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Effects of overactive bladder on treatment-related behaviour and quality of life in an Eastern European country: findings from the LUTS POLAND Study

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Abstract

Introduction: The aim of this study was to investigate treatment-related behaviour and quality of life of a Polish population that reported symptoms of overactive bladder (OAB) syndrome. The analysis also evaluated the impact of individual lower urinary tract symptoms and their specific bother on treatment seeking, treatment receiving, treatment satisfaction, and treatment continuation, in the same population.
Material and methods: The participants were aged ≥ 40 years with possible diagnosis of OAB based on a score of ≥ 8 on the OAB-V8 questionnaire. Respondents used Likert-like scales to rate the frequency and symptom-specific bother of individual lower urinary tract symptoms. Regression models were constructed to analyse all associations.
Results: Of 6005 participants, 33.9% (n = 2041) had a possible diagnosis of OAB. Almost 40% (n = 810) were seeking treatment, and most participants received treatment (37.7%, n = 770). There was no difference between individuals in urban and rural areas. Prescribed drugs were the most common treatment for OAB symptoms. We did not observe differences in treatment satisfaction or dissatisfaction between men and women, but statistically more men than women continued their treatment. Symptoms of all categories, not only storage, but also voiding, and post-micturition, were associated with a negative effect on an individual's treatment-related outcome. Finally, OAB had a negative effect on quality of life because 43% (n = 878) of persons with possible OAB had concerns about their quality of life related to their urinary condition.
Conclusions: This study is the first Eastern European population-representative analysis of treatment-related behaviours for OAB. Our study highlights the importance of patient education about the condition and treatment options.

Key words: Poland, overactive bladder, epidemiology, treatment seeking.

Introduction

Overactive bladder (OAB) is a bladder-centric syndrome that consists of urinary frequency, urgency, urge urinary incontinence, and nocturia [1]. OAB is highly bothersome, and it negatively affects the quality of life by impairing social functioning, mental health, work productivity, sleep, and sexuality [2]. These effects lead to financial issues with higher healthcare resource use and costs [3].

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Several large epidemiological studies have evaluated the prevalence of OAB in population-based analyses [4, 5]. In these studies, OAB was highly prevalent and might have affected over 50% of adult men and women, with some variability depending on study population, age, survey methodology, data collection, and culture or ethnicity. Because the prevalence of OAB increases with age, the number of people affected by OAB may further increase as life expectancy continues to increase [5, 6].

Despite high OAB prevalence and its effect on quality of life, treatment-seeking for OAB appears to be meagre. These data are available only from high-income countries of Western Europe and North America. To date, treatment-related behaviours for OAB have not been investigated in any Central or Eastern European country. Furthermore, the effects of OAB on quality of life have not been evaluated at the population level. Because some cultural norms may inhibit individuals from admitting or discussing their health issues, the quality of data on healthcare-seeking behaviour may vary between countries and regions [2, 7]. As Central-Eastern Europe is often considered a distinct cultural entity with Poles, as Slavic people, culturally different from other European people, particularly Germanic and Romance people [8], we have an extremely limited understanding of the treatment-related behaviour for OAB in Poland. Additionally, with a relatively high number of people living in Polish rural regions, available data on behaviour related to OAB treatment may not be fully transferable to Poland because relationships between OAB and treatment-related behaviour have not been reported and compared between urban and rural areas. These data are necessary to support health improvement programs, educational campaigns, and resource allocation.

A recent nationwide, population-representative epidemiological study of OAB in Poland, the first reliable epidemiological study (n = 6005) of OAB in a Central or Eastern Europe country, reported that 26.8% of men and 39.5% of women aged ≥ 40 years had a possible diagnosis of OAB [9]. These estimates suggested that there is a substantial burden of OAB in Poland. Therefore, the aim of this study was to analyse the effect of OAB on treatment-related behaviour (treatment seeking, treatment receiving, treatment satisfaction, and treatment continuation) and quality of life in a Polish population that reported symptoms of OAB.

Material and methods

We performed a further analysis of data from the LUTS POLAND survey, population-representative cross-sectional epidemiological study. Complete details of the study design and methodology are published and presented briefly here [9]. The study included representative pools of men and women, aged ≥ 40 years, who lived in all geographical regions of Poland (including urban and rural areas). The local research ethics committee (1072.6120.160.2019) approved the experiment, and the study was registered with ClinicalTrials.gov (NCT04121936). Informed consent was obtained from all participants.

Study design

After considering the general applicability of surveys on population-representative samples in Poland, we chose a computer-assisted telephone interview (CATI) system instead of face-to-face interviews (which have limitations in stratifications for place of residence) and Internet surveys (which have limitations in stratifications for age, i.e. computer access or lack of computer skills by older persons) [10, 11]. The most recent population census was employed as the basis for creating a target sample with a sample matching technique [12]. Before and after completion of the questionnaires, the survey sample was stratified by age, sex, and place of residence (for both geographical regions, i.e. 16 states (voivodships); and type/size of places of living, including adequate proportion of urban and rural areas) to reflect the entire Polish population. We excluded participants with current/past urinary tract infection (within 1 month prior to the study) and women who were pregnant at the time of the survey or who had given birth within the preceding 6 months.

Data collection

All data were collected prospectively. To identify participants with possible diagnoses of OAB, we used the Overactive Bladder–Validated 8-question Screener (OAB-V8), a validated screening tool for OAB that was used widely in other large-scale population-based international studies [13–15]. The OAB-V8 score was used for dichotomizing individuals, with a score of ≥ 8 to qualify as a possible diagnosis of OAB. Table I shows the telephone survey questions regarding the impact of bladder problems on treatment seeking, treatment receiving, treatment satisfaction, treatment continuation, and quality of life, as well as items of the OAB-V8. All participants were also asked about individual lower urinary tract symptoms including storage (frequency, urgency, nocturia, urinary incontinence), voiding (intermittency, slow stream, hesitancy, straining, splitting/spraying, terminal dribble), and post-micturition symptoms (incomplete emptying, post-micturition dribble), in accordance with standardized terminology provided by the International Continence Society [1]. Par-

Table I. Items of the OAB-V8 and questions regarding treatment seeking, treatment receiving, treatment satisfaction, treatment continuation, and quality of life

(A) OAB-V8 questionnaire						
How bothered have you been by...	Not at all	A little bit	Somewhat	Quite a bit	A great deal	A very great deal
1. Frequent urination during the daytime hours?	0	1	2	3	4	5
2. An uncomfortