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Sexual Dysfunction Among Cancer Survivors

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1. Introduction

“Sexual and reproductive health and wellbeing are essential if people are to have responsible, safe and satisfying sexual lives. Sexual health requires a positive approach to human sexuality and an understanding of the complex factors that shape human sexual behaviour. These factors affect whether the expression of sexuality leads to sexual health and well-being or to sexual behaviour that put people at risk or make them vulnerable to sexual and reproductive ill-health. Health program managers, policy-makers and care providers need to understand and promote the potentially positive role sexuality can play in peoples’ lives and to build health services that can promote sexually health societies.” - (WHO 2006)

There is increasing number of cancer survivors worldwide. A lot of them experience sexual dysfunction for a long time which can last beyond ten years post treatment. Sexual dysfunction can occur as a result of any aspect of cancer and cancer treatment. Sexual functioning and/or satisfaction have been found to be of concern to many cancer survivors. Sexual function can be affected by physical or emotional trauma especially if the genitals are affected and can adversely affect the quality of life of the patients. Sexual dysfunction includes erectile dysfunction in males and disruption in the sexual response cycle (sexual desire, excitement, arousal, orgasm and resolution) and dyspareunia in women. There are differences in the pattern of sexual dysfunction between males and females as females may be able to cope better than males emotionally. Bonini-Colmano et al. (2007) noted that malignant diseases have a strong influence in quality of life, sexuality being one of the most affected variables. In their study to determine the prevalence of sexual dysfunction in a cohort of patients with cancer and its relationship with the following: pain, fatigue, nausea, vomiting, mechanisms of adaptation to stress, anxiety and depression, questionnaires were used which included treatment, adverse events, Zimong and Snaith depression and anxiety scale, sexual dysfunction questionnaire, coping strategies of Tobin David, Hopwood body image scale and the analogical visual test for pain evaluation. Sixty four patients were evaluated. Seventy two percent were women and median age was 50 years. Libido was absent in 50%; this was associated with gender (better in men; $p=0,05$) and the presence of pain ($p=0,05$) and fatigue ($p=0,05$) but not with age. All patients who had intact libido also had arousal and orgasms; this was more prevalent in men than in women and in subjects younger than 60 years. Arousal was absent in 47% of cases. Forty four percent of men had erectile dysfunction; this was present in all patients older than 60 years. Frequency of

intercourses was decreased in 75%. Fifty eight percent of patients said that their sexuality was better before the diagnosis of their disease. Interestingly, 85% didn't talk to their doctors about their sexual problems. The study concluded that one out of 2 patients had sexual dysfunction, predominantly women and that sexuality was affected mainly by pain and fatigue. Although normal libido was present in all ages, subjects older than 60 years had less arousal and orgasms.

The age of the patients also determines the extent of the problem. Testicular cancer for example is more common among youths. At this age group, the patients are either about to get married or in early stage of their family life. Sexual problem at this stage can be grievous and very traumatizing. Prostate cancer on the other hand is common among the elderly who would have completed their family and may be more concerned about survival than sexual activities. Sexual issues may therefore not be of prominence among this age group. The site of the disease also determines the extent of the problem. A male patient with cancer of the penis treated with amputation of the penis will experience more sexual dysfunction than a patient with testicular cancer who has a testicle removed. In females, a breast cancer patient who had the affected breast removed (mastectomy) will experience more sexuality issues than a female counterpart who had only the lump removed (lumpectomy). (Ofman 1995) Likewise, a female patient treated for cervical cancer with radiotherapy will experience more sexual problems than a female patient treated for head and neck cancer with radiotherapy.

Survivors of cancer of various anatomical sites experience various degrees of sexual dysfunction. After treatment, approximately 20% to 30% of breast cancer survivors, 80% of prostate cancer survivors, 37% of Hodgkin's survivors, and 58% of head and neck cancer survivors report sexual difficulties. (Elyse et al., 2009) Changes in body image, pain, and loss of desire result from both cancer and its treatment; long-term physical and psychological side effects from cancer treatments can affect sexual functioning. Long-term psychological responses, such as depression and anxiety about cancer, may alter the survivor's ability for intimacy and sexuality.

Sexual dysfunction therefore is an important issue that affects many cancer survivors who are increasingly being cared for by health personnel. It is noted that sexual dysfunction among these group of patients is never addressed by most of their care givers during follow up management. Many effective behavioural and pharmacological treatments for sexual dysfunction exist. However, to identify cancer survivors who may benefit from these treatments, conversations about sexual dysfunctions must be initiated. Survivors express a desire to be able to discuss sexual issues with medical professionals. However, there are barriers to these conversations for both patients and physicians. A public opinion poll of 500 adults in the United States showed that 85% would be willing to talk to their physicians if they had a sexual problem. However, 71% did not think that their physicians would be responsive or helpful, and 68% were concerned that their physicians would be uncomfortable and also reports from some studies found that lack of knowledge, expertise, time, and comfort are barriers to these conversations. (Bober et al., 2009)

2. Aim

The aim of this chapter is to highlight sexual health issues among cancer survivors so that clinicians and care givers can be able to predict this sequel and incorporate measures as early as possible towards prevention, reduction, assessment using appropriate instruments

and management of this important condition among patients thereby improving the sexuality aspect of their quality of life.

3. Methods

Available literature (hard and electronic copies) including the authors work relevant to this topic were consulted and evaluated. The sexuality component of the authors work on quality of life of head and neck cancer patients seen at The Radiotherapy Department, University College Hospital, Ibadan Nigeria (yet to be published) is reported .

