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Disease acceptance, sexual, and urination disorders among men with prostate cancer or benign prostatic hyperplasia: a cross-sectional study

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Abstract: Introduction: Prostate benign hyperplasia affects a significant number of men over 50 years, often causing symptoms in the lower urinary tract. While, prostate cancer is the most common cancer in recent decades.
Aim: The aim of the study was assessment of the level of illness acceptance, sexual, and urinary disorders among men with prostate cancer or benign prostatic hyperplasia.
Methods: In the study, 100 patients who have been treated in the urology departments because of benign hyperplasia or prostate cancer participated. The Acceptance of Illness Scale (AIS), International Index of Erectile Function (IIEF-15), and International Prostate Symptom Scale (IPSS) were used in the research.
Results: The respondents weakly accepted their illness (26.9 points). The intensity of symptoms accompanying prostate diseases was moderate (18.8 points), and they were mainly characterized by moderate disorders in the IIEF-15 scale (erectile function — 9.3 pts, orgasmic function — 2.9 pts, sexual desire — 5.1 pts, intercourse satisfaction — 3.7 pts, overall satisfaction — 4.4 pts). There are statistically significant differences in the acceptance of illness due to marital status and treatment method. There is also a statistically significant correlation between the level of symptoms accompanying prostate diseases (IPSS), illness acceptance (AIS), and the level of sexual disorders in overall satisfaction (OS).
Conclusions: A low level of illness acceptance, moderate severity of symptoms related to urination, and serious sexual disorders suggest the implementation of broader help for patients, including psychological, sexological, urological, and other specialists. The outcomes showed how difficult the condition of prostate disease is for men, including sexual and urination disorders.

Key words: prostate, prostate cancer, benign prostate hyperplasia, sexual disorders, urination, disease acceptance.

Introduction

Benign prostatic hyperplasia (BPH) is characterized by a number of lower urinary tract symptoms (LUTS) such as frequent urination, intermittent urination, urgency to urinate, weakened urine stream, etc. The prevalence of these symptoms increases with aging and exceeds 60% [1]. In addition to observation and pharmacological management among asymptomatic patients, the standard treatment is transurethral resection of the prostate (TURP), after which patients have a 1% risk of urinary incontinence and erectile dysfunction [2]. In contrast, prostate cancer (PCa) is most often diagnosed in the asymptomatic stage during preventive examinations or by chance and it may not manifest any symptoms in the early stages, and develops slowly [3]. One of the treatment methods is prostatectomy, and approximately 25–75% of men who undergo it experience erectile dysfunction [4], decreased sexual desire, orgasmic changes, ejaculatory disorders etc. [5]. A relationship between BPH, LUTS, and sexual disorders has been shown, regardless of age, comorbid diseases, and lifestyle factors [6]. International research assessing the correlation between LUTS and sexual dysfunction was conducted among patients aged 50–80 years and showed that among 83% of sexually active men, the frequency of LUTS was 90%, erectile disorders were 49%, and lack of erection was 10% [7]. Researchers have indicated that sexual and urination disorders are closely associated with prostate diseases (BPH and PCa), and that the level of illness acceptance varies for each patient, especially in the case of chronic diseases or cancer, including BPH and PCa.

Illness acceptance can be impacted by various illnesses, crises, or life stressors, some of which may be chronic diseases or cancer [8], and it changing the world's perception and the valuing of life [9]. Illness acceptance is a challenge for oncology patients, as it is closely related to accepting pain, suffering, and life discomfort [10]. Body image and sexual dysfunction are particularly crucial and specific aspects of life, especially for prostate cancer patients. The complication of urinary incontinence significantly impacts a patient's social life [11]. Erectile dysfunction can result in a patient withdrawing from intimate relationships, avoiding or discontinuing sexual contact, and experiencing increased emotional stress, which can further exacerbate erectile disorders [12].

Due to above the main aim of the study was to assess and compare the levels of illness acceptance, sexual and urinary disorders among men with prostate cancer and prostate benign hyperplasia. Additionally, the aim was to examine the relationship between illness acceptance, the presence of sexual disorders, urinary disorders. This relationship may seem obvious, but there is no data on these correlations in selected countries, especially Poland.

Materials and Methods

Study design

This is a cross-sectional study. The research group consisted of 103 male patients from urology departments in the Silesian Voivodeship in Poland. Data were collected from March to December 2021.

Statistical procedures

Statistical analysis was performed in Statistica 13.3 program. Regression analysis was employed to assess the impact of predictors on illness acceptance (AIS), prostate symptom score (IPSS), and

sexual disorders (IIEF15), as well as to evaluate the effectiveness of the independent variable in explaining the dependent variable. The correlation between AIS, IPSS, and IIEF15 was examined using Spearman rank correlation. The differences between patients with prostate cancer and patients with benign prostatic hyperplasia were examined using the Mann–Whitney test. The significance level was set at $p = 0.05$.

Ethical procedure

Participants were informed before the start of the study that participation was voluntary and anonymous. The inclusion criteria were voluntary consent to participate in the study, while the exclusion criteria were incomplete questionnaire completion and lack of consent to take part in the study. The consent from Bioethical Committee was obtained (Ethical number: BNW/NWN/0052/KB/135/23).

Tools

The study used an anonymous questionnaire that included a sociodemographic section, the Acceptance of Illness Scale (AIS), the International Index of Erectile Function (IIEF15), and the International Prostate Symptom Scale (IPSS). The surveys were distributed as paper forms, and then the data were collected in Excel sheets.

The Acceptance of Illness Scale (AIS) was utilized to measure the level of illness acceptance. The Polish version was established by Juczyński, and its stability and internal consistency are comparable to the original version. Each statement is assessed on a five-step scale, where 1 indicates strong agreement and 5 indicates strong disagreement. The final assessment of the level of illness acceptance is a sum of points, which can range from 8 to 40 points. A score equal to or higher than 35 points indicates good illness acceptance, a score lower than 30 points indicates weak illness acceptance, and a score between 30 and 35 points indicates an average level of disease acceptance [13].

The International Index of Erectile Function (IIEF15) was used to measure erectile disorders in the past four weeks. Its validation showed good psychometric characteristics. The total score can range from 5 to 75 points. The 15 questions are categorized into five domains. In the area of erectile function (EF), respondents may receive from 0 to 30 points, in each of the Orgasmic Function (OF), Sexual Desire (SDe), and Overall Satisfaction (OS) areas from 0 to 10 points, and in the Intercourse Satisfaction (IS) domain, from 0 to 15 points [14].

The International Prostate Symptom Score (IPSS) was endorsed by the European Association of Urology (EAU) and it is used to evaluate urination disorders. It comprises seven questions rated on a scale from 0 to 5 points, and they are related to urination issues such as nocturia, feeling of incomplete emptying of the bladder, urgent need to urinate, straining during urination, weak or intermittent urine stream, and frequency of urination. The final score is the sum of the points from each question and can range from 0 to 35 points [15].

Participants

The study group consisted of 103 patients from urology departments: 58 men (56.3%) with PCa and 45 men (43.7%) with BPH. More than half (53.4%) of them had undergone surgical treatment,

36.9% (38 men) were waiting for surgical treatment, while the rest indicated pharmacological treatment as the only method of treatment (6.8%) or another method (2.9%). The mean age of the participants was 67.9 years (±7.3 years), and the majority were married (81.6%) and predominantly lived in cities (84.5%).

Results

Descriptive statistics

The respondents scored 27 and 26.8 points on the AIS scale, indicating poor illness acceptance. On the IIEF-15 scale, they scored erectile function at 7.8 and 11.2 points, orgasmic function at 2.4 and 3.5 points, intercourse satisfaction at 4.9 and 5.3 points, overall satisfaction at 3 and 4.6 points, showing moderate impairment, and sexual desire at 4.9 and 5.3 points, indicating mild to moderate impairment. Overall, participants scored 22.3 and 29.4 points out of 75 on the IIEF-15 scale, indicating severe and moderate sexual dysfunctions. Participants scored 18.8 and 18.7 points on the IPSS scale, indicating moderate symptom severity. There were statistically significant differences in the level of sexual dysfunction on the IIEF-15 scale between PCa patients (22.3 points) and BPH patients (29.4 points). BPH patients had higher scores (11.2 points) than PCa patients (7.8 points) in the EF area, indicating greater intensity of sexual disorders among PCa patients. Details are presented in Table 1.

Table 1. Descriptive statistics and comparison of AIS, IIEF15 and IPSS among BPH patients and PCa patients — U Mann–Whitney test.

	All			Patients with BPH			Patients with PCa			p-value
	M	**Me**	**SD**	**M**	**Me**	**M Rank**	**M**	**Me**	**M Rank**	
AIS	26.9	27.0	8.0	27.0	27.0	52.2	26.8	28.0	51.8	0.947
IPSS	18.8	20.0	9.0	18.7	18.0	52.1	18.8	20.0	51.9	0.984
EF	9.3	3.0	9.7	7.8	2.0	46.1	11.2	8.0	59.5	0.024
OF	2.9	0.0	3.9	2.4	0.0	47.3	3.5	2.0	58.0	0.073
SDe	5.1	5.0	2.3	4.9	5.0	49.9	5.3	5.0	54.8	0.410
IS	3.7	0.0	4.8	3.0	0.0	47.7	4.6	3.0	57.5	0.098
OS	4.4	3.0	2.8	4.2	3.0	48.4	4.8	5.0	56.7	0.164
IIEF15	25.4	16.0	21.8	22.3	10.0	46.3	29.4	23.0	59.4	0.028

M — mean; Me — median; M Rank — mean rank.

Regression analysis

A detailed analysis showed a significant affect among men with BPH:

- Place of residence on EF and OF As the place of residence changes by one point compared to living in a city, the EF decreases by 0.302 points and the OF decreases by 0.312 points.
- Marital status on OS: As the marital status changes by one point, OS decreases by 0.351 points. Details are presented in Table 2.

Table 2. Impact of sociodemographic factors on the IIEF15 areas, AIS and IPSS — regression analysis.

Model	PCa					BPH				
	EF									
	B	SE	β	t	p	B	SE	β	t	p
constant	12.841	12.619		1.018	0.314	49.327	15.828		3.116	0.004
Stage of treatment	–2.061	2.145	–0.135	–0.961	0.341	–0.432	2.304	–0.028	–0.187	0.852
Marital status	2.668	2.699	0.144	0.988	0.328	–3.118	2.753	–0.178	–1.133	0.265
Place of residence	–1.399	4.012	–0.056	–0.349	0.729	–9.077	4.431	–0.302	–2.048	0.048
Education	–1.324	1.748	–0.113	–0.757	0.452	1.902	1.770	0.165	1.074	0.290
Professional activity	–0.407	2.865	–0.022	–0.142	0.888	–5.798	3.532	–0.254	–1.642	0.109
	OF									
constant	4.656	4.970		0.937	0.353	21.717	6.418		3.384	0.002
Stage of treatment	–1.091	0.845	–0.180	–1.292	0.202	–0.455	0.934	–0.072	–0.487	0.629
Marital status	1.120	1.063	0.152	1.054	0.297	–2.140	1.116	–0.302	–1.917	0.063
Place of residence	–0.760	1.580	–0.077	–0.481	0.633	–3.783	1.797	–0.312	–2.106	0.042
Education	–0.310	0.689	–0.067	–0.450	0.654	0.360	0.718	0.077	0.501	0.619
Professional activity	–0.177	1.128	–0.024	–0.156	0.876	–1.658	1.432	–0.180	–1.158	0.254
	Sde									
constant	8.605	3.055		2.817	0.007	11.320	3.544		3.194	0.003
Stage of treatment	–0.328	0.519	2.817	–0.631	0.531	–0.377	0.516	–0.112	–0.731	0.470
Marital status	0.664	0.653	–0.631	1.016	0.314	–0.995	0.616	–0.262	–1.614	0.115
Place of residence	0.467	0.971	1.016	0.480	0.633	–0.634	0.992	–0.097	–0.639	0.527
Education	–0.664	0.423	0.480	–1.569	0.123	0.477	0.396	0.191	1.202	0.237
Professional activity	–1.311	0.693	–1.569	–1.891	0.064	–0.868	0.791	–0.176	–1.098	0.279
	IS									
constant	4.856	6.280		0.773	0.443	29.130	7.771		3.749	0.001
Stage of treatment	–0.973	1.068	–0.128	–0.912	0.366	–0.158	1.131	–0.021	–0.140	0.890
Marital status	1.755	1.343	0.189	1.307	0.197	–2.604	1.351	–0.303	–1.927	0.062
Place of residence	–0.848	1.997	–0.068	–0.425	0.673	–4.369	2.175	–0.297	–2.008	0.052
Education	–0.224	0.870	–0.038	–0.257	0.798	–0.159	0.869	–0.028	–0.182	0.856
Professional activity	–0.881	1.426	–0.094	–0.618	0.540	–2.683	1.734	–0.240	–1.547	0.130
	OS									
constant	6.224	3.809		1.634	0.108	12.324	4.120		2.991	0.005
Stage of treatment	–0.814	0.647	–0.174	–1.257	0.214	–0.165	0.600	–0.041	–0.275	0.785
Marital status	0.767	0.815	0.134	0.941	0.351	–1.582	0.717	–0.351	–2.207	0.034
Place of residence	–0.756	1.211	–0.098	–0.624	0.535	–0.879	1.153	–0.114	–0.762	0.451
Education	–0.444	0.528	–0.124	–0.842	0.404	0.499	0.461	0.168	1.083	0.286
Professional activity	0.166	0.865	0.029	0.191	0.849	–0.828	0.919	–0.141	–0.901	0.374
	IIEF-15									
constant	37.182	28.689		1.296	0.201	123.819	34.233		3.617	0.001
Stage of treatment	–5.267	4.877	–0.150	–1.080	0.285	–1.586	4.983	–0.047	–0.318	0.752
Marital status	6.974	6.137	0.163	1.136	0.261	–10.438	5.954	–0.272	–1.753	0.088
Place of residence	–3.296	9.121	–0.057	–0.361	0.719	–18.742	9.584	–0.285	–1.956	0.058
Education	–2.966	3.975	–0.110	–0.746	0.459	3.079	3.829	0.122	0.804	0.427
Professional activity	–2.610	6.513	–0.060	–0.401	0.690	–11.835	7.639	–0.237	–1.549	0.130

Model	PCa					BPH				
	EF					EF				
	B	SE	β	t	p	B	SE	β	t	p
	AIS									
constant	39.495	9.085		4.347	0.000	17.834	16.120		1.106	0.276
Stage of treatment	–1.057	1.544	–0.095	–0.684	0.497	–0.260	2.347	–0.018	–0.111	0.912
Marital status	–3.894	1.943	–0.288	–2.004	0.050	–2.025	2.803	–0.127	–0.722	0.475
Place of residence	1.988	2.888	0.109	0.688	0.494	2.092	4.513	0.077	0.464	0.646
Education	–1.176	1.259	–0.138	–0.934	0.354	2.142	1.803	0.204	1.188	0.242
Professional activity	0.801	2.062	0.058	0.388	0.699	1.935	3.597	0.093	0.538	0.594
	IPSS									
constant	4.006	12.349		0.324	0.747	18.931	15.245		1.242	0.222
Stage of treatment	1.088	2.099	0.073	0.518	0.606	–0.015	2.219	–0.001	–0.007	0.995
Marital status	–0.515	2.641	–0.028	–0.195	0.846	–1.075	2.651	–0.071	–0.405	0.688
Place of residence	5.246	3.926	0.214	1.336	0.187	0.684	4.268	0.026	0.160	0.873
Education	0.471	1.711	0.041	0.275	0.784	–2.369	1.705	–0.238	–1.389	0.173
Professional activity	0.793	2.803	0.043	0.283	0.778	3.344	3.402	0.170	0.983	0.332

B — non-standardized coefficient; SE — standard error; β — standardized coefficient; t — test statistics; p — statistical significance.

