

## Chapter

# Sexual and Psychoemotional Disorders in Male Patients Treated for Prostate Carcinoma

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## Abstract

The prostate carcinoma affect the quality of life of most male patients, including in particular their sexual and emotional life. The aim of study was to assess sexual and psychoemotional disorders in male patients diagnosed with prostate carcinoma and receiving cancer treatment. The study's patients were recruited at the Oncological Hospital in Wieliszew, Poland, between September 2016 and December 2017. The study was performed in 166 male patients diagnosed with prostate cancer. Two standardized questionnaires were used in the study, EORTC QLQ-C30 and QLQ-PR25, for patients with prostate cancer, developed by the European Quality of Life Group. The type and stage of cancer treatments were a significant contributor to feeling tense, worried, depressed, and irritable among the study patients. The stage of treatment, however, caused a negative effect on these parameters. Pretreatment patients declared high or very high satisfaction with their sexual life, while post-treatment patients and those on cancer treatment indicated low sexual satisfaction. However, a feeling of embarrassment during intimate contact as well as erectile disorders correlated both with the type and stage of cancer treatment. Our results show that affected male patients should be offered continuous psychological care, especially those waiting for treatment and those on treatment.

**Keywords:** prostate carcinoma, quality of life, sexual disorders, psychoemotional disorders, oncological treatment

## 1. Background

Prostate carcinoma (PCa) is one of the most frequent malignant cancers in the male population. In terms of incidence, it is second only to lung cancer. Treatment of prostate carcinoma includes surgical procedures, radiotherapy, chemotherapy, and hormone therapy, and all these procedures have an adverse impact on the sexual functioning of men. Erectile disorders, loss of sex drive, and difficulty achieving orgasm are the most frequent problems in the course of disease and its treatment [1, 2]. The existing studies show that few men with sexual dysfunctions and on cancer treatment seek the help of a specialist to effectively eliminate such problems

[3]. Other studies show that this population of patients frequently experiences, as a result of changes in the sexual functioning, fear, anxiety, and depression as well as loss of male identity [4]. Therefore, psychological care and social support (including their closest family and friends) are increasingly considered an important component of many chronic diseases. At the same time, studies suggest that men who find no emotional support in their social environment are more exposed to depression and more seldom achieve positive mental well-being [5]. Additionally, it was demonstrated that specialist (psychological) and social support are associated with significantly reduced mental stress and general improvement of the quality of life in the population of men with prostate carcinoma.

## 2. Material and methods

The study's patients were recruited at the Oncological Hospital in Wieliszew, Poland, between September 2016 to December 2017. The study was performed 166 male patients diagnosed with prostate cancer. The study included men who gave informed, written consent to participate. In the study was used two standardized questionnaire: EORTC QLQ-C30 (version 3.0) and QLQ-PR25 for patients with prostate cancer, developed by the European Quality of Life Group. These questionnaires are used to research the summary sense of health and evaluation of performance in various dimensions (physical, emotional and social) and typical symptoms of prostate cancer.

### 2.1 Ethics

The Ethical Committee consent for the presented research is not required. According to the statement of the Ethical Committee of the Medical University of Warsaw: "The Committee does not provide opinions on surveys, retrospective studies, or other non-invasive research" (Detailed information and templates of documents of Ethics Committee of Medical University of Warsaw (Accessed 2016-10-01): <http://komisjabioetyczna.wum.edu.pl/content/szczeg%C3%B3w%C5%82owe-informacje-orazwzory-dokument%C3%B3w>).

## 3. Results

The study included 166 men. The mean age of participants was  $67.66 \pm 7.25$  (range: 51–84 years). The main part of population taking part in the study comprised people aged 65–69 years (37.35%). The majority (68.7%) of patients, during the study, were undergoing the treatment. The treatment analysis revealed that 66% of the participants subjected to radiotherapy. Smaller numbers were found for the remaining therapy: 16.9% hormonal therapy, 2.38% surgery (4.8%), and 3.6% chemotherapy. The proportion of patients was treated with combined therapies: radiotherapy + surgery (8.33%), radiation + hormonal therapy (6.03%), and surgery + hormonal + chemotherapy (2.41%). The characteristics of the patients are shown in **Table 1**.

### 3.1 Emotional problems

No correlation was found between the study variable and the health status or quality of life score or the age of patients. However, feeling tense may be affected by the type of treatment administered to the patients ( $\chi^2 = 94.15$ ,  $p = 0.0000$ ;  $R = 0.21$ ,  $p > 0.05$ ). The results of statistical analysis show that the greatest number

Characteristics of the patients in the survey	Number of patients (N = 166 (100%))
Age	
<54	2 (1.2)
55–59	16 (9.6)
60–64	26 (15.7)
65–69	62 (37.3)
70–74	24 (14.5)
75–79	24 (14.5)
>80	12 (7.2)
Stage of oncology treatment	
Before treatment	20 (12)
During the course of treatment	114 (68.7)
After treatment	32 (19.3)
Type of oncology treatment <sup>a</sup>	
Surgery	8 (4.8)
Radiotherapy	110 (66)
Hormonal therapy	28 (16.9)
Chemotherapy	6 (3.6)
I do not know	20 (12)

<sup>a</sup>The question with multiple answers.

**Table 1.**  
 Characteristics of the group of patients participating in the survey.

of men who declared that they did not feel tense during the last week underwent radiotherapy (58.82%) or radiotherapy and surgical treatment (57.14%). On the other hand, all the patients who received surgical treatment, chemotherapy, and hormone therapy indicated that they felt very tense. A similar correlation was shown in relation to the stage of cancer treatment ( $\text{Chi}^2 = 19.73$ ,  $p = 0.00310$ ;  $R = -0.00$ ,  $p > 0.05$ ).

Feeling worried also depends on the stage of cancer treatment ( $\text{Chi}^2 = 21.67$ ,  $p = 0.00139$ ;  $R = 0.20$ ,  $p > 0.05$ ). Posttreatment patients significantly more often indicated that they did not worry during the last week (56.25% of the group), while patients waiting for treatment more often declared to feel worried or very worried (40% of the group in total). Similarly to the question about feeling tense, the results show that feeling worried affected all the patients undergoing surgical treatment, chemotherapy, and hormone therapy. Patients receiving radiotherapy (27.45% of the group) or both radiotherapy and surgical treatment (28.57%) ( $\text{Chi}^2 = 69.06$ ,  $p = 0.0000$ ;  $R = 0.13$ ,  $p > 0.05$ ) most often indicated that they did not feel worried. However, no correlation was found between feeling worried and the patients' age ( $p > 0.05$ ).

The impact of health status on patients feeling worried was also insignificant ( $\text{Chi}^2 = 44.87$ ,  $p = 0.00043$ ;  $R = -0.04$ ,  $p > 0.05$ ), although it could be observed that patients with a greater health status score more rarely indicated that they felt worried. A similar correlation was observed with regard to the quality of life score ( $\text{Chi}^2 = 43.38$ ,  $p = 0.00071$ ;  $R = -0.11$ ,  $p > 0.05$ ).

None of the patients who received cancer treatment declared to be very or significantly irritable. However, these responses were indicated by 40% of the patients waiting for treatment ( $\text{Chi}^2 = 16.24$ ,  $p = 0.01251$ ;  $R = -0.03$ ,  $p > 0.05$ ). The

least irritability were experienced by patients undergoing radiotherapy or surgical treatment, the greatest irritability—by patients receiving surgical treatment, chemotherapy, and hormone therapy ( $\text{Chi}^2 = 69.05$ ,  $p = 0.0000$ ;  $R = 0.06$ ,  $p > 0.05$ ). On the other hand, no correlation was found between feeling irritable and the patients' age, health status, or quality of life score ( $p > 0.05$  for all the cases).

Even though no correlation was found between the age or the quality of life score and feeling depressed ( $p > 0.05$ ), a statistical analysis of the study results showed that feeling depressed may depend on the patient's health status ( $\text{Chi}^2 = 33.34$ ,  $p = 0.01517$ ;  $R = -0.36$ ,  $p = 0.00681$ ). Patients with a lower health status score much more often declared that they felt depressed during the last week.

As with the above-described correlations, feeling depressed is also correlated (although weakly) with the stage of the patient's treatment ( $\text{Chi}^2 = 13.11$ ,  $p = 0.04122$ ;  $R = 0.06$ ,  $p > 0.05$ ) and the type of treatment ( $\text{Chi}^2 = 67.37$ ,  $p = 0.0000$ ;  $R = 0.11$ ,  $p > 0.05$ ). No depression was most often indicated by patients who underwent cancer treatment (56.25% of this group), radiotherapy (45.10%), or both radiotherapy and surgery (42.86%).

The greatest difficulties in remembering were indicated by pretreatment patients (30% of responses "to a significant degree" and "very much" in this group of patients compared to 7% of the patients on treatment and 0% of the posttreatment patients) ( $\text{Chi}^2 = 19.25$ ,  $p = 0.00376$ ;  $R = -0.07$ ,  $p > 0.05$ ) and those receiving surgical treatment, hormone therapy, and chemotherapy (100% of the group) ( $\text{Chi}^2 = 97.20$ ,  $p = 0.0000$ ;  $R = 0.08$ ,  $p > 0.05$ ). Additionally, a strong correlation was found between difficulties in remembering and health status score ( $\text{Chi}^2 = 34.89$ ,  $p = 0.00976$ ;  $R = -0.45$ ,  $p = 0.0000$ ). The higher health status score is correlated with an absence of difficulties in remembering or only slight difficulties in remembering. Serious and very serious difficulties in remembering were indicated only by the patients with a health status score less than 5. A similar correlation exists with regard to the quality of life score. Patients with the lowest quality of life score did not indicate any considerable or significant problems in remembering. Patients who declared frequent problems in remembering had a lower quality of life score ( $\text{Chi}^2 = 32.30$ ,  $p = 0.02024$ ;  $R = -0.26$ ,  $p = 0.00071$ ). However, no correlation was found between difficulties in remembering and the patients' age ( $p > 0.05$ ) (Tables 2 and 3).

### 3.2 Urination problems

Among the study patients, 12% of them frequently passed urine during the day. This problem has a significant impact on the quality of life of the patients

Emotional problems	Question no. <sup>a</sup>	Number of patients (N = 166) N (%)			
		Not at all	A little	Quite a bit	Very much
Feeling circuit	21	86 (51.8)	72 (43.4)	4 (2.4)	4 (2.4)
Feeling worried	22	40 (24.1)	98 (59)	22 (13.3)	6 (3.6)
The feeling of annoyance	23	68 (40.9)	70 (42.2)	22 (13.3)	6 (3.6)
Feeling depressed	24	70 (42.2)	72 (43.4)	18 (10.8)	6 (3.6)
Difficulty in remembering	25	84 (50.6)	68 (41.0)	10 (6)	4 (2.4)

<sup>a</sup>Number of issues in accordance with the questionnaire QLQ-C30.

**Table 2.**  
*Emotional problems of the patients.*

Emotional problems	Question no. <sup>a</sup>	Quality of life	
		p-value	R-Spearman <sup>b</sup>
Feeling circuit	21	0.727	—
Feeling worried	22	0.000	—
The feeling of annoyance	23	0.353	—
Feeling depressed	24	0.174	—
Difficulty in remembering	25	0.020	-0.364

<sup>a</sup>Number of issues in accordance with the questionnaire QLQ-C30.  
<sup>b</sup>Significant correlation  $p < 0.05$ .

**Table 3.**  
 Emotional problems of the patients and felt the quality of life.

( $\text{Chi}^2 = 30.86$ ,  $p = 0.02988$ ;  $R = -0.24$ ,  $p = 0.02967$ ). Patients with no problems with frequent urination during the day had a higher quality of life score compared to patients who had to urinate very frequently during the day. Similar but significantly weaker correlation was identified between the quality of life score and frequent nighttime urination ( $\text{Chi}^2 = 33.42$ ,  $p = 0.01484$ ;  $R = -0.11$ ,  $p > 0.05$ ) or the quality of life score and the need to hurry into the toilet before passing urine ( $\text{Chi}^2 = 33.83$ ,  $p = 0.01321$ ;  $R = 0.05$ ,  $p > 0.05$ ).

Over 60% of the patients indicated that having to get up at night to urinate affected their night's rest. This problem had a strong impact on how the patients assessed their quality of life ( $\text{Chi}^2 = 54.09$ ,  $p = 0.0000$ ;  $R = -0.52$ ,  $p = 0.0000$ ). The quality of life score was also affected by problems related to going out of the house due to the fact that the patients had to be close to a toilet. Problems with involuntary release of urine were indicated by nearly half of the patients, and 17% of the patients considered this problem to be considerable or significant. This group of patients usually has a lower quality of life score, even though this correlation is not strong ( $\text{Chi}^2 = 43.87$ ,  $p = 0.00060$ ;  $R = -0.21$ ,  $p > 0.05$ ). Nearly 50% of the patients declared to have painful urination; however, no correlation was found between pain and the quality of life score ( $p > 0.05$ ). Among the study patients, 32.53% of them use protection products against urinary incontinence. Using this type of protection was considered a nuisance only by 40% of the patients and affected how they perceived their quality of life ( $\text{Chi}^2 = 55.22$ ,  $p = 0.00001$ ;  $R = -0.23$ ,  $p = 0.03563$ ). Generally, limitations related to everyday functioning due to urination problems were indicated by nearly 40% of men. This effect was considered significant or highly significant by 12% of the patients. However, the correlation between the limitation of everyday activities and the quality of life score is insignificant ( $\text{Chi}^2 = 38.50$ ,  $p = 0.00332$ ;  $R = 0.17$ ,  $p > 0.05$ ). Detailed results are given in Tables 4 and 5.

### 3.3 Sexual activity of the study patients

Nearly 60% of the patients indicated that they experienced a sense of loss of manhood due to the disease or its treatment. Younger patients more often declared a strong or very strong sense of loss of manhood (100% of patients under the age of 54 years, 62.5% of patients aged 55 to 59 compared to 50% of patients aged 75–79 or 16.67% of patients over the age of 80 years) ( $\text{Chi}^2 = 40.61$ ,  $p = 0.00172$ ;  $R = 0.09$ ,  $p > 0.05$ ). A sense of loss of manhood was mostly declared by the post-treatment patients or the patients on cancer treatment (the responses “very strong” and “strong” were given by 57.89 and 75% compared to 30% of patients waiting

Problems with urination	Question no. <sup>a</sup>	Number of patients (N = 166) N (%)			
		Not at all	A little	Quite a bit	Very much
Frequent urination during the day	31	14 (8.4)	76 (45.8)	56 (33.7)	20 (12.1)
Frequent urination during the night	32	22 (13.3)	82 (49.4)	44 (26.5)	18 (10.8)
The need to accelerate the toilet before urinating	33	48 (28.9)	64 (38.6)	28 (16.9)	26 (15.7)
The impact of waking up at night to night stay	34	56 (33.7)	64 (38.6)	36 (21.7)	10 (6)
Problems with leaving home because of the frequent need to use the toilet	35	80 (48.2)	60 (36.1)	14 (8.43)	12 (7.2)
Involuntary leakage of urine	36	86 (51.81)	52 (31.33)	18 (10.8)	10 (6)
Pain when urinating	37	84 (50.6)	70 (42.2)	6 (3.6)	6 (3.6)
Problems with wearing protection against incontinence	38 <sup>b</sup>	32 (59.3)	16 (29.6)	6 (3.6)	0 (0)
Limitation of daily activities by problems with urination	39	102 (61.5)	44 (26.5)	14 (8.4)	6 (3.6)

<sup>a</sup>Number of issues in accordance with the questionnaire QLQ-C30.  
<sup>b</sup>Question applies only to patients wearing protection against urinary incontinence (N = 54).

**Table 4.**  
Problems with urinating in the group of patients studied.

Problems with urination	Question no. <sup>a</sup>	Quality of life	
		p-value	R-Spearman <sup>b</sup>
Frequent urination during the day	31	0.029	0.239
Frequent urination during the night	32	0.014	—
The need to accelerate the toilet before urinating	33	0.013	—
The impact of waking up at night to night stay	34	0.000	-0.518
Problems with leaving home because of the frequent need to use the toilet	35	0.002	-0.314
Involuntary leakage of urine	36	0.000	—
Pain when urinating	37	0.060	—
Problems with wearing protection against incontinence	38 <sup>c</sup>	0.000	-0.231
Limitation of daily activities by problems with urination	39	0.003	—

<sup>a</sup>Number of issues in accordance with the questionnaire QLQ-C30.  
<sup>b</sup>Demonstrated statistically significant correlations only;  $p < 0.05$ .  
<sup>c</sup>Question applies only to patients wearing protection against urinary incontinence (N = 54).

