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Prevalence, classifications and factors associated with sexual dysfunction among adult cancer patients on chemotherapy at the Uganda Cancer Institute, Mbarara

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Abstract

Background Sexual dysfunction is a social challenge that devastates many people, including cancer patients. However, among the numerous reported side effects of chemotherapy sexual dysfunction is the least studied and reported. The chemotherapeutics used among cancer patients are potential risk factors for the development of sexual dysfunction, and such an understanding of these risk factors can lead to numerous interventions to bypass their effects on sexual activity.

Objective The goal of this study was to determine the prevalence, classification and factors associated with sexual dysfunction among cancer patients receiving chemotherapy.

Methods A cross-sectional study was conducted among 214 cancer patients at the Mbarara Regional Referral Hospital in southwestern Uganda for a period of 3 months from August to October 2023. A systematic sampling technique was employed in the study; a questionnaire was used to collect patient data. The standardized female sexual function index and international index of erectile function tools were used to classify types of sexual dysfunctions among women and men, respectively. Sexual dysfunction-associated factors were analyzed by logistic regression using Stata version 17.

Results A total of 127 males and 87 females with a median age of 50 years were enrolled. Overall (42.1%) of the patients, (54.3%) males and (24.1%) females experienced sexual dysfunction. (33.9%) of male reported overall sexual dissatisfaction, while among female (18.4%) patients reported decreased sexual desire. while others reported reduced arousal and vaginal pain. Multivariate logistic regression revealed the following independent risk factors for sexual dysfunctions: male sex (AOR 3.99, 95% CI 1.93–8.25; p value = 0.001), gastrointestinal cancer (AOR 3.46, 95% CI 1.34–8.93; p value = 0.010) and anthracyclines use (AOR 4.26, 95% CI 1.02, 17.76; p value = 0.047).

Conclusions Our findings suggest that there is a high prevalence of sexual dysfunction among cancer patients at the Mbarara Regional Referral Hospital. In male patients, overall sexual dissatisfaction is the most prevalent, while

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decreased sexual desire is prevalent in females. Routine screening of sexual functions should be encouraged for all patients receiving chemotherapies. Males patients, those diagnosed with gastrointestinal cancers and those receiving regimens containing anthracyclines should be more closely monitored for sexual dysfunction.

Keywords Anorgasmia, Dyspareunia, Erectile dysfunction, Anthracyclines, Chemotherapy

Introduction

Globally in 2020, 19.3 new cancer cases were estimated to be reported, with almost 10.0 million cancer deaths. These burdens are expected to increase to 28.4 new cases by the year 2040, which accounts for a 47% increase from the 2020 value. Furthermore, it is projected that by 2028, over the next six years, more than 1,700,000 people will be diagnosed with cancer and more than 600,000 people with cancer will lose their lives [1]. While this condition continues to ravage worldwide, Uganda is no exception because its cancer incidence was 34,008 in 2020. Almost 15% of the population in the country has a risk of developing cancer before 75 years of age, with a mortality in the same year of 22,992 [2] .

However, with timely diagnosis and advanced treatment, most cancer patients have high survival rates [3]. Despite improved survival rates, it is necessary to focus on patients' quality of life which can be affected by complications from delayed diagnosis or treatment modalities, especially sexual desirability which requires thoughtfulness [4]. Sexual dysfunctions (SD) are strains and distresses that occur during a sexual reaction that prevents an individual from experiencing satisfaction from sexual activity [5]. Most of these dysfunctions are subjective thus SD as a result of chemotherapy and radiotherapy decrease after treatment is completed [6].

To determine the prevalence of sexual dysfunction, a study in Germany reported a combined prevalence of sexual dysfunction among all genders of 31.8%, 40.5% of which were male and 23.07% of which were female [7]. Elsewhere among Turkish women, 55.9% had their sexuality negatively affected by chemotherapy treatment [8]. A study in Nigeria showed that six [6] months after treatment, 67.9% of breast cancer patients felt inadequate as women and 70.0% experienced a decreased conjugal frequency [9]. In Kenya, 85% of cancer patients had SD, while 65% of these patients had discussed their sexuality with a physician [10].

Further studies revealed that both male and female cancer patients had reduced sexual frequency, decreased sexual satisfaction and reduced penetration and no penetrative sexual activities. Vaginal dryness, tiredness and feeling unattractive were reported by females while erectile dysfunction was reported by males [11]. Furthermore both male and female patients with colorectal cancer had a 61% decrease in sexual desire, a decreased sexual frequency stood at 48%, and the orgasm possibility was at 48% two years after diagnosis [12].

