinikizo lolote.

Sahihi ya mchunguzi _____ Tarehe _____

Appendix v: Participants Questionnaire **SERIAL NO ……..**

PART A: SOCIO-DEMOGRAPHIC DATA. PART A:

(TICK IN THE BOXES OR ANSWER IN THE SPACE PROVIDED)

1. What is your age in years? _____
2. What is your sex? a. Male ☐
   b. Female ☐
3. What is your county of residence? _____
4. Which is your religion? a. Catholic. ☐
   b. Protestant. ☐
   c. Anglican. ☐
   d. Muslim. ☐
   e. others. _____
5. What is your level of education? a. Primary. ☐
   b. Secondary. ☐
   c. College. ☐
   d. University. ☐
   e. others. _____
6. Are you currently employed? a. Yes. ☐
   b. No. ☐
7. What is your average monthly income?
   a. Less than Ksh. 10,000. ☐
   b. Ksh. 10,001-25,000. ☐
   c. Ksh. 25,001-50,000. ☐
   d. Over Ksh. 50,000 ☐
   e. Other. _____
8. What is your diagnosis? _____
9. Which year were you diagnosed with cancer? _____

10. What was the stage of the cancer at the time of diagnosis?

a. Stage 1. ☐
b. Stage 2. ☐
c. Stage 3. ☐
d. Stage 4 ☐
e. Don't know ☐
f. Other. _____

11. What is the duration since the completion of cancer treatment?

a. Less than 6 months. ☐
b. 7 months-12 months. ☐
c. 1-2 years. ☐
d. More than 3 years. ☐

12. Which cancer treatment did you receive? (Tick all that apply)

a. Surgery. ☐
b. chemotherapy ☐
c. Radiotherapy ☐
d. Others. _____

12c. If you received chemotherapy, can you state the chemotherapy you received?

_____

_____

_____

13a. Has cancer and cancer treatment affected your sexual health? a. Yes. ☐
b. No. ☐

13b. If yes, explain how. _____

_____

_____

_____

14a. Have you ever had a discussion with your healthcare providers about your sexual health?

a. Yes ☐
b. No ☐

15. Were you taught about sexual changes to expect after cancer treatment? a. Yes ☐
b. No ☐

15b. If yes, what were you taught?_____-
_____
_____
_____

PART B: BIOLOGICAL EFFECTS OF CANCER TREATMENT ON SEXUAL HEALTH.

Have you experienced any of the following symptoms after you completed cancer treatment? (Please tick all that apply to you in the spaces provided)

	Symptoms	Yes	No
1	Has your sexual activity been affected by cancer treatment?		
2	Have you experienced low libido after cancer treatment?		
3	Has your sexual desire decreased after cancer treatment?		
4	Have you achieved organism after cancer treatment/?		
5	Have you experienced fatigue and tiredness after cancer treatment?		
6	Have you experienced pain during sex after cancer treatment?		
7	Have you experienced mood changes after cancer treatment?		
8	Have you experienced erectile dysfunction?		
9	Have you had monthly periods after the completion of cancer treatment?		
10	Have you experienced a lack of ejaculation after cancer treatment?		
11	Have you experienced vaginal dryness?		
12	Have you suffered from urine or fecal incontinence after cancer treatment?		

PART C: PSYCHOLOGICAL EFFECTS OF CANCER TREATMENT ON SEXUAL HEALTH

Have you experienced any of the following feelings after cancer treatment? **Select all that apply**

	Feeling	Yes	No
1	Has your sexual satisfaction been affected after cancer treatment?		
2	Have you experienced low confidence in yourself after cancer treatment?		
3	Are you happy with your body image after cancer treatment?		
4	Do you experience low self-esteem after cancer treatment?		
5	Have you felt less sexually attractive after cancer treatment?		
6	Have you felt ashamed of your appearance before your spouse or partner after cancer treatment?		
7	Have you felt less masculine or feminine after cancer treatment?		
8	Have you felt worried for your partner concerning your sexual activities after cancer treatment?		
9	Have you ever felt anxious or worried about sexual activity after cancer treatment?		