**Table 5.**  
Problems with urination and the evaluation of the quality of life for patients.

for treatment) ( $\text{Chi}^2 = 14.74$ ,  $p = 0.02230$ ;  $R = 0.15$ ,  $p > 0.05$ ). The type of treatment had no impact on a sense of loss of manhood ( $p > 0.05$ ). Nearly half of the patients had no interest in sexual life during the last 4 weeks (45.8%). No interest in having sex was mostly indicated by elderly patients over 70 years of age. None of the patients under 60 years of age selected the response “none” ( $\text{Chi}^2 = 41.22$ ,

$p = 0.00142$ ;  $R = 0.08$ ,  $p > 0.05$ ). As regards the stage of oncological treatment, 43.75% of the posttreatment patients and 52.63% of the patients on treatment had no interest in sex. Among the patients waiting for treatment, it was 10% ( $\text{Chi}^2 = 26.89$ ,  $p = 0.00015$ ;  $R = 0.18$ ,  $p > 0.05$ ). Patients undergoing radiotherapy or radiotherapy and hormone therapy showed least interest in sexual life, while patients undergoing surgical treatment or surgical treatment, chemotherapy, and hormone therapy—greatest interest in sexual life ( $\text{Chi}^2 = 55.75$ ,  $p = 0.00001$ ;  $R = 0.09$ ,  $p > 0.05$ ). Nearly 60% of the patients were not sexually active during the last 4 months, and there is no correlation between the level of sexual activity and the patient's age ( $p > 0.05$ ). The posttreatment patients and those on treatment were least sexually active (the response “none” was indicated by 64.91% and 50% of the patients in these groups, respectively). Among the patients waiting for treatment, 30% of the patients declared lack of sexual activities ( $\text{Chi}^2 = 20.32$ ,  $p = 0.00234$ ;  $R = 0.12$ ,  $p > 0.05$ ). Based on an analysis of the type of treatment, it can be shown that patients who underwent surgical treatment or chemotherapy and hormone therapy were characterized by greatest sexual activity (100% in both cases). In the other treatment categories, the percentage of sexually active men was about 40% ( $\text{Chi}^2 = 46.43$ ,  $p = 0.00026$ ;  $R = 0.04$ ,  $p > 0.05$ ).

Among the patients who were sexually active during the last 4 months, 37% of them were satisfied or very satisfied with their sexual life. High or very high satisfaction with sexual life was indicated by 50% of the patients prior to cancer treatment, 12.5% of the posttreatment patients, and 7% of the patients on treatment ( $\text{Chi}^2 = 23.89$ ,  $p = 0.00239$ ;  $R = 0.33$ ,  $p = 0.00228$ ). The type of treatment also affected satisfaction with sexual life ( $\text{Chi}^2 = 76.52$ ,  $p = 0.00000$ ;  $R = 0.05$ ,  $p > 0.05$ ). Patients undergoing surgical procedures, hormone therapy, and chemotherapy were very satisfied with their sexual life, while patients undergoing only surgical procedures or surgical procedures combined with radiotherapy declared low or no satisfaction with their sexual life. The patient's age has no effect on his satisfaction with sexual life ( $p > 0.05$ ).

Difficulties with achieving or maintaining erection were declared by 73.3% of the sexually active patients, regardless of their age ( $p > 0.05$ ). Significant or considerable difficulties were most often indicated by patients on cancer treatment (30% of the patients) ( $\text{Chi}^2 = 16.71$ ,  $p = 0.03328$ ;  $R = 0.29$ ,  $p = 0.00839$ ) or patients undergoing radiotherapy (43.33%) ( $\text{Chi}^2 = 61.98$ ,  $p = 0.00003$ ;  $R = -0.01$ ,  $p > 0.05$ ).

Difficulties with ejaculation were declared by 66.7% of the sexually active patients, even though these problems are not related to the patients' age ( $p > 0.05$ ). Problems with ejaculation were least frequent among patients prior to cancer treatment (50%), while all the posttreatment patients reported having such difficulties ( $\text{Chi}^2 = 34.44$ ,  $p = 0.00003$ ;  $R = 0.27$ ,  $p = 0.01530$ ). Patients who received surgical treatment, hormone therapy, or both radiotherapy and hormone therapy had no difficulties with ejaculation ( $\text{Chi}^2 = 45.58$ ,  $p = 0.00496$ ;  $R = 0.04$ ,  $p > 0.05$ ).