Matching model

The adjusted $R^2 = 0.270$ means that the model explains 27% of the variability of EF in the IIEF-15 scale. The adjusted $R^2 = 0.264$ means that the model explains 26.4% of the variability of OF in the IIEF-15 scale. The adjusted $R^2 = 0.114$ means that the model explains 11.4% of the variability of OS in the IIEF-15 scale. Details are presented in Table 3.

Table 3. Impact of sociodemographic factors on AIS, IIEF15 areas, IPSS — matching model.

	PCa		BPH	
Model	R2	SE	R2	SE
EF	0.084	9.638	0.270	8.869
OF	0.095	3.796	0.264	3.596
Sde	0.156	2.333	0.220	1.986
IS	0.088	4.796	0.267	4.354
OS	0.114	2.909	0.250	2.309
IIEF	0.102	21.912	0.286	19.182
AIS	0.101	6.939	0.085	9.033
IPSS	0.081	9.432	0.087	8.542

SE — standard error.

Correlation between AIS, IIEF15 areas and IPSS

Among PCa patients, there was a statistically significant correlation between AIS and OS. This correlation was positive, indicating that as illness acceptance increases, overall satisfaction also increases. Whereas among BPH patients, there was a statistically significant correlation between

IPSS and OS in the IIEF15. This was a negative correlation, indicating that as symptoms associated with prostate diseases increase, overall satisfaction decreases. Details are presented in Table 4.

Table 4. Correlation between IPSS, AIS and IIEF-15.

Correlation		All		PCa		BPH	
		R Spearman	p-value	R Spearman	p-value	R Spearman	p-value
IPSS	EF	–0.057	0.568	0.004	0.978	–0.109	0.475
	OF	–0.142	0.154	–0.127	0.343	–0.157	0.304
	Sde	–0.086	0.389	–0.107	0.425	–0.044	0.773
	IS	–0.121	0.223	–0.144	0.282	–0.089	0.561
	OS	–0.265	0.007	–0.209	0.115	–0.316	0.035
	IIEF15	–0.126	0.206	–0.104	0.438	–0.146	0.339
AIS	EF	0.144	0.147	0.220	0.097	0.056	0.713
	OF	0.120	0.227	0.233	0.078	0.003	0.983
	Sde	0.116	0.242	0.080	0.550	0.170	0.264
	IS	0.084	0.398	0.231	0.081	–0.068	0.658
	OS	0.205	0.038	0.263	0.0459	0.077	0.614
	IIEF15	0.135	0.174	0.173	0.195	0.074	0.631

Discussion

The studied groups of urological patients scored similarly on each scale. The most significant score difference was observed in the IIEF scale, with BPH patients experiencing greater severity of sexual dysfunction. Respondents in both groups showed poor acceptance of illness and moderate symptom severity on the IPSS scale. There was a significant effect of place of residence on EF and OF, as well as an impact of marital status on OS among BPH patients. AIS had a significant impact among PCa patients, and IPSS had an effect on overall satisfaction among BPH patients.

In a study by Hosseini *et al.*, PCa men scored 16.1 points [16]. In the research by Wong, Chinese patients scored 13.03 points on the IPSS scale [17]. Although the studies by Wong *et al.* and Hosseini *et al.* showed different results, they confirm a moderate level of impairment similar to our own study.

The study by Albaugh *et al.* showed that PCa patients scored 16.1 points on the IIEF15 scale in EF, 6.6 points in OF, 7.3 points in SD, 8.3 points in IS, and 5.5 points in OS [18]. In our study, patients scored lower in all areas than patients in the Albaugh *et al.* study (EF — 7.8 points, OF 2.4 points, SDe 4.9 points, IS 3.0 points, OS 4.2 points), indicating greater severity of symptoms. Urinary incontinence after prostatectomy caused many negative feelings in patients, significantly affecting their well-being resulting in embarrassment, social rejection, isolation from others, anger over loss of control, lowered self-esteem, as well as feelings of anxiety and fear.

A study by Ravi *et al.*, found a significant correlation between urinary incontinence and the presence of anxiety and depression [19]. In our study, patients were characterized by poor disease acceptance, which may be explained by the feelings described above related to urinary incontinence or prostate cancer treatment. In our study, there were no statistically significant differences in either AIS or IPSS symptom severity.

Smoleń *et al.*, in their study among oncological patients, showed that an active working life and being in a relationship influenced illness acceptance. Patients with genitourinary cancers obtained 25.48 points, and age had a significant effect [20]. Czerw *et al.*, in their 2017 study among PCa men, indicated that they scored 30.39 on illness acceptance, and education was the most significant variable [21]. The results obtained by Smoleń *et al.* in their study reflect our own results and indicate poor illness acceptance, but none of the above factors affected disease acceptance. The research by Czerw *et al.* showed greater disease acceptance than our own study and the study by Smoleń *et al.*

In his 2017 study, Izdebski found that 36% of respondents (both healthy and sick) were satisfied with their sexual relationships [22]. In contrast, participants in our study expressed moderate satisfaction. A study conducted by Raczyńska *et al.* among healthy men revealed that 10% of them experienced sexual dysfunction but were moderately satisfied with their sexual life and relationships [23]. In our study, participants reported moderate impairment in overall satisfaction, consistent with the findings of Raczyńska *et al.*, and severe impairment in intercourse satisfaction, indicating more significant severity than in the Raczyńska *et al.* study. Our study also demonstrated a statistically significant correlation between AIS and OS, showing that a decrease in OS corresponded to a decrease in AIS, confirming the results of Izdebski's 2007 study, where he noted that 60% of respondents felt that erectile dysfunction negatively impacted their self-esteem [23]. This negative impact may indirectly affect illness acceptance and relationship satisfaction.

A Polish study showed that half of men with LUTS or BPH had sexual dysfunctions, 60% of which were erectile dysfunction, which accompanied 25% of men with PCa and 25% of men after TURP [24]. Rosen *et al.* showed that BPH caused LUTS, and 70% of patients additionally had erectile dysfunction. This frequency oscillates between 35% and 95% and tends to increase with the severity of LUTS [7]. In our own study, a statistically significant correlation was shown between IPSS and overall satisfaction with the sexual relationship, partly confirming the above findings.

Our study found statistically significant differences among BPH patients in EF and OF by place of residence, and OS by marital status. These findings partially support the study by Laumann *et al.* [25], who identified divorce within the past 3 years as one of the factors for decreased sexual desire, and the study by Zhu *et al.* [26], who identified, among other factors, marital status, severity of LUTS, and presence of depression as factors affecting EF. Other studies, such as those by Laumann *et al.* and Zhu *et al.*, identified age and health condition as factors affecting the presence of sexual dysfunctions. However, these factors were not confirmed in our own study.

Conclusions

Our own results aren't significantly different from international studies, which may indicate that urinary and sexual disorders are common, and men around the world suffer at a comparable level. This proves that the problem is widespread and its scale is broad, suggesting the need to implement more extensive assistance for patients, including psychological, sexological, urological, and other specialists.

Sexual and urinary disorders are a kind of taboo subject, especially among elderly patients. In Polish society, there is a great deal of unawareness and embarrassment regarding male symptoms, resulting in an underestimation of the number of patients and many men not seeking professional help.

Conflict of interest

None declared.

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Author Contributions

Conceptualization, K.J., A.K. and A.M.; Data curation, K.J., A.K. and A.M.; Formal analysis, A.K..; Funding acquisition, K.J. and A.M.; Investigation, K.J., and A.M.; Methodology, K.J., A.K. and A.M.; Project administration, K.J. and A.M.; Resources, K.J.; Software, A.K., K.J.; Supervision, K.J. and A.M.; Validation, K.J., and A.M.; Visualization, K.J. and A.M.; Writing—original draft, K.J., A.K. and A.M.; Writing—review and editing, K.J. and A.M.

All authors have read and agreed to the published version of the manuscript.

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