4. Findings and discussion

The findings together with relevant discussion pertaining to common group of malignancies are as follows:

4.1 Female breast cancer survivors

Breast cancer is a common cancer among women and survival has increased over time especially if treatment is commenced early. Five year survival has reached about 97% especially in the developed countries with early disease. (Thors et al., 2001) This implies that a lot of women will live long and are likely to experience sexual dysfunction. With breast cancer the term “survivors” is used here to refer to women who have completed surgery, chemotherapy/hormonal and/or radiation therapy for the treatment of breast cancer. Most breast cancer survivors experience about 15% reduction in sexual satisfaction after treatment (Bukovic et al., 2005). Approximately 20–30% of breast cancer survivors experience sexual problems including general sexual disruption, decreased frequency of intercourse, and difficulties reaching orgasm that may persist 20 years post-treatment (Alfano et al., 2007). The reported prevalence of this problem varies greatly, partly due to the various methods and instruments used in their assessment. In terms of specific sexual difficulties, the most common current symptoms reported in this study were absence of sexual desire (48%), reduced sexual desire (64%), anorgasmia (44%), lubrication difficulties (42%), and dyspareunia (38%) while two or more problems were present in about 97% of the participants. These findings show that certain problems appear to be related to the desire stage of sexual activity (e.g. loss of interest in sex), while others appear to be related to the arousal stage (e.g. lubrication difficulties) and the orgasmic stage (e.g. anorgasmia).

In a study among sexually active and recurrence free breast cancer patients who had completed surgery, chemotherapy, and radiation therapy, 64% of the women reported an absence of sexual desire, 38% suffered from dyspareunia, and 42% experienced lubrication problems. Vaginismus, brief intercourse and female orgasmic disorder were reported by 30% of the subjects. Thirty-six percent suffered from sexual dysfunction before treatment, which worsened in about 27%, while in 49% of women sexual problems arose mainly after chemotherapy (26%) or surgery (12%). About one-half experienced changes in the relationship with their partner (Barni and Mondin 1997). In another study of breast cancer survivors, sexual dysfunction occurred more frequently in women who had received chemotherapy and in younger women who were no longer menstruating and depression was an important determinant of lower sexual desire, and survivors on antidepressants had greater problems with arousal and achieving orgasm. (Melisko et al., 2010) In a retrospective study of breast cancer among young females in Nigeria aged 40 years and

below earlier reported by the author, 46 % of the patients reported loss of libido (Ntekim et al., 2009). Another study revealed that women diagnosed at age ≤ 40 years had significant less sexual interest after treatment than women over 40 years (Morrow, 2011).

Survivors with upper extremity lymphedema following breast cancer treatment also experience sexual dysfunction with upper extremity lymphedema as an additional predisposing factor. Sixty-nine women presenting for rehabilitation treatment for upper extremity lymphedema (UEL) were assessed by physical examination and validated self-report assessment instruments measuring demographics, psychological distress, sexual functioning, social support, coping style, pain and functional status by Passik and colleagues (2007). Their analyses revealed that women with UEL had high levels of psychological distress, and high levels of sexual, functional and social dysfunction. There were no linear relationships between severity of UEL and levels of distress. Women with UEL in their dominant hand, however, had more distress and less overall sexual satisfaction than those with UEL in their non-dominant limb. Women with pain of any intensity were the most distressed, and had the most significant difficulties in psychological and physical functioning. Women with pain also perceived significantly less interpersonal support than those without pain. Virtually none were receiving pain treatment. An avoidant coping style and low perceived social support were significant correlates of psychological distress. The study concluded that UEL poses significant functional, social and sexual functioning problems in women following breast cancer treatment and that these patients may also benefit from psychological support and sexual therapy in addition to physical rehabilitation. There are therefore multiple predisposing factors for sexual dysfunction including pre-existing sexual problems, negative sexual self-schemas, (cognitive generalizations regarding sexual aspects of the self; they represent a core component of one's sexuality) and normal age-related changes in sexual functioning. Physical consequences of treatment like absence of one breast, scar on the breast and upper extremity lymphedema are also important predisposing factors. Partners sexual problems and psychological reaction to the diagnosis of cancer are also contributory. Physiologic changes induced by chemotherapy are also important contributors. Induction of premature menopause can result in an estrogen deficiency state that increases the likelihood of hot flashes and poor vaginal lubrication that may contribute to sexual dysfunction (Kaplan, 1991)

4.1.1 Sexual dysfunction and chemotherapy

Compared to breast cancer women who were not treated with adjuvant chemotherapy, women treated with adjuvant chemotherapy are 5.7 times more likely to report vaginal dryness, 3 times more likely to report decreased libido, 5.5 times more likely to report dyspareunia, and 7.1 times more likely to report difficulty reaching orgasm. (Ganze et al., 1998). Chemotherapy therefore affects sexual functioning in women though the extent may vary according to different drug regimen and patients age.

4.1.2 Sexual dysfunction and hormonal therapy

It has been found that the incidence of vaginal dryness, dyspareunia, and loss of sexual interest in women taking Aromatase Inhibitors (AIs) was significant. These symptoms were particularly bothersome in women who experienced acute chemotherapy induced menopause as reported by Fallowfield et al., 2004. In the 5 year follow up in this study, vaginal discharge was less frequently bothersome with anastrozole than Tamoxifen (1.2%

vs. 5.2%) but vaginal dryness (18.5% vs. 9.1%), dyspareunia (17.3% vs. 8.1%), and reduced libido (34.0% vs. 26.1%) were all more common with anastrozole compared with Tamoxifen (Cella 2006). In the quality of life sub-study for the Intergroup Exemestane Study (IES), loss of libido was common and did not differ between groups receiving Tamoxifen for 5 years compared to those patients who switched over to exemestane after 2–3 years of Tamoxifen. There were no differences between the Tamoxifen or exemestane groups for vaginal dryness, discomfort with intercourse, and vaginal irritation (Fallowfield 2006). Even in patients without a diagnosis of breast cancer, hormonal therapies appear to have an impact on sexual function. Analysis of quality of life data from the Study of Raloxifene and Tamoxifen (STAR) prevention trial found that a higher percentage of women randomized to the Tamoxifen arm remained sexually active compared to women in the Raloxifene arm. Among sexually active participants, women randomized to the Raloxifene group experienced significantly more dyspareunia, greater difficulties with sexual interest, sexual arousal, and sexual enjoyment, but no significant difference in the ability to experience an orgasm (Land 2006).