Reproductive and nonproductive cancers caused an incidence of sexual displeasure in equal measures in more than one-third of adolescents and young adults [13]. While a study grounded on the international index of erectile function (IIEF) revealed that patients receiving cisplatin treatment had a notable decline in erectile function after treatment [13]. Erectile dysfunction affects 40.72% of prostate cancer patients and has been linked to cancer treatment regimens, cancer site, and age. 63% of patients [14]with non-Hodgkin lymphoma NHL who were receiving alkylating-based chemotherapy reported sexual dysfunction while twenty-two 22% percent had the perception of being infertile [15].

These lost sexual functions (SF) can lead to disappointment due to intimacy loss, frustration, anger, sadness, feelings of inadequacy, shifts in femininity and masculinity, relationship strains, and difficulty in forming new relationships. On the other hand, they increase patient confidence, reprioritize sex, renegotiate sex, while some relationships and marriages are strengthened [11]. Therefore, increased focus on sexual functions may give rise to increased clinical awareness, service development, and research on underserved aspects of cancer care [16]. An indicator that the sexual functions of patients can be achieved by timely interventions and understanding of the risk factors among cancer patients.

In Uganda, cancer patients reportedly experience and report sexual dysfunction, but the extent of this dysfunction is not known. No study has evaluated these dysfunctions among cancer patients in Uganda. Therefore, our study aimed to determine the prevalence and factors associated with sexual dysfunction among cancer patients who were receiving chemotherapy.

Methods

Study design and setting

This was a descriptive cross-sectional study conducted among adult cancer patients visiting the Uganda cancer institute (UCI) at Mbarara Regional Referential Hospital MRRH (UCIMRRH). To evaluate the prevalence, factors associated and classifications of sexual dysfunction among cancer patients receiving chemotherapy. The study was carried out from August 2023 to October 2023. The UCIMRRH has two [2] units, the pediatric and adult units. The adult unit has a 20-bed capacity, while the pediatric unit has approximately 20 beds. These units were established in 2017, and they offer both inpatient and outpatient services to cancer patients. The

UCIMRRH also has two [2] oncologists, one [1] oncology pharmacist, one [1] pharmacist, and 5 nurses.

Study population

All male and female adult cancer patients who visited the UCIMRRH and met the inclusion criteria were included in the study. Patients who had at least one chemotherapy cycle within the last 21 days prior to being interviewed were included. Patients with prior SD diagnosis before cancer diagnosis, those with advanced cancer.

A systematic sampling technique was used. On average 450 patients visit the UCIMRRH per month. Therefore 450*3=1350/214=*6.34*. Every 6th patient to attend the clinic was recruited to the study until the sample size was achieved. But this is after the first participant had been selected randomly between attendee number 1 and number 6.

Sample size was calculated from the population of 5003.Sample size was estimated using the formula recommended by Fisher et al., (1998). Population estimate $P=0.5$, Since our target population was less than 10,000 the sample was adjusted using the following Formula by Jung H [17] to give a sample size of 217.

Data collection

A semi structured interview questionnaire comprising the first 22 questions both in English and in Runyankole was developed and is included in the supplementary file. The questionnaire was administered by the principal researcher and research assistants after the participants signed informed consent forms to collect primary (demographic data) and secondary (disease and treatment data). A pretest of the data collection tool was conducted on 5% of the sample (10 patients) before the actual data were collected. These patients were tagged to ensure that they were not sampled again during the actual data collection, and the pretest data were not included in the final analysis.

The survey contained a cover letter with a research aim, and the researchers contacted each interview for a maximum of one hour. Trained research assistants, a nurse and a pharmacist were trained on ethical considerations and data collection before the commencement of the study. Together with the principal researcher, reviewed patient charts to obtain relevant disease types and treatment regimens.

A female sexual function index FSFI tool developed and validated by [18] and published by [19, 20] was used by the principal investigator to classify female sexual dysfunctions. The scale has a maximum score of 36 and values less than 26 were considered to indicate sexual dysfunction in females. They are measured in six different domains. Sexual desire maximum has a score of 6, arousal maximum score of 6, lubrication maximum score of 6, orgasm maximum score of 6, vaginal pain maximum score of 6 and satisfaction maximum score of 6.

The international index of erectile function (IIEF) tool developed and validated by [21] and used by [22, 23] was used to classify male sexual dysfunctions. IIEF has a scale ranging from 0 to 75 with 5 different domains between A-E. Each sexual classification is classified according to the following domains: erectile function maximum score of 30, orgasmic function maximum score of 10 and sexual desire maximum score of 10, intercourse satisfaction maximum score of 15 and overall satisfaction maximum score of 10.

Data management and analysis

Statistics and data (Stata) software version 17 was used to analyze and interpret the data. Both descriptive and inferential analyses were performed, and the results are presented as the means, medians and percentages. The prevalence of SD was calculated by dividing the number of participants with SDs by the sample size and then multiplying the result by 100. This prevalence was also stratified by sex. The classifications of SD are reported as percentages and were stratified by sex. To determine the independent factors associated with SD, logistic regression was employed, whereby variables with a p value<0.25 in the bivariate logistic regression were adopted for multivariate analysis to account for confounding factors. Variables with a p value<0.05 were considered statistically significant independent risk factors for SD in the multivariate analysis.

Results

Participant characteristics

217 patients were interviewed and 3 of whom withdrew from the study. Over half (127) were male, (105) were older than 50 years. The median age was 50 years (IQR 45; 58), whereas more than two-thirds (181) were married (Table 1).

Types of cancers documented

Reproductive organ cancers (43.9%) were mostly prostate cancer (22%). Gastrointestinal cancers (39.7%), esophageal cancer (12.6%), were the commonly diagnosed neoplasms (Figs. 1 and 2).

Prevalence of sexual dysfunction among adult cancer patients

The prevalence of sexual dysfunction among adult cancer patients at Uganda cancer institute Mbarara Regional Referral Hospital was 42.5%. Among females (24.1%) had sexual dysfunction and (54.3%) of males had sexual dysfunction (Fig. 3).

Table 1 Demographic and clinical classifications of participants at Uganda cancer institute Mbarara

Classifications	Category	Frequency n
Gender	Male	127
	Female	87
Age Median=50 IQR: 45;58	>50years	105
	41-50yrs	61
	31-40yrs	39
	21-30yrs	9
Religion	Anglican	96
	Catholic	86
	Muslim	20
	Others	12
Comorbidity	Hypertension	29
	Hiv	26
	Diabetes	8
	None	151
Marital	Married	181
	Widowed	15
	Separated	9
	Not married	6
	Divorced	3
Cancers ICD-11	Reproductive cancers	94
	GIT Cancers	85
	Hematological cancers	17
	Sarcomas	18
Cancer Stage	Stage 3	96
	Stage 2	61
	Not staged	50
	Stage 1	7
Classes of chemotherapy used	Taxanes	101
	Platinum analogues	72
	Antimetabolites	42
	Monoclonal antibodies	41
	Hormonal therapy	30
	Anthracyclines	24
	Alkylating agents	20
	Plant alkaloids	7

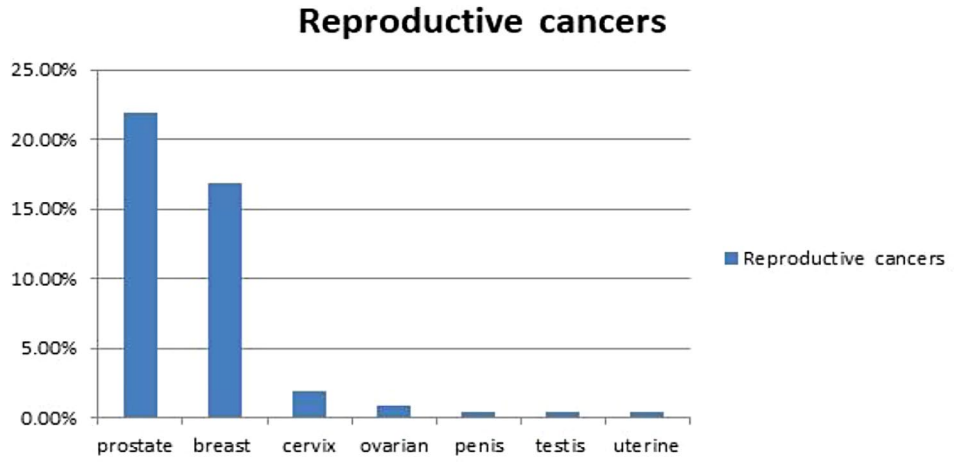

Fig. 1 Distribution of cancer of reproductive organs among the adult cancer patients studied

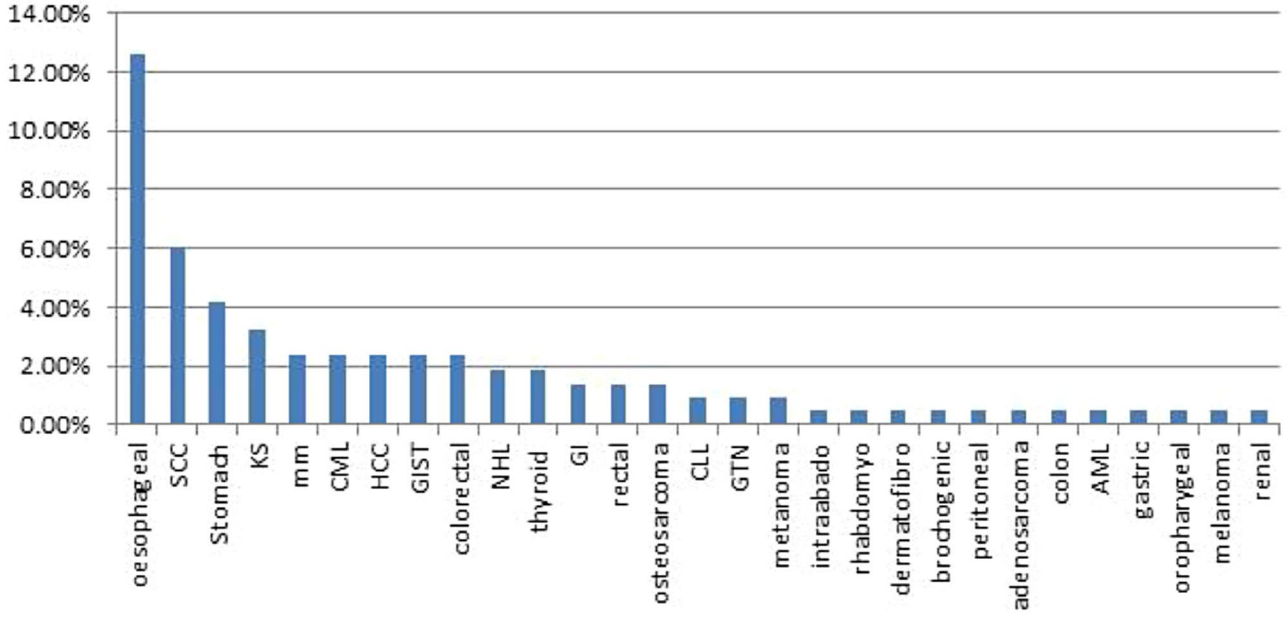

Fig. 2 Distribution of other cancers affecting study participants at the Uganda cancer institute Mbarara Regional Referential Hospital. *Note* SCC: squamous cell carcinoma, KS: Kaposi sarcoma, MM: multiple myeloma, CML: chronic myeloid leukemia, GIST: gastro intestinal tumors, NHL: non Hodgkin lymphomas, GI: gastro intestinal, CLL: chronic lymphoid leukemia, GTN: gestational trophoblastic neoplasm AML: acute myeloid leukemia

Classifications of sexual dysfunctions among cancer patients

The common affected sexual domain in men was overall sexual dissatisfaction (33.9%), while females reported low sexual desire (18.4%) as the common sexual dysfunction (Table 2).

Among the male participants 19 had three sexual domains affected, while [8] female participants had four affected sexual domains (Fig. 4).

Factors associated with sexual dysfunctions

According to our bivariate logistic regression analysis, five variables, namely, male sex (COR 3.75 [2.05–6.82 at 95% CI]; p value=0.000). Hormone therapy (COR 3.13 [1.41-7.00 at 95% CI]; p value=0.005). Anthracyclines therapy (COR 5.92 [1.71–20.50 at 95% CI]; p value=0.005). Gastrointestinal cancer (COR 2.75 [1.49–5.05 at 95% CI]; p value=0.001), and age bracketing for 31–40 years (COR 1.56 [0.73–3.34 at 95% CI]; p value=0.000), were significantly associated with sexual dysfunction. These five variables were adapted for multivariate logistic regression. Multivariate logistic regression there were only three variables: male sex (AOR 3.99 [1.93–8.25 at 95% CI]; p value=0.001), use of anthracyclines (AOR 4.26 [1.02–17.76 at 95% CI]; p value=0.047), and history of gastrointestinal cancers (AOR 3.46

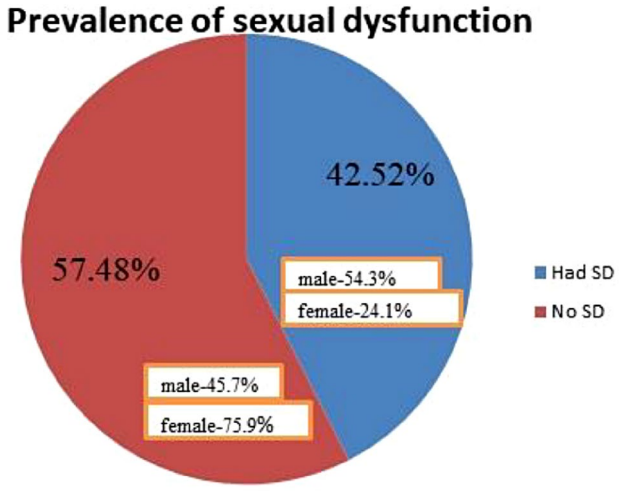

Fig. 3 prevalence of sexual dysfunction among cancer patients at Uganda cancer institute Mbarara Regional Referral Hospital

Table 2 Description of the classification of sexual dysfunction identified among participants at Uganda Cancer Institute Mbarara Regional Referral Hospital

Gender	Classification	Percentage
Male	Overall sex dissatisfaction	33.9%
	Erectile dysfunction	32.3%
	Decreased orgasm	28.4%
	Intercourse dissatisfaction	27.6%
	Reduced sexual desire	25.9%
Female	Low sex desire	18.4%
	Decreased sexual arousal	17.2%
	Decreased satisfaction	16.1%
	Painful penetration	13.8%
	Decreased orgasm	11.5%
	Reduced lubrication	8.1%

[1.34–8.93 at 95% CI]; p value=0.010) that had significant association with sexual dysfunctions (Table 3).

Discussion

The prevalence of sexual dysfunctions among adult cancer patients at UCI MRRH was 42.5% (95% CI: 35–49%), with 54.3% and 24.1 male and female patients, respectively. This finding shows that there is a burden of sexual dysfunction among adult cancer patients at ICU MRRH. These findings are similar to the 39.0% reported in a study performed in the U.S [24]. The reasons could be the use of similar tools, the FSFI and IIEF tools, and the use of an almost equal sample size.

The findings of this study, however, are higher than those of a study performed in Germany that documented a prevalence of 31.8%, with men reporting a higher proportion (40.5%) than women (23.7%) [25]. This is because the German study had a larger sample size than our study. The current prevalence 42.1% is lower than that reported in studies in Kenya (85%) and Denmark, which reported an overall higher prevalence of 60% [19, 26]. This difference may have resulted from the use of different methods, as body image scales and multidimensional social support scales were used in addition to FSFI and IIEF tools; additionally, these studies included participants with advanced cancer, which was excluded from our study.

Sexual topics are rarely discussed and sexual screening not routinely done during routine cancer treatment thereby making these effects to be missed. Our study revealed that among male adult patients, the sexual domains most strongly affected was sex dissatisfaction were similar to those reported in a study performed in Sweden. Other individuals affected had erectile dysfunction and orgasmic dysfunction, these findings are comparable to those of studies performed in Germany [14, 27, 28]. All these sexual dysfunctions in men have nearly a similar pathophysiology. Therefore these dysfunctions could be attributed to the use of chemotherapeutic agents that interfere with the erection mechanism. The psychological distress that these patients experience which could interfere with their sexual life in addition to the presence of reproductive cancers.

While assessing the classification of female sexual dysfunctions, the most affected domain that we noted was decreased sexual desire. A finding which is similar to the findings of a study in Guinea [29]. These findings of decreased sexual arousal and vaginal pain in our study are similar to those of numerous studies conducted in Sweden, Canada and Australia [27, 28, 30]. This could be attributed to the psychological distress that patients experience. Importantly dyspareunia which can be due to cytotoxic chemotherapy which alters reproductive system morphology. Additionally hormonal therapy which is used in women with gynecological cancer can alter their sex hormone status.

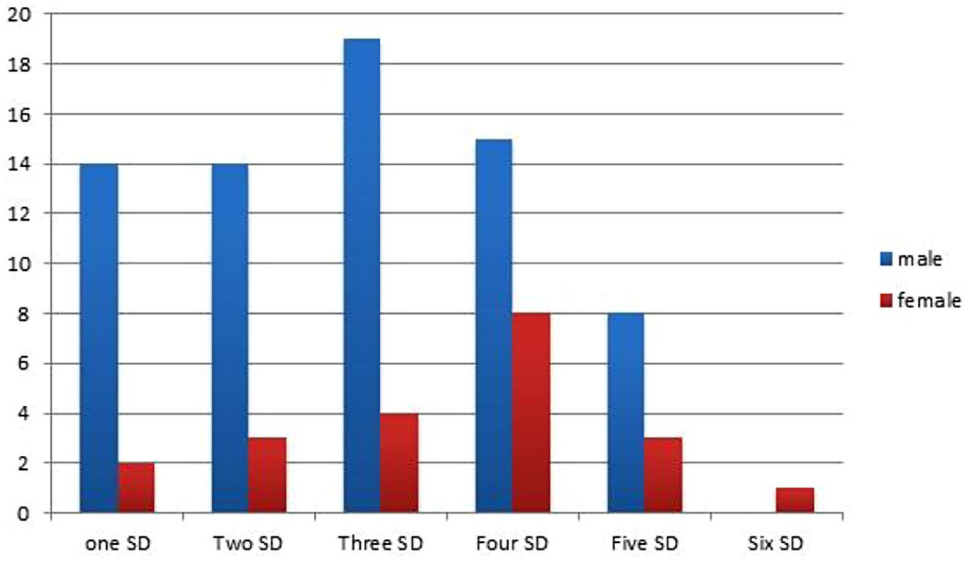

Fig. 4 Distribution of the number of sexual dysfunctions among male and female adult cancer patients at the Uganda cancer institute mbarara Regional Referral Hospital

Table 3 Logistic analysis of factors associated with sexual dysfunction among adult cancer patients at Uganda cancer institute Mbarara regional referral hospital

Classification	Level	COR	P value	95% CI	AOR	95% CI	P value
Age	>51	Ref					
	21-30	7	0.71	0.85-57.96			
	31-40	**1.56**	**0.25**	**0.73-3.34**			
	41-50	1.18	0.61	0.62-2.22			
Gender	Female	Ref					
	Male	**3.74**	**0.000**	**2.05-6.82**	**3.99**	**1.93-8.25**	**<0.001**
Taxanes	No	Ref					
	Yes	0.65	0.126	0.38-1.13			
Platinum analogs	No	Ref					
	Yes	1.59	0.123	0.88-2.85			
Alkylating agents	No	Ref					
	Yes	1.78	0.25	0.66-4.83			
Hormonal therapy	No	ref					
	Yes	**3.13**	**0.005**	**1.41-7.00**			
Anthracyclines	No	Ref					
	Yes	**5.91**	**0.005**	**1.71-20.50**	**4.26**	**1.02-17.76**	**0.047**
GIT cancer	No	Ref					
	GIT	**2.75**	**0.001**	**1.49-5.05**	**3.46**	**1.34-8.93**	**0.010**
Education	Primary	Ref					
	None	1.75	0.111	0.87-3.50			
Hypertension	No	Ref					
	Yes	0.46	0.056	0.21-1.02			
Diabetes	No	Ref					
	Yes	0.42	0.25	0.10-1.81			

The logistic regression revealed that the factors significantly associated with sexual dysfunction among cancer patients receiving chemotherapy were male sex, GIT cancer status, and the chemotherapy agent anthracycline ($p=0.05$).

Although the overall prevalence of sexual dysfunction is high, sex plays a role in this disease. According to our study male sex are 3.99 times more likely to develop sexual dysfunction than females. These findings are similar to those of a study in Canada in which being male was found to be a risk factor for developing sexual dysfunction [28]. Conditions such as hypothyroidism and hyperthyroidism in men have been found to exert effects on the level of circulating sex hormones via peripheral and central pathways that invoke psychiatric and autonomic dysregulation that eventually impair sexual function [31]. Additional androgen deprivation therapy used in some male cancer patients decrease the level of circulating androgen that has an integral part in maintaining the integrity of penile smooth muscles eventually altering penile smooth muscles structure [32–34].

Patients with Gastrointestinal cancer are 3.46 times more likely to develop sexual dysfunction than those who did not have GIT cancer. This finding is similar to that of a study in France that reported GIT and lower rectal cancers to be significant risk factors for developing SD among cancer patients [12, 35]. A lower tumor location that compresses genital nerves, such as the pudendal nerve and the presence of stoma in some colorectal cancer patients which cause anxiety and distress have been identified as reasons for sexual dysfunction [36, 37].

The chemotherapy agents that were independently associated with sexual dysfunction among cancer patients were anthracyclines. Patients receiving anthracyclines are 4.26 times more likely to develop sexual dysfunction than are those who do not receive anthracyclines therapy. These findings are similar to those of a study performed in the Netherlands that reported anthracyclines to be associated with the development of sexual dysfunctions [38]. Anthracyclines have systemic effects and cause vaginal and rectal mucosal toxicities that reduce sexual desire and sexual arousal [39]. The carditoxicity symptoms of anthracyclines can be exacerbated during sexual intercourse, resulting in one or more sexual dysfunctions.

Strength

The use of validated sexual dysfunction tools to assess sexual functions.

Limitations

Breast and prostate cancer are prevalent cancers in this study; the finding cannot easily be generalized to other cancers. This study is limited by its cross-sectional design as we relied on patients' self-reported dysfunction which could introduce potential recall bias. These could be improved by performing a prospective study in which the SD baseline is assessed before the initiation of chemotherapy. The study was also performed at a single center. The sample size of 214 cannot be generalized to the larger cancer population.

Conclusion

Our findings suggest that nearly half of the adult cancer patients receiving chemotherapy at the Uganda cancer institute Mbarara Regional Referral Hospital experienced sexual dysfunctions. The most affected sexual domain in men was overall sexual satisfaction and erectile dysfunctions. While females reported decreased sexual desire as the most common type of sexual dysfunction. Being male, having gastrointestinal cancer and receiving the chemotherapy agent anthracycline were found to be independent factors associated with sexual dysfunction. Routine screening of sexual functions in cancer patients should be done. Sexual rehabilitation and establishment of a sexual rehabilitation clinic to be emphasized in cancer centers. Enhance heath care workers' pharmacovigilance practices in cancer clinics. Further research to be carried out on sexual dysfunction and its relation to quality of life.

Abbreviations

ADT	Androgen deprivation therapy
ED	Erectile dysfunction
FSFI	Female Sexual Function Index
GIT	Gastrointestinal tract
GVHD	Graft-versus-host disease
IIEF	International Index of Erectile Function
MRRH	Mbarara Regional Referral Hospital
MUST	Mbarara University of science and technology
SD	Sexual dysfunction
SF	Sexual function
UCI	Uganda Cancer Institute

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12885-024-12987-z.

Supplementary Material 1

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Author contributions

J.N.O, R.T and J.I wrote the study proposal, data collection and wrote the final dissertation. J.N.O and S.G.G collected and analyzed data. G.K and S.G.G did data analysis. T.M.Y and J.N.O prepared the manuscript. all authors reviewed and approved the manuscript.

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Data availability
All the data that support the conclusion of the study as well as the manuscript are incorporated in this manuscript any required data will be availed if and when requested.

Declarations

Ethical declarations
This study was carried out in accordance with the Helsinki Declaration. Approval was sought from the pharmacy department. Research approval was obtained from the Mbarara University faculty research ethics committee before commencing the study. Ethical approval was obtained from the MUST Research and Ethics Committee Institutional Review Board (IRB) approval number (MUST-2023-876). The request and approval of the study facility were obtained from relevant authorities at Mbarara Regional Referential Hospital. Full consent was obtained from the participants prior to the study on a voluntary basis and with the right to withdraw any time during the study. For data confidentiality, unique patient identifiers, rather than patient names were used, and the data were accessible only to the principal researcher and research assistants. With softcopies being password protected and hard copies kept under lock and in key in a secured cupboard.

Consent for publication
All the authors agreed to the submission of this manuscript for publication in addition to the consent to publish, which was included in the informed consent form and obtained ethical and participant approval.

Competing interests
The authors declare no competing interests.

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