A feeling of embarrassment during intimate contact was indicated only by 56.7% of the sexually active patients. The above variable was not age-dependent ( $p > 0.05$ ). However, a feeling of embarrassment was correlated with the stage of cancer treatment ( $\text{Chi}^2 = 16.85$ ,  $p = 0.03164$ ;  $R = 0.30$ ,  $p = 0.00526$ ) and the type of treatment ( $\text{Chi}^2 = 40.05$ ,  $p = 0.02111$ ;  $R = 0.00$ ,  $p > 0.05$ ). Embarrassment during sexual contact was not experienced by pretreatment patients, patients receiving surgical treatment, hormone therapy or radiotherapy in combination with hormone therapy.

It should be pointed out that none of the discussed aspects of sexual activity, in relation to all the patients or only those sexually active during the last 4 months, had no impact on the quality of life score ( $p > 0.05$  for all cases). The above results are shown in **Tables 6** and **7**.

Sexual activity	Question no. <sup>a</sup>	Number of patients (N = 166) N (%)			
		Not at all	A little	Quite a bit	Very much
Feeling perdition masculinity	49	26 (15.7)	44 (26.5)	40 (24.1)	56 (33.7)
The interest in sexual intercourse	50	72 (45.8)	48 (28.9)	20 (12.1)	22 (13.3)
The degree of sexual activity	51	96 (57.8)	34 (20.5)	18 (10.8)	18 (10.8)
Satisfaction with sexual intercourse	52 <sup>b</sup>	28 (46.8)	10 (16.7)	8 (13.3)	14 (23.3)
Difficulty getting or maintaining an erection	53 <sup>b</sup>	16 (26.7)	12 (20.0)	14 (23.3)	18 (30.0)
Difficulties with ejaculation	54 <sup>b</sup>	20 (33.3)	12 (20.0)	6 (10.0)	22 (36.7)
The feeling of embarrassment during intimacy	55 <sup>b</sup>	26 (43.3)	4 (6.7)	12 (20.0)	18 (30.0)

<sup>a</sup>Number of issues in accordance with the questionnaire QLQ-C30.

<sup>b</sup>Question applies only to patients who are sexually active within the last 4 weeks (N = 60).

**Table 6.**  
Sexual activity patients.

Problems with urination	Question no. <sup>a</sup>	Quality of life	
		p-value	R-Spearman <sup>b</sup>
Feeling perdition masculinity	49	0.134	—
The interest in sexual intercourse	50	0.420	—
The degree of sexual activity	51	0.384	—
Satisfaction with sexual intercourse	52 <sup>c</sup>	0.509	—
Difficulty getting or maintaining an erection	53 <sup>c</sup>	0.142	—
Difficulties with ejaculation	54 <sup>c</sup>	0.361	—
The feeling of embarrassment during intimacy	55 <sup>c</sup>	0.585	—

<sup>a</sup>Number of issues in accordance with the questionnaire QLQ-C30.

<sup>b</sup>Demonstrated statistically significant correlations only;  $p < 0.05$ .

<sup>c</sup>Question applies only to patients who are sexually active within the last 4 weeks (N = 60).

**Table 7.**  
Sexual activity and quality of life of the patients.

## 4. Discussion

Sexuality is an important aspect of human life, and emotions related to sexual activity influence mental well-being, relationship, or how we see ourselves. Sexual function disorders (e.g., erectile dysfunction) caused by prostate carcinoma significantly reduces the quality of life of men [6–8]. Cancer treatment is also related to reduced sex drive and penile dysfunction manifesting itself through, for example, reduced ability to have an orgasm, erectile disorders, or urinary incontinence [9, 10]. The above changes in sexual functions are also related to anxiety and depression, challenges in everyday life, and disrupted intimate relations with the patient's partner [11–14]. However, other studies indicated that many patients with

prostate carcinoma suffer at a later stage from complications in the course of disease and its treatment [15, 16].