11. Have you experienced any other feelings*?*

_____

_____

_____

_____

PART D: SOCIOLOGICAL EFFECTS OF CANCER TREATMENT ON SEXUAL HEALTH. Tick the correct answer or select all that apply to you or write in the spaces provided

1. Are you married? a. Yes ☐

b. No ☐

2. Have you had children after cancer treatment? a. Yes ☐

b. No ☐

3. have you had pressure to have children after cancer treatment? a. Yes ☐

b. No ☐

3b. if yes, from whom? a. Partner/ spouse ☐

b. Family members ☐

4. Has your spouse/partner had an extra-marital affair after cancer treatment? a. Yes ☐

b. No ☐

4b. If yes, what do you think caused this?

_____

_____

_____

5. Have you experienced marital strain after cancer treatment? a. Yes ☐

b. No ☐

6. Have you experienced anxiety about failure to perform your sexual functions after cancer treatment? a. Yes ☐

b. No ☐

6. Have you suffered from gender-based violence after cancer treatment? a. Yes ☐

b. No ☐

7. Are satisfied with the relationship with your partner? a. Yes ☐

b. No ☐

8a. Have you experienced sexual problems with your partner(s) after cancer treatment? a. Yes ☐

b. No ☐

8b. if yes, state the sexual problems you have experienced.

_____

_____

_____

_____-

9. What have you done on your own to overcome the sexual health challenges you have faced?

_____

_____

_____

_____

_

10a. What have you been taught by your Healthcare provider on sexual health?

a. Yes

b. No

10b. if yes what were you taught? _____

_____

_____

_____

The end.

Appendix vi: Dodoso la washiriki **Serial No…….**

PART A: SOCIO-DEMOGRAPHIC DATA

Maelekezo: Weka sahihi au jaza katika pengo.

1. Una miaka mingapi? _____

2. Wewe ni wa jinsia gani? a. Mwanaume ☐

b. Mwanamke ☐

3. Unaishi katika kaunti gani? _____

4. Wewe ni wa dini gani? a. Katoliki. ☐

b. Protestanti. ☐

c. Anglikani. ☐

d. Muislamu. ☐

e. nyingineyo. _____

5. Kiwango chako cha elimu ni kipi? a. Shule ya msingi. ☐

b. Shule ya upili. ☐

c. Koleji. ☐

d. Chuo kikuu. ☐

e. others. _____

6. Je, Umeajiriwa? a. Ndio. ☐

b. La. ☐

7. Kwa mwezi mapato yako ni ya pesa ngapi?

a. Chini ya shilingi 10,000. ☐

b. Kati ya shilingi 10,001 na 25,000. ☐

c. Kati ya shilingi 25,001 na 50,000. ☐

d. Zaidi ya shilingi 50,000 ☐

e. Nyingine. _____

8. Je, unaugua saratani ipi? _____

9. Wajua saratani ilikua katika hatua ipi ilipogunduliwa?

a. Hatua 1. ☐
b. Hatua 2. ☐
c. Hatua 3. ☐
d. Hatua 4 ☐
e. Sijui. ☐
f. nyingine_____

10. je uligundua kuwa unaugua saratani mwaka upi? _____

11. Uko na muda upi tangu umalize matibabu ya saratani?

a. Chini ya miezi 6 ☐
b. Kati ya miezi 7-12 ☐
c. Kati ya mwaka 1-2 ☐
d. Zaidi ya miaka 3 ☐

12. Je ulipokea matibabu gani ya saratani? (Chagua yote yanayokuhusu)

a. Upasuaji ☐
b. Tiba ya kemikali ☐
c. Matibabu ya miale ☐
d. Mengineo. _____

13a. Je, matibabu ya sarataani yaadhiri afya yako ya ngono? a. Ndio ☐

b. La ☐

13b. Kama ndio, eleza vipi? _____

_____

_____

_____

14. Je, emewahi jadili kuhusu afya yako ya ngono na mshauri wako wa afya?

e. *Ndio* ☐
f. La ☐

15. Je, ulifunzwa kuhusu madadiliko ya afya ya ngono ambayo ungetarajia baada ya kumaliza matibabu ya saratani? a. Ndio ☐

b. La ☐

SEHEMU YA PILI: MATHARA YA KIBIOLOGIA YA MATIBABU YA SARATANI KWA AFYA YA NGONO.

Je, umepatwa na dalili na ishara yoyote kati ya hizi baada ya kumaliza matibabu ya saratani?

(Tia sahihi majibu yote yanayo kuhusu)

	Dalili na ishara	Ndio	La
1	Je tendo lako la ngono limeharithiwa na matibabu ya saratani?		
2	Je msukumo wako wa tendo la ngono umepungua baada ya matibabu ya saratani?		
3	Je hamu yako ya ngono imeathiriwa na matibabu ya saratani?		
4	Je umeweza kupata mshindo wa ngono tangu umalilize matibabu ya saratani?		
5	Je, emehisisi uchovu na kuchoka baada ya matibabu ya saratani ambako kukeadhiri tendo lako la ngono?		
6	Je, umehisi uchungu wakati wa tendo la ngono baada ya matibabu ya saratani?		
7	Je, umepata mhemko wa hisia baada ya matibabu ya saratani ambayo yameadhiri afya yako ya ngono?		
8	Je, emepata upungufu wa nguvu za kiume baada ya matibabu ya saratani?		
9	Je unapata vipindi vya hedhi vya kila mwezi baada ya matibabu ya saratani?		
10	Je, umepatwa na shida ya umekosa kutokwa na manii/kumwaga baada ya matibabu ya saratani?		
11	Je, umehisi ukavu wa njia ya uke baada ya matibabu ya saratani?		
12	Je, umeadhiriwa na kutojizuia kwa mkojo au choo baada ya matibabu ya saratani?		

SEHEMU YA TATU: ATHARI ZA KISAIKOLOJIA ZA MATIBABU YA SARATANI KWA AFYA YA NGONO.

Je umekuwa na baadhi ya hisia zifuatazo baada ya matibabu ya saratani? (Chagua zote ambazo zina kuhusu)

	Hisia	Ndio	La
1	Je, unaridhika na tendo la ngono baada ya matibabu ya saratani?		
2	Je, kujiamini kwako kimapenzi kumeadhirika baada ya matibabu ya saratani?		
3	Unafurahia picha yako ya mwili baada matibabu ya saratani?		
4	Je, umehisi kutojithamini mbele ya mpenzi wako baada ya matibabu ya saratani?		
5	Je, umehisi mvutio wako wa kimapenzi kwa mpenzi wako imepungua?		
6	Je, umehisi aibu kujihusu baada ya matibabu ya saratani?		
7	Je, umehisi upungufu wa uume au uke wako baada ya matibabu ya saratani?		
8	Je, umekuwa na hofu juu ya mpenzi wako kuhusu tendo la ngono baada ya matibabu ya saratani?		
9	Je umekuwa na wasiwasi kuhusiana na tendo la ngono baada ya matibabu ya saratani?		

10. je umekuwa na hisia zingine zozote? _____

_____

_____

_____

_____

SEHEMU YA NNE: ATHARI ZA KIJAMII ZA MATIBABU YA SARATANI KWA AFYA YA NGONO.

Maelezo: Weka sahihi, chagua au ujibu katika pengo lililotolewa.

1. Umeoa au kuolewa? a. Ndio ☐

b. La ☐

1b. Kama la, umekuwa ma msukumo wa kuoa au kuolewa baada ya matibabu ya saratani?

a. Ndio ☐

b. La ☐

2. Je, umepata Watoto baada ya matibabu ya saratani? a. Ndio. ☐

b. La ☐

3a. Je, umekuwa na msukumo wa kupata Watoto baada ya matibabu ya saratani?

a. Ndio ☐

b. La ☐

3b. Kama ndio, ni kutoka kwa nani? a. Mpenzi wangu ☐

b. Familia yangu ☐

c. Wakwe wangu ☐

d. Wengine. _____

4a. Je, mpenzi wako amekuwa na mpango wa kando baada yako kumaliza matibabu ya saratani?

a. Ndio ☐

b. La ☐

c. Sijui ☐

b. ☐

4b. Kama ndio, wafikiria ni nini ilichangia yeye kufanya hivyo?

_____

_____

_____

5. Je, umepata mgogoro katika ndoa au uhusiano wako baada ya matibabu ya saratani?

a. Ndio ☐

b. La ☐

6. Je, umepitia dhuruma za kijinsia katika uhusiano au ndoa yako baada ya matibabu ya saratani?

a. Ndio ☐

b. La. ☐

7. Unaridhika na uhusiano ulionao na mpenzi wako?

a.Ndio ☐

b. La ☐

8a. Je, umepata changomoto zozote za kimapenzi baada ya kumaliza matibabu ya saratani?

a. Ndio ☐

b. La ☐

8b. Kama ndio, ni changamoto zipi hizo?_____

_____

_____

_____

9. je wewe umewezaje hushinda au kujikimu dhidi ya shida za afya ya ngono umezopitia?

_____

_____

_____

_____

10a. je, umefunzwa na mhudumu wako wa afya kuhusu afya ya ngono?

a. Ndio ☐

b. La. ☐

10b. Kama ndio, ulifunzwa nini?_____

_____

_____

_____

_____

Mwisho. Asante.

Appendix vii: Focused Group Discussion Guide

1. What is sexual health?
2. What changes on your body have experienced after cancer treatment and have these changes affected your sexual health?
3. How has cancer treatment affected how you feel about yourself?
4. How has cancer treatment affected your femininity or masculinity in relation to sexual health?
5. In what way has cancer treatment affected the way you related with other people sexually?
6. How has cancer treatment affected your sexual relationship with your partner?
7. What challenges have you encountered after cancer treatment related to sexual health?
8. How have you dealt with effects or changes on your sexual health after cancer treatment?

end

Appendix viii: Work plan

Activity	December 2022 - March 2023	April-June 2023	July-2023	July-August 2023	September 2023	October 2023	October-November 2023
Proposal development							
Proposal submission							
ERC approval							
Data collection							
Data analysis							
Report writing and Submission							
Dissemination of findings and publishing							

Appendix ix: Budget

Item	Unit cost (Ksh)	Quantity	Total Ksh.
Proposal and questionnaire development			
Pens	15.00	10	150.00
Pencils	25.00	5	125.00
Ream of paper	800.00	2	1,600.00
Files	100.00	5	500.00
Flash disks	800.00	2	1,600.00
Internet	5000.00	3 months	15,000.00
Photocopying and printing	10.00	1000	10,000.00
Binding	200.00	10	2,000.00
ERC Approval	2000.00	1	2,000.00
Sub-total			32,825.00
Data collection and analysis			
Questionnaire, FGD guide printing, and photocopying	15.00	300.00	4,000.00
Principal investigator costs	10,000.00	1	10,000.00
Research Assistant	700.00	2	15,000.00
Data entry and cleaning	10,000.00		20,000.00
Statistician	20,000.00	1	20,000.00
Sub-total			111,825.00
Thesis development			
Printing	10.00	1,000	10,000.00
Binding	150.00		
Airtime			5,000.00
Contingency (10%)			11,500
Total			**128, 475**

Appendix x: Letter to KNH-UoN Ethics Committee

Letter to Ethics Committee

Patrick Mwai Mwangi

Reg No. H56/40559/2021

Department of Nursing

Faculty of Health Sciences

University of Nairobi

20/04/2023

To

The Chairman

Kenyatta National Hospital/University of Nairobi Ethics and Research Committee

P.O. Box 20723-00202

Nairobi

Dear Sir/ Madam

RE: REQUEST TO CONDUCT STUDY

I am a second-year student at the University of Nairobi, School of Nursing Sciences pursuing a Master of Science degree in Nursing (Oncology). I am undertaking a study **on the Biopsychosocial effects of cancer treatment on sexual health among cancer survivors at Kenyatta National Hospital** as a requirement for the course. The study will use quantitative and qualitative research designs to collect data from selected participants who will be recruited from the Kenyatta National Hospital, Cancer Treatment Centre. The data collection will be done by **Patrick Mwai Mwangi Reg No: H56/40559/2021** as the principal investigator.

I look forward to your consideration.

Thank you in advance.

Yours faithfully,

Patrick Mwai Mwangi.

Appendix xi: KNH-UoN ERC approval

UNIVERSITY OF NAIROBI
FACULTY OF HEALTH SCIENCES
P O BOX 19676 Code 00202
TELEGRAMS: varsity
Tel:(254-020) 2726300 Ext 44355

KNH-UON ERC
Email: uonknh_erc@uonbi.ac.ke
Website: http://www.erc.uonbi.ac.ke
Facebook: https://www.facebook.com/uonknh.erc
Twitter: @UONKNH_ERC https://twitter.com/UONKNH_ERC

KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

Ref: KNH-ERC/A/439

16th August, 2023

KENYATTA NATIONAL HOSPITAL APPROVED 16 AUG 2023 KNH/UoN-ERC P.O. Box 20723 - 00202, NAIROBI

Patrick Mwai Mwangi
Reg. No. H56/40559/2021
Dept. of Nursing Sciences
Faculty of Health Sciences
University of Nairobi

Dear Patrick,

ETHICAL APPROVAL-RESEARCH PROPOSAL: BIOPSYCHOSOCIAL EFFECTS OF CANCER TREATMENT ON SEXUAL HEALTH AMONG CANCER SURVIVORS AT KENYATTA NATIONAL HOSPITAL CANCER TREATMENT CENTER (P403/04/2023)

This is to inform you that KNH-UoN ERC has reviewed and approved your above research proposal. Your application approval number is **P403/04/2023.** The approval period is 16th August 2023 –15th August 2024.

This approval is subject to compliance with the following requirements;

i. Only approved documents including (informed consents, study instruments, MTA) will be used.
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by KNH-UoN ERC.
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to KNH-UoN ERC 72 hours of notification.
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH-UoN ERC within 72 hours.
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to KNH-UoN ERC.

Appendix xii: NACOSTI approval

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **679143**

Date of Issue: **11/September/2023**

RESEARCH LICENSE

This is to Certify that Mr.. PATRICK MWANGI MWAI of University of Nairobi, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: BIOPSYCHOSOCIAL EFFECTS OF CANCER TREATMENT ON SEXUAL HEALTH AMONG CANCER SURVIVORS AT KENYATTA NATIONAL HOSPITAL for the period ending : 11/September/2024.

License No: **NACOSTI/P/23/28958**

679143

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

See overleaf for conditions

Appendix xiii: Study Registration Certificate

KNH/R&P/FORM/01

KENYATTA NATIONAL HOSPITAL
P.O. Box 20723-00202 Nairobi

Tel.: 2726300/2726450/2726565
Research & Programs: Ext. 44705
Fax: 2725272
Email: knhresearch@gmail.com

Study Registration Certificate

1. Name of the Principal Investigator/Researcher
   PATRICK MWAI MWANGI
2. Email address: mwpatrick.ras@students.uonbi.ac.ke Tel No. 0729041323
3. Contact person (if different from PI) /
4. Email address: / Tel No. /
5. Study Title
   BIOPSYCHOSOCIAL EFFECTS OF CANCER TREATMENT ON SEXUAL HEALTH AMONG CANCER SURVIVORS AT KENYATTA NATIONAL HOSPITAL CANCER TREATMENT CENTER
6. Department where the study will be conducted CANCER TREATMENT CENTER
   (Please attach copy of Abstract)
7. Endorsed by Research Cordinator of Department where study will be conducted.

   Name: ..... Signature ..... Date .....
8. Endorsed by KNH Head of Department where study will be conducted.

   Name: Dr A. NDIRITU Signature ..... Date 23/08/23
9. KNH UoN Ethics Research Committee approved study number P403/04/2023
   (Please attach copy of ERC approval)
10. I PATRICK MWAI MWANGI commit to submit a report of my study findings to the Department where the study will be conducted and to the Department of Medical Research.

    Signature ..... Date 18/08/2023
11. Study Registration number (Dept/Number/Year) CTC /196/2023
    (To be completed by Medical Research Department)
12. Research and Program Stamp

KENYATTA NATIONAL HOSPITAL Research & Programs 23 AUG 2023

All studies conducted at Kenyatta National Hospital **must** be registered with the Department of Medical Research and investigators **must commit** to share results with the hospital.

BIOPSYCHOSOCIAL EFFECTS OF CANCER TREATMENT ON SEXUAL HEALTH AMONG CANCER SURVIVORS AT KENYATTA NATIONAL HOSPITAL

ORIGINALITY REPORT

14%	9%	7%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	erepository.uonbi.ac.ke Internet Source	3%
2	Murray, Emily K. "Exploring the psychosocial experience of sexuality in young adult cancer survivors and implications for sexual health", Proquest, 20111003 Publication	1%
3	Submitted to Kenyatta University Student Paper	1%
4	erepository.uonbi.ac.ke:8080 Internet Source	1%
5	"Abstracts of the 7th Annual Conference of the American Psychosocial Oncology Society, 18-21 February 2010, New Orleans, Louisiana, USA", Psycho-Oncology, 02/2010 Publication	<1%
6	dissertation.npmcn.edu.ng Internet Source	<1%

9/11/2023
DR IRENE O. NAGERO

SCHOOL OF NURSING SCIENCES
CHAIRMAN
10 NOV 2023
UNIVERSITY OF NAIROBI
P.O. Box 30197, NAIROBI

Dr. E. Makokha
10/10/2023