Ganz et al (1999) , found that among women 1 to 5 years post treatment, sexual problems (as measured by the CARES and the Watts Sexual Functioning Scale) were more common in women who had received chemotherapy. Lindley et al. (1998 as cited in Thors 2001), reported an interaction between age and chemotherapy in that the greatest negative change in sexual functioning (as measured by a series of questions that included items measuring sexual satisfaction and interest) occurred in premenopausal women who experienced chemotherapy-induced amenorrhea. Under oestrogen deprivation, with time, the mucosal and stromal tissues of the vagina, urethra, and trigone of the bladder undergo atrophy, resulting in decreased tissue elasticity and fluid secretion. This may lead to symptomatic vaginal dryness and irritation as well as dyspareunia. Oestrogen deprivation also leads to an elevation in vaginal pH which may increase the risk of vaginal and urinary tract infections.

4.1.3 Interventions

Study Instruments:

A number of study instruments have been used in sexual dysfunction studies in breast cancer survivors. The two more commonly used ones are Sexual History Form and the sexual summary subscale of the Cancer Rehabilitation Evaluation System (CARES). The Sexual History Form was developed by Schover and Jensen (1988, cited in Thors et al., 2001) and is composed of 27 multiple choice questions assessing sexual functioning, frequency, and satisfaction with sexual activity. This questionnaire has been standardized and norms from a healthy community sample are available for comparison purposes. The CARES is a quality-of-life instrument that includes an 8-item subscale measuring sexual interest and sexual dysfunction. The CARES has been shown to have adequate reliability and validity, and normative scores are available for cancer patients (Thors et al., 2001).

Other study questionnaires include Watts Sexual Functioning Questionnaire (442-13, sexual dysfunction subscale of The European Organization for Research and Treatment of Cancer [EORTC] QLQ-C30), Derogatis Sexual Functioning Inventory (DSFI), Arizona Sexual Experience Scale (ASEX) and Female Sexual Functioning Index (FSFI). Revised Dyadic Adjustment Scale can be used to assess partner relationship variables so also with Marital Satisfaction Inventory-Revised (MAI-R) (Stead 2003).

Communication with women concerning sexual life is vital. Psychotherapy and behavioural approaches has been shown to be useful in managing these patients. Pharmacologic agents especially non estrogenic topical agents for specific problems like vaginal dryness are recommended. However a thorough assessment to determine which aspect of sexual function is affected can help in prescribing suitable approach to management. This can be done using more detailed study instruments. The commencement of pelvic floor muscle exercises, use of vaginal moisturizer to alleviate vaginal dryness and olive oil as lubricant during intercourse has been shown to improve sexual function in breast cancer survivors. (Juraskova 2011)

4.2 Genito-urinary cancer survivors

Survivors of cancer of the genito-urinary system do experience sexual dysfunction of which some are peculiar to affected organs. Some organs like the urinary bladder are closely related to sex organs and can directly affect sexual functions during the course of the disease and treatment. Post treatment effects like ovarian failure after chemotherapy and pelvic radiotherapy in females can have effects on sexual functions of survivors.

4.2.1 Testicular cancer

Testicular cancer is the most common cancer of young men in their 20s and 30s. Since the advent of effective multiagent cisplatinum-based chemotherapy, the majority of patients are cured. This disease occurs during the peak period of reproductive life and at a key time for career and family. As cured testicular patients have a long life expectancy, sexual function becomes an important issue. It has been found that hormonal dysfunction is frequent after the diagnosis of testicular cancer and treatment can have an additional detrimental effect. This can have a significant impact on the sexual life of the survivor and contribute to other health problems. Most patients, however, remain fertile though this can be affected by their treatment. Long-lasting sexual problems after therapy for testicular cancer are present in approximately one-fifth of patients undergoing treatment for testicular germ cell tumour. On the other hand, the majority of patients have not reported infertility or sexual dysfunction-related symptoms (Hartmann et al., 1999). In a study by Huddart and colleagues, the testicular module of the EORTC QLQ C-30 Questionnaire, which consists of six questions directed at sexual function and sexual satisfaction and two additional questions about masculinity and concerns about fathering children, was used. Overall sexual function from the analysis seemed to be satisfactory with 83% of patients expressing satisfaction in their sexual relationships with their partner with no differences between treatment groups. Compared to surveillance there was a tendency for treated groups to have less sexual activity and less interest in sex. This was only statistically significant for patients treated with chemotherapy and radiotherapy (CRT) and less interest in sex was of borderline significance for CRT and radiotherapy (RT). Additionally, radiotherapy treatment was associated with reduced sexual enjoyment compared with patients on surveillance (Huddart et al., 2005) The Derogatis Interview for Sexual Functioning-II Self-Report-Male questionnaire can also be used to assess sexual dysfunction in males (Greenfield et al., 2010).

4.2.2 Prostate cancer

Erectile dysfunction is common after prostatectomy because of the interference with the nerves. The extent being different with different methods of surgery as some have more nerve sparing effects than others.

In comparison with prostatectomy, patients treated with external beam radiation report less long-lasting urinary symptoms, but more bowel side effects, with no difference in global quality of life. Sexual disorders are initially less important with external beam radiation but increase over time. Brachytherapy shows no sexual function preservation benefit relative to external beam radiation and may be less favourable with more urinary sequelae. The association of hormonal therapy and external beam radiation decreases the quality of life of the patients, with a negative impact on vitality, sexuality and increase urinary disorders. Intensity-modulated radiotherapy (IMRT) seems to better preserve the long-term digestive quality of life in comparison with conformal radiation therapy (Joly et al., 2010). Radical surgical prostatectomy for cancer is performed by the perineal, retropubic, or transpubic routes. Surveys of patients undergoing either retropubic or perineal prostatectomy have reported comparable findings, with estimates of diminished erectile capabilities or complete erectile failure after surgery for 90% of the patients. The incidence of ejaculation difficulties with or without concomitant erectile failure is estimated as occurring for 78% of the retropubic and 100% of the perineal prostatectomy patients. If hormone therapy and/or orchiectomy are additionally used after either surgical procedure, virtually 100% of the patients experience erectile failure and ejaculation difficulties. These estimates are three to four times higher than those for patients treated for benign conditions with less extensive surgery (Andersen 1985). The sexual domain of the Expanded Prostate Cancer Index (EPIC) questionnaire can be used to assess prostate cancer survivors.

4.2.3 Bladder cancer

Early bladder cancer is treated by transurethral resection and there may be minimal sexual dysfunction. Cystectomy is associated with reduction in desire and erectile function in about 30% of male patients while sexual excitement and orgasm is impaired in women. (Anderson 1985) A comprehensive, disease specific measure of health related quality of life in patients with localised bladder cancer has been developed by Gilbert et al., (2010).

4.3 Gynaecological cancer survivors

Modalities of treatment comprising of surgery, chemotherapy, radiotherapy and hormonal therapy either single or in various combinations are used to treat gynaecological malignancies. All these modes have the potential to affect sexual functions of the patients. Gynaecological malignancies have the ability to affect a woman's sexual wellbeing primarily as the sexual reproductive organs are involved. Altered sexual functioning is the most affected aspect of quality of life of gynaecological cancer survivors occurring in 40-100% of patients compared to 19%-50% of the healthy outpatient population (Andersen, 1985).

4.3.1 Cervical cancer

The two modes of treatment for early disease, radical hysterectomy and radiation therapy, are equally common for early stage cervical cancer. Surgical treatment allows ovarian preservation for premenopausal women, but does cause vaginal shortening, which has contributed to coital discomfort (Andersen & Hacker 1983). Radiation therapy destroys ovarian functioning and causes vaginal atrophy and stenosis. Dyspareunia from lack of lubrication, tenderness of the vagina, and post coital bleeding have been resultant problems. Comparable outcome with 29% and 33% of radiation and hysterectomy patients, respectively, reporting subsequent sexual difficulties have been reported (Andersen 1985).

Some studies demonstrated that women with early stage cervical cancer receiving hysterectomy and radiotherapy suffered a number of short-term sexual difficulties such as dyspareunia, problems during intercourse and lack of sexual satisfaction, but that by 6 months after the surgery these problems had often reduced. However, some sexual difficulties persisted, in particular lack of sexual interest and lack of lubrication. In contrast, women with advanced, recurrent, or persistent cervical cancer experienced prolonged problems with vaginal lubrication, lack of orgasm, and lower frequency of intercourse, in addition to reduced sexual interest, throughout the 24 months post diagnosis (Stead 2004)

The Female Sexual Function Index (FSFI) questionnaire and ALARM model are useful questionnaires to assess sexual function in these patients (Andersen 1990).

In a study by Lindau ST et al. (2007) sexual problems were significantly more prevalent among very long term (>25 years) survivors of cervical and vaginal cancers than in population-based comparison group. For example, the prevalence of dyspareunia (pain during intercourse) and difficulty lubricating were, respectively, nearly 7 and 3 times higher among survivors. Survivors were also significantly more likely than those in the population-based sample to exhibit complex sexual morbidity, defined as concurrent sexual problems in three or more of seven domains, and to report avoiding sex because of sexual problems (62% versus 43%). In the same study, 62% of survivors reported that a doctor had never initiated a conversation about the effects of cancer or treatments for genital tract cancer on sexuality and Bivariate analysis revealed that a conversation with a physician about the sexual effects of genital tract cancer and cancer treatment is associated with significantly fewer sex morbidities. Some studies show that education on vaginal lubricants, moisturizers, and dilator use (as needed) can decrease the morbidity of vaginal atrophy (Carter et al., 2011).

4.3.2 Vulval cancer

Surgical treatment is commonly used for treating vulval carcinoma. This has some effects on sexual performance of the patients and various patterns of sexual dysfunction have been reported. A survey of 18 patients treated with wide local excision rather than vulvectomy for microinvasive disease indicated that all women continued to be orgasmic during sexual activity, in contrast to two radical vulvectomy patients who reported loss of orgasmic ability and dyspareunia. (Andersen 1985) A retrospective study of women who received radical surgery indicated discrepancies between the actual and the preferred frequency of sexual activities such as intercourse and a limited capacity for sexual arousal among these patients. Interestingly, orgasmic responsiveness is reported by women who had and who had not undergone clitoral excision at the time of vulvectomy (Thuesen et al., 1992). Another study has shown that more than half of women with vulval cancer experience sexual problems, with those women undergoing local vulval excision for vulval dysplasia experiencing the most problems. While these, in part, are related to anatomic changes, inadequate counselling and poor advice were contributing factors. A small study described how vulvectomy was associated with altered body image and arousal difficulties, and suggested that risk factors for sexual problems were age, depression, poor performance status, and preoperative sexual dysfunction. These findings demonstrate the need for appropriate counselling and advice for women with vulval cancer. (Green et al., 2000)

4.3.3 Endometrial cancer

Women with endometrial cancer are usually older and postmenopausal and their treatment often involves surgery plus radiotherapy and so surgery and radiation induced vaginal

difficulties can occur. The pattern of sexual difficulties may be similar to those with cervical cancer of similar age group.

4.3.4 Ovarian cancer

Ovarian cancer is usually treated with a hysterectomy (including oophorectomy), and chemotherapy. Few of them also have adjuvant radiotherapy. These can all affect sexual functioning, through a decrease in oestrogen production resulting in vaginal atrophy and dryness. There can be hot flushes and loss of sexual interest resulting from changes in body and hormonal levels especially if the patients were pre menopausal prior to treatment. A study of 200 survivors of ovarian cancer showed that over 50% reported worsened sexual function (Stewart et al., 2001)

A cross-sectional study in 232 women with ovarian cancer showed that ovarian cancer is also associated with low sexual desire (47% reported no/little desire), vaginal dryness (experienced in 80% of women having sexual intercourse in the last month), dyspareunia (in 62%), and problems with orgasm (in 75%). This study also evaluated predictors of sexual activity and found that being married, being under 56 years, not receiving treatment, good self-esteem/body image, and length of time since end of treatment were all associated with being sexually active. This paper compared the findings of the research with studies in breast cancer and healthy postmenopausal women and concluded that although low desire, vaginal dryness, and dyspareunia occur in these other groups; the problems are more common and more severe in women with ovarian cancer. (Stead, 2004). A study of survivors of ovarian cancer found that about 80% of them who were sexually active before treatment reported vaginal dryness. This can lead to dyspareunia and subsequent fear of possible pain during vaginal penetration may contribute to the loss of interest in sex. (Carmack-Taylor et al., 2004). EORTC QLQ OV 28 is a useful questionnaire in assessing sexual dysfunction among ovarian cancer survivors.

The possible sexual problems caused by cancer treatment in females are presented in table 1 below.

Treatment	Low Sexual Desire	Less Vaginal Moisture	Reduced Vaginal Size	Painful Intercourse	Trouble Reaching Orgasm	Infertility
Chemotherapy	Sometimes	Often	Sometimes	Often	Rarely	Often
Pelvic radiation therapy	Rarely	Often	Often	Often	Rarely	Often
Radical hysterectomy	Rarely	Often ^b	Often	Rarely	Rarely	Always
Radical cystectomy	Rarely	Often ^b	Always	Sometimes	Rarely	Always
Abdominoperineal (A-P) resection	Rarely	Often ^b	Sometimes	Sometimes	Rarely	Sometimes ^b
Total pelvic exenteration with vaginal reconstruction	Sometimes	Always	Sometimes	Sometimes	Sometimes	Always
Radical vulvectomy	Rarely	Never	Sometimes	Often	Sometimes	Never
Conization of the cervix	Never	Never	Never	Rarely	Never	Rarely
Oophorectomy (removal of one tube and ovary)	Rarely	Never ^b	Never ^b	Rarely	Never	Rarely
Oophorectomy (removal of both tubes and ovaries)	Rarely	Often ^b	Sometimes ^b	Sometimes ^b	Rarely	Always
Mastectomy or radiation to the breast	Rarely	Never	Never	Never	Rarely	Never
Tamoxifen therapy for breast or uterine cancer	Sometimes	Often	Sometimes	Sometimes	Rarely	Always
Androgen therapy	Never	Never	Never	Never	Never	Uncertain

^b Vaginal dryness and size changes should not occur if one ovary is retained or if hormone therapy is given.

Table 1. Female sexual problems caused by cancer treatment. (Adapted from American Cancer Society Inc. 2009 as cited in Audette and Waterman 2010).

4.4 Gastro intestinal cancer survivors

Survivors of gastrointestinal malignancies also experience sexual disorders. Although studies in most sites are not easily available, few reports show that survivors of these cancer site also experience sexual dysfunction.

4.4.1 Colorectal cancer survivors

Colorectal cancer is quite common all over the world including Europe and America. Surgical resection is an effective treatment modality for early diseases. The surgical approach differs according to the location of the tumour. Low lying tumours are located 0-5 cm from the anal verge and abdomino- perineal resection is the approach commonly used resulting in permanent colostomy. A review by Sprangers et al. (2003) noted that this operation disrupts nerve fibres associated with sexual function more in men than in women. It also noted that low or high anterior resection used in the treatment of tumours located more than 5cm from the anal verge (lower or upper colon) which are sphincter sparing, also disrupts some nerves associated with sexual function especially if ultra low anastomosis are used. In a study on survivors after chemo-radiotherapy for rectal cancer using EORTIC QLQ-CR38, The scores for "sexual functioning" and "enjoyment" were low. Men had more sexual problems than females (62.5 vs. 25 mean scores respectively). (Tiv et al, .2010). Erectile dysfunction was also reported among men and the presence of colostomy was reported to further reduce sexual functioning in males but not in females.

Several retrospective studies of sexual functioning after excision of the rectum for cancer have been conducted. For men, estimates of sexual dysfunctions have ranged from 32% to 59% for sexual desire, from 28% to 76% for erectile difficulties and from 66% to 86% for ejaculation disruption (Andersen, 1985). Estimates for women from one investigation reported that 28% of the sample had reduced desire and 21 % reported genital numbness or dyspareunia. (Kuchenhoff 1981 as cited in Andersen 1985)

Laparoscopic surgical techniques have been used in resection of colorectal cancers with reported equivalence in tumour clearance with conventional open techniques. It has additional advantage of less pain, reduced hospital stay and earlier return to normal function. In a retrospective assessment for rectal dysfunction in colorectal cancer patients who had laparoscopic resection, Aquah et al. (2002) reported that a significant difference in sexual function in males but not females was noted. Seven of the 15 sexually active men in the laparoscopic group reported impotence or impaired ejaculation while only one of the 22 patients in the open surgery group had such complain. ($P=0.004$). The study concluded that laparoscopic resection of colorectal cancer was associated with more sexual dysfunction than open surgical resection.

4.4.2 Hepatocellular cancer (HCC)

Patients with hepatocellular carcinoma also experience sexual dysfunction. In a study by Steel et al., (2005) comparing sexual dysfunction among hepatocellular cancer patients and chronic liver disease (CLD) patients, reported that with regards to the differences between HCC patients and those with CLD with respect to sexual problems, the rates of sexual morbidity were found to be higher in patients diagnosed with HCC for the majority of the sexual problems, including hypoactive sexual desire disorder (26% vs. 18%), sexual aversion disorder (18% vs. 5%), male orgasmic disorder (13% vs. 5%), premature ejaculation (17% vs. 5%), and dyspareunia (12% vs. 5%). The only disorder in which CLD patients reported a higher prevalence than HCC patients was male erectile disorder (21% vs. 17%) Male patients

had more sexual problems than the general population. The study also noted that co morbid conditions like hypertension, diabetes mellitus and cardio vascular diseases were more prevalent among HCC patients and medications for these conditions could add to their sexual problems.

4.4.3 Anal cancer

Majority of patients treated for anal cancer experience sexual dysfunction. A study using split course chemo radiotherapy for the treatment of anal cancer among 58 patients reported that fifty percent of patients maintained an interest in having sexual relations but 100% of male patients had difficulty maintaining an erection. Forty-four percent of men qualified the erectile dysfunction as severe (# 4 on the scale: very much). Among women, 65% had no interest at all in sexual relations, 21% a little, and only 14% had a moderate interest. For those women who maintained an interest in having sexual relations, 50% reported having pain or discomfort during intercourse. The majority of the patients did not suffer from non-satisfaction regarding their body or loss of masculinity or femininity in relation to their cancer or the treatment (Provencher et al., 2010).

4.5 Haematological cancer survivors

Survivors of haematological cancers including lymphoma do also experience sexual dysfunction especially those treated with bone marrow transplant. (Haematopoietic Stem Cell Transplant - HSCT). These patients usually receive cytotoxic chemotherapy and or whole body irradiation to suppress graft versus host reaction. Jean et al. (2009) in an extensive review of this aspect among survivors of HSCT noted that “these treatments impair the production of testosterone at least for the first year for males, and induce ovarian failure for most women. Effects are not solely gonadal. Treatments are known to permanently damage function of the hypothalamic-pituitary-gonadal axis. Luteinizing hormone (LH) is elevated in most female survivors and normal in most males. Follicle stimulating hormone is elevated in over 90% of females and most males. Most females have primary ovarian failure with consequent low endogenous oestrogen levels, and vaginal tissue atrophy is a risk. Chronic GVHD (Graft Versus Host Disease) may also contribute to vaginal introital stenosis and mucosal changes that contribute to dyspareunia, vaginal irritation, and increased sensitivity of genital tissues. Male sexual problems have been attributed to gonadal and cavernosal arterial insufficiency with resulting libido and erectile dysfunction.” These reactions are mostly noted with alkylating agents class of cytotoxic drugs.

The lymphomas (Hodgkin's lymphoma [HL] and non-Hodgkin's lymphoma [NHL]) are among the most common cancers affecting men under 45 years. Survival rates are now excellent, but treatment is associated with a number of side effects including sexual dysfunction with potential implications for compromised quality of life (QoL). A study was carried out to address (i) the prevalence of sexual dysfunction among lymphoma survivors relative to the general population, survivors of other cancers, and in survivors of HL and NHL; and (ii) relationships between sexual functioning and disease and treatment, demographic, and psychological variables. Sexual function was found to be compromised relative to the general population, better than testicular cancer survivors, and worse than leukemia survivors. Depression was consistently associated with sexual dysfunction. There was evidence that chemotherapy, relapse, reduced testosterone levels, older age at survey, and worse physical QoL were associated with worse sexual function (Arden-Close et al., 2011). Another study found out that sexual problems were commonly reported by HL

survivors, with 54.2% reporting decreased sexual activity and 41.4% reporting decreased interest. In the long term, this study did not show any difference in sexual function in long term survivors compared with the general population (Reclitis et al., 2010). However in another study on male lymphoma using Brief Sexual Function Index (BSFI) questionnaire, survivors had a mean age at survey of 47.4 years, the mean duration of follow-up was 14.8 years, and 79% lived in committed relationships. All BSFI domain scores decreased significantly with age. Lymphoma survivors also had low testosterone and/or elevated LH and had lower BSFI scores than survivors with normal gonadal hormones. Multivariate analyses showed that increasing age, more emotional distress, poor physical health, and low testosterone and/or elevated LH were significantly associated with reduced sexual function within the lymphoma group. Lymphoma survivors had significantly lower BSFI domain scores than did controls on erection, ejaculation, and sexual satisfaction (Kiserud et al., 2009). Erectile dysfunction has also been reported in 61% of lymphoma survivors assessed at least two years after treatment. (Aksoy et al., 2008). An earlier report found that chemotherapy for Hodgkin's disease produces ovarian failure in young women. The consequences of this are emotional distress, sexual dysfunction, and the disruption of families and friendships. These side effects of cytotoxic therapy had developed in 25 of 41 patients, among whom retrospective study was conducted (Chapman et al., 1979). Chemotherapy for Hodgkin's disease in that era however consisted of largely alkylating agents. Current combinations may not have such marked effects on ovarian function.

4.6 Central nervous system survivors

Survivors of brain tumours also experience sexual dysfunction. Neuroendocrine disturbances in anterior pituitary hormone secretion are common following radiation damage to the hypothalamic-pituitary (H-P) axis, the severity and frequency of which correlate with the total radiation dose delivered to the H-P axis and the length of follow-up. The somatotrophic axis is the most vulnerable to radiation damage and GH deficiency remains the most frequently seen endocrinopathy. With low radiation doses (<30 Gy) GH deficiency usually occurs in isolation in about 30% of patients, while with radiation doses of 30-50 Gy, the incidence of GH deficiency can reach 50-100% and long-term gonadotropin, TSH and ACTH deficiencies occur in 20-30, 3-9 and 3-6% of patients, respectively. With higher dose cranial irradiation (>60 Gy) or following conventional irradiation for pituitary tumours (30-50 Gy), multiple hormonal deficiencies occur in 30-60% after 10 years of follow-up. Precocious puberty can occur after radiation doses of <30 Gy in girls only, and in both sexes equally with a radiation dose of 30-50 Gy. Hyperprolactinaemia, due to hypothalamic damage is mostly seen in young women after high dose cranial irradiation and is usually subclinical. H-P dysfunction is progressive and irreversible and can have an adverse impact on growth, body image, sexual function and quality of life. Regular testing is advised to ensure timely diagnosis and early hormone replacement therapy (Dalzy and Shalet, 2009). A prospective trial of the methods of sexual rehabilitation of 31 men with pituitary tumours has shown that therapy with testosterone and chorionic gonadotropin effectively corrects hypogonadism and sexual disorders. In insufficient efficacy, normalization of sexual function is achieved with tadalafil. Both methods of treatment had no negative effect on the size of the prostatic gland and PSA level except 2 patients with somatotropinoma on testosterone. In the course of chorionic gonadotropin treatment pituitary tumour increased in size in 3 patients (Rozhivanov & Kurbatov 2010). There is a case report of a 39-year-old patient with a history of high-grade anaplastic astrocytoma who presented to the Sexual Health Program at the Memorial Sloan-Kettering Cancer Center complaining of vaginal

discharge and several months of amenorrhea. Although the patient was administered extensive aggressive antineoplastic treatments, her disease rapidly progressed. She was found to have mild vaginal atrophy and had improved sexual function after treatment which consisted of intravaginal non-hormonal moisturizers and vaginal lubricants, counselling, and sexual education (Krychman et al.,2004).

4.7 Survivors of sarcoma

Sarcomas of soft tissues and bones/ cartilages are usually treated with surgery (if possible depending on the site), radiotherapy and sometimes with chemotherapy consisting of vincristine, cyclophosphamde, doxorubicine with or without actinomycine D. Chemotherapy especially cyclophosphamide has been reported to be associated with low sperm count and raised follicle stimulating hormones in males . Exposure before puberty was not found to be protective and infertility was associated with high doses of cyclophosphamide. (Kenny et al., 2001) Total sacrectomy and reconstruction for patients with osteosarcoma, chondrosarcoma, giant cell tumour and chordoma in the sacral region is associated with high degree of sexual dysfunction likely due to disruption of the nerves around the site. (Wuisman et al., 2000)

4.8 Head and neck cancer survivors

Survivors of head and neck cancers also have sexual dysfunction. In a study involving 55 participants, eighty-five percent showed interest in sex. Fifty-eight percent were satisfied with their current sexual partner and 49% were satisfied with their current sexual functioning. Majority reported arousal problems, 58% did not participate in sexual intercourse, and 58% had orgasmic problems. Most patients were not depressed. There was no correlation between sexual functioning and performance status or severity of disfigurement. Patients younger than 65 years of age had more advanced disease, lower performance status and significantly poorer sexual functioning; those older than 65 years were more satisfied with their sexual partner and current sexual functioning (Monga et al, 1997).

Study instruments used in studies among head and neck cancer patients include Derogatis Sexual Function Scale, EORTIC QLQ H&N 37 sexual subscale

A quality of life studies among head and neck cancer survivors has been carried out at the Radiotherapy Department of The University College Hospital Ibadan Nigeria by the author. The aim of the study was to compare the quality of life pre treatment with quality of life at least 9 months post treatment of head and neck cancer patients seen at the centre. The materials and methods used included the assessment and evaluation of head and neck cancer patients that presented for treatment. All patients evaluated had histological confirmation of their conditions .Those with ECOG performance status greater than 2 or for palliative treatment were excluded as well as patients that were HIV positive. To study the sexuality component, The EORTIC H&N QLQ 35 questionnaire was used. There are only 2 questions that relate to the sexuality domain in the instrument and these are questions:

29. Have you felt less interest in sex? And 30. Have you felt less sexual enjoyment? These were assessed on a 4 point Likert scale as follows:

Not at all	A little	Quite a bit	Very much
1	2	3	4

The questionnaires were administered before commencement of treatment and at least 9 months after treatment during follow up visits.

A total of 100 patients were evaluated. The characteristics of the patients are presented in table 2.

Age group distributions	
Age group (yrs)	
16-25	13(13%)
26-35	9(9%)
36-45	20(20%)
46-55	16(16%)
56-65	24(24%)
66-75	0 (0%)
76-85	18(18%)
Sex:	
Male	58(58%)
Female	42(42%)
Marital status:	
Single	21(21%)
Married	70(70%)
Widow/widower	9(9%)
Level of Education:	
Primary	6(6%)
Secondary	38(38%)
Tertiary	31(31%)
None	25(25%)

Table 2. Head and Neck Quality of Life (Sex) studies : Patients’ characteristics. (N=100)

The overall mean age was 49.86 years with a range of 18-85 years and Standard Deviation (SD) = 17.48. Mean age for males = 51.59 years, range = 19-85 years and SD = 16.93 while mean age for females = 47.60 years with a range of 18-85 years and SD = 18.39. The pre-treatment and post treatment scores are presented in table 3

	Pre- treatment scores	post treatment scores	Std Deviation	p-value
Overall (mean)	38.6	49.8	18.00	0.00
Male	35.0	46.2	31.38	
Female	42.2	53.9	28.70	0.21
Stage				
1/11		44.0	29.67	
111/1V		50.3	30.56	0.47
Disease Sites				
Oral cavity	40	44		
Nasopharynx:	49	58		
Oropharynx :	50	53		
Larynx:	36	50		
Sino-nasal region	44	60		
Salivary gland:	32	36		
Thyroid gland	15	41		

Table 3. Head and Neck Quality of Life (Sex) Scores (N=100)

These results show that there were reduction in sexual functioning in all the patients after treatment for head and neck cancers and these were noticed with all cancer sites. Survivors of cancers of the Sino-nasal region experienced the highest sexual problems followed by those with laryngeal cancers among the core head and neck cancer patients. Survivors of thyroid cancer however had the highest score of sexual dysfunction and it is better considered separately as endocrine cancers since hypothyroidism can result in sexual dysfunction. Patients with advanced diseases (stages III & IV) experienced more sexual problems than those with early diseases (stages I & II). [P value 0.47] This is similar to earlier reports by Monga et al., (1997) who reported poorer sexual function among patients with advanced disease which was more in those 65 years and above. The result also shows that the effect was more on females than males (P value 0.21). This may probably be due to the use of chemotherapy which may have more effects on the hormonal status of the female patients. Some chemotherapy agents affect the ovaries leading to reduction in the amount of circulating oestrogen. This leads to reduced sexual functions. Ovarian failure occurs most often in women who are above 35 years of age after chemotherapy (Schover, 2008).

The reported changes in sexuality is important because the mean age of these patients was 49 years which means that these patients are relatively young and therefore sexually active, as this is an important social aspect for many of them.

This analysis gives an indication that these patients have sexual issues following treatment. These issues need to be addressed by care givers. More detailed study focussing on sexuality of survivors using questionnaires that can evaluate specific aspects of sexual function is required for better assessment and management of survivors of head and neck cancers in this environment.

4.9 Lung cancer survivors

Sexual problems exist among survivors of lung cancer. A report noted that sexual concerns were common, with 52% of patients reporting at least mild sexual concerns and were stable. Sexual concerns were significantly associated with physical and emotional symptoms. Particularly strong relationships were found between sexual concerns and shortness of breath and emotional distress. Age moderated the relationship between both fatigue and shortness of breath and sexual concerns. Gender moderated the relationship between emotional distress and sexual concerns. Self-reported sexual concerns were noted to be common in people with lung cancer, are stable, and are related significantly to physical and emotional symptoms. Age and gender influenced the distress associated with sexual symptoms in this population. (Reese et al., 2011)

4.10 Management of sexual dysfunction

It is important that sexual issues be looked into among cancer patients especially after treatment. During the course of the disease, lots of issues like anxiety concerning the disease and its treatment, financial issues, employment related issues and other social issues may affect sexual health of the patients. Those who have completed their treatment will be free from many other co-founding problems and sexual issues will come to the fore. These have to be addressed as part of the patients' management. It is also pertinent to note that these issues vary in intensity with respect to duration of survival hence periodic reassessment needed for necessary adjustments in pattern of care.

4.10.1 Assessment

Cancer survivors should be assessed for sexual dysfunction before treatment and as soon as they are clinically stable. It is important to know the pre treatment sexual functioning of the individual as this varies from person to person. This baseline information will also enable the health personnel to assess the degree of variation ascribable to the disease and its treatment. Anxiety and depression associated with the illness should be identified and managed before addressing sexual concerns. There is also need to distinguish cancer patients with sexual difficulties and concomitant psychosocial stressors (*e.g.*, financial, familial, occupational, marital). These latter difficulties could disrupt the range, frequency, enjoyment, or importance of sexual activity for cancer patients as they sometimes do for healthy individuals.) from those without additional stressors, allowing more specific etiologic associations to be identified

Discussions on survivors sexual health can be commenced using some tools like:-

PLISSIT model—Permission, Limited Information, Specific Suggestions and Intensive Therapy. This model involves four stages to guide the assessment and treatment of sexual dysfunction. The first stage, permission, involves providing the patient with an opportunity to discuss sexual problems or concerns. Limited information involves the provision of general information about the sexual problem and options for intervention. Specific suggestions would include detailed discussions about treatment options and techniques that could be used to improve sexual activity. Intensive Therapy usually involves referral to a specialist. This model can be used to systematically guide the healthcare professional through the evaluation of sexual dysfunction and the provision of information. (Stead 2004) ALARM model- Activity, Libido, Arousal, Resolution, Medical information. Communication has to be initiated by the health care personnel with the patients concerning the above aspects of their sexual lives in order to establish possible areas of intervention. PLEASURE model –Partner, Lovemaking, Emotions Attitude, Symptoms, Understanding, Reproduction Energy.

BETTER model- Bring up the topic, Explain that sexuality is an important aspect of quality of life and should be discussed, Tell patients that there are resource s available to address concerns or problems, Timing is important, offer discussions and let them know you are available anytime, Educate patients and families how treatment can impact sexuality, Record discussions , assessment, interventions and outcomes (Audette & Waterman 2010).

These tools can be applied for general screening of patients for sexual dysfunction and it is recommended that this assessment should be done periodically to monitor the patients. Detailed diagnostic tools could then be applied in those with established problems for more specific diagnosis based on disease site and patients characteristics. A list of some other tools that can be used to assess various aspects of sexual dysfunction is provided in table 4..

4.10.2 Treatment

Some physical therapy like exercises can help in the treatment of some forms of sexual dysfunction as part of general well being resulting from exercise. Specific exercises like pelvic floor exercises can promote relaxation and help in relieving dyspareunia following treatment of some gynaecological malignancies. Intercourse should be encouraged at least three times per week following pelvic irradiation in women. Alternatively, vaginal dilators of fingers can be used at least three times per week for ten minutes to keep the vaginal canal patent. This is also useful towards follow up examinations (Borduka & Sun 2006). Pharmacological agents like non steroidal lubricants for women are also available for those experiencing vaginal dryness. Psychological therapy especially by specialists can improve

the situation. Hormonal replacements may be useful especially in some hormone associated conditions like following treatment for pituitary tumours and other endocrine malignancies.

Name of Questionnaire	Author(s)	Original language
Arizona Sexual Experience Scale	Gelenberg, A.	English
Brief Index for Sexual Functioning for women (BISF-F)	Rosen ,R.	English
Brief Sexual Function Index (BSFI)	O'Leary, M.	English
Changes in Sexual Functioning Questionnaire (CSFQ)- F & M Components	Clayton ,A	English
Derogatis Index for Sexual Functioning (DISF) M & F	Derogatis, L	English
Erectile dysfunction Inventory of Treatment Satisfaction (EDITS)	Altof S Et al., for Pfizer Inc	English
Erectile Dysfunction Quality of Life ED EQOL	Mac Donagh	English
Erectile Dysfunction Question (EDQ)	Araujo, A.	English
Female Sexual Desire Profile (FSDP)	Nillson ,A.	English
Female Sexual Distress Scale (FSDS)	Derogatis, L.	English
Female Sexual Distress Scale (FSDS)- Revised 2005	Derogatis, L.	English
Female Sexual Encounter Profile - adapted (FSEPa)	Ferguson D.	English
Female Sexual Function Questionnaire (FSFQ)	Quirk, F	English
Female Sexual Function Index (FSFI)	Rosen ,R & Ferguson D	English
International Index of Erectile Function (IERF)	Rosen, R for Pfizer Inc	English
International Index of Erectile Function (IERF)- Partner Diary	Rosen ,R. For Pfizer Inc	English
Inventory of Treatment satisfaction (ITS)	Althof et al.	English
Mc coy Sexuality Questionnaire (MFSQ)	Mc Coy, N.	English
MOS Sexual Function Module (MOS-SEXUAL)	Ware Dr.	English
Psychosexual Daily Questionnaire (PDQ)	Wang, C.	English
Sexual Activity Questionnaire (SEXACQ)	Fallowfield L	English
Sexual Function Index (SFI)	O'Leary	English
Sexual Life Quality Questionnaire (SLQQ)	Lass, S.	English
Sexual Satisfaction Module (SEXTES)	Testa, M.	English

Table 4. Specific Questionnaires: Sexuality. Adapted from Mapi Institute (n.d.)

5. Conclusion

The prevalence of sexual dysfunction among cancer survivors is high and the extent varies according to years of survival, disease site, age and sex of the patients. It should therefore be borne in mind that almost all oncology patients have sexual issues. There is need for improvement in the routine assessment of sexual functions among cancer survivors. To enhance this, training on basic assessment techniques including communication should be undergone by all those who partake in the care of cancer patients. There is also need for increased training in management of sexual issues and management techniques should be improved upon through further research for effectiveness.

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