On the other hand, feeling worried also depends on the stage of cancer treatment. Patients waiting for treatment more often declared to be worried (to a considerable or significant extent) than posttreatment patients. At the same time, all the patients who received surgical treatment, chemotherapy, and hormone therapy indicated that they felt worried. No fatigue was most often indicated by patients receiving radiotherapy or both radiotherapy and surgical treatment. However, health status also had an insignificant impact on patients feeling worried, even though patients with a greater quality of life score more rarely declared that they felt worried. Other studies suggest that hot flushes were strongly associated with insomnia and they caused depression particularly in the group of elderly men receiving hormone therapy [17–19]. However, Yang et al. [20] determined that physical condition of cancer patients was closely related to the fatigue index and it was also the major factor affecting the quality of life of patients. Other studies showed that regular monitoring of fatigue and its elimination could improve physical condition of patients and therefore improve their quality of life [21, 22]. It is well documented in the literature that all types of cancer treatment, and especially chemotherapy, are associated with side effects such as fatigue, depression, pain, and many other problems [23–25]. Urination problems during the day had a significant negative impact on the quality of life of patients. A similar but significantly weaker correlation was identified between the quality of life score and frequent nighttime urination or the quality of life score and the need to hurry into the toilet before passing urine. At the same time, having to get up frequently at night to urinate affects the night's rest and has a strong impact on how patients perceive their quality of life. However, pain during urination was declared by half of the patients, and no correlation was found between pain and the quality of life score. Vogl et al. [26] showed that an insignificant number of men undergoing cancer treatment had certain difficulties passing urine which were reversible over time. However, Arscott et al. [27] demonstrated that urinary tract symptoms are frequently associated with sexual disorders after surgical treatment and radiotherapy.

An analysis of the sexual activity of the study patients showed that younger men more often indicated a strong or very strong sense of loss of manhood due to the disease or its treatment. A sense of loss of manhood was mostly declared by posttreatment patients or patients on cancer treatment. The type of treatment had no impact on a sense of loss of manhood ( $p > 0.05$ ). In one of their studies, Zaider et al. [1] found that 1/3 of the male patients lost an important aspect of their manhood as a side effect of disease treatment, which proved to be a significant obstacle to their sexuality. O' Shaughnessy et al. [2] determined that the affected patients may not be fully aware of their sexual losses. In another study, an inability to perform sexually by men diagnosed with a chronic disease was described as a source of suffering [28, 29]. Harrington et al. [30] argued that a body image is an important aspect of human quality of life, especially in patients diagnosed with cancer. On the other hand, the loss of sexual functions in posttreatment patients may undermine their concept of manhood [31, 32].

Patients undergoing surgical treatment or chemotherapy and hormone therapy showed the least interest in sexual life. On the other hand, there is no correlation between the level of sexual activity and the patients' age ( $p > 0.05$ ). Posttreatment patients and patients on treatment were least sexually active. Additionally, taking into account the type of treatment, patients receiving surgical treatment or chemotherapy and hormone therapy were characterized by greatest sexual activity. Another study demonstrated that unwillingness to meet people or have sex is more common among men treated for cancer and it is most likely best observable

in men with prostate carcinoma who receive hormone therapy. The study at hand showed that more than 95% of men treated with this method reported subjective sex drive disorders [6]. However, DiBlasio et al. [13] demonstrated that more than 95% of men receiving hormone therapy reported libido and sex drive disorders. The loss of libido is frequently observable in patients with Hodgkin disease (Hodgkin lymphoma), where more than 40% of men reported this side effect [14]. The loss of libido was also observable in patients with hematologic cancers [15, 16]. Different results were obtained by Olsson et al. [33] who argued that low libido may originate from fatigue and/or feeling unwell. Furthermore, this condition may be associated with the stage of disease and intensive cancer therapy.

Our study showed that among sexually active men, pretreatment and posttreatment patients as well as patients on cancer treatment were satisfied or very satisfied with their sexual life. The level of satisfaction with sexual life was also affected by the type of treatment, while the patients' age had no effect on their satisfaction with sexual life ( $p > 0.05$ ). Given that good mental well-being depends on many factors, it cannot be stated without ambiguity that men can achieve sexual satisfaction only through a successful sexual intercourse. However, for men with chronic erectile disorders, inability to achieve penetration may be a source of considerable difficulties and frustration. For example, couples open to changes and willing to cooperate were able to adapt to the needs of the affected partner and to accept the side effects of cancer treatment [34–36].

However, our studies showed that men receiving treatment or radiotherapy have considerable or major difficulties in achieving or maintaining erection. Other study [3] shown that erectile disorders were observed in 77% of men treated for prostate carcinoma who underwent radical prostatectomy and in 60% of patients receiving radiotherapy. It was also observed that post-radiotherapy erectile disorders were usually delayed (1 or 2 years after therapy) in contrast to a quick response achieved in a group of patients immediately after surgical treatment [28]. Erectile disorders were also observed in other populations, for example, in patients treated for anal diseases or rectal and testicular cancer [9, 11]. Difficulties with ejaculation were not correlated with the age of patients ( $p > 0.05$ ). Problems with ejaculation were least frequent among patients prior to cancer treatment, while all the posttreatment patients reported having such difficulties. Patients who received surgical treatment, hormone therapy or both radiotherapy and hormone therapy had no problems with ejaculation. Sullivan et al. [37] determined that radiotherapy, especially if it is focused on the prostate gland, may be associated with anejaculation (inability to ejaculate). A study in 364 men diagnosed with prostate carcinoma and undergoing radiotherapy showed that as many as 72% of the patients experienced anejaculation. However, elderly men and patients receiving lower doses of radiation were less exposed to this side effect. This situation may lead to an intentional avoidance of orgasm by men suffering from prostate carcinoma. On the other hand, Wassersug et al. [12] noticed that the lack of ejaculation in men having homosexual relations caused particular discomfort. However, in our study, a feeling of embarrassment during intimate contact (in sexually active men) was not correlated with age but with the stage of cancer treatment and the type of therapy.

Embarrassment during sexual contact was not experienced by pretreatment patients, patients receiving surgical treatment, hormone therapy, or radiotherapy combined with hormone therapy. Additionally, none of the discussed aspects of sexual activity, in relation to all the patients or only those sexually active during the last 4 months, had no impact on the quality of life score ( $p > 0.05$  for all cases). Harrington et al. [38] showed that men who underwent hormone therapy are exposed to verbal abuse due to changes in their appearance as a side effect of the

therapy (weight gain, loss of muscle mass, reduced hair, gynecomastia). Reduced embarrassment and dissatisfaction with one's own body was reported by men with the same diagnosis but undergoing treatment other than hormone therapy. A feeling of embarrassment is also caused by changes in body weight (weight gain or weight loss) which in turn affects the image of one's own manhood [39, 40]. However, problems related to the body image are not necessarily focused only on the penis. In male patients treated for colorectal cancer, intestinal stoma was associated not only with erectile disorders but also with a feeling of shame before themselves and their partner.

## **5. Conclusions**

1. Despite the existing psychoemotional disorders, no correlation was found between the age of patients and feeling tense, worried, irritable, or depressed. Additionally, complaints reported by sexually active patients showed no correlation between age and a sense of loss of manhood, erectile disorders, satisfaction with sexual life, or embarrassment during intimate contact.
2. The type and stage of cancer treatment (mostly prior to therapy) had a significant impact on feeling tense, worried, depressed, and irritable. It was also shown that feeling depressed affects the patient's health status to a considerable extent. Our results show the urgent need to provide the patients with continuous psychological care, especially those waiting for treatment and those on treatment.
3. The method of treatment had no major impact on a sense of loss of manhood and the degree of sexual activity, while the stage of treatment (posttreatment patients and patients on treatment) had a negative effect on these parameters. Pretreatment patients declared high or very high satisfaction with their sexual life, while posttreatment patients and those on cancer treatment indicated low sexual satisfaction. However, feeling embarrassed during intimate contact as well as erectile disorders correlated both with the type and stage of cancer treatment. An analysis of the sexual functioning of prostate carcinoma men suggests that the patients should be under the care of a clinical sex therapist.

## **Conflict of interest**

All authors declare no conflict of interests.

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## **Ethical approval (animals)**

This article does not contain any studies with animals performed by any of the authors.

## Ethical approval (human)

The Ethical Committee consent for the presented research is not required. According to the statement of the Ethical Committee of the Medical University of Warsaw: “The Committee does not provide opinions on surveys, retrospective studies, or other non-invasive research” (Detailed information and templates of documents of Ethics Committee of Medical University of Warsaw (Accessed 2016-10-01): <http://komisjabioetyczna.wum.edu.pl/content/szczeg%C3%B3w%C5%82owe-informacje-orazwzory-dokument%C3%B3w>).

## Informed consent

Informed consent was obtained from all individual participants included in the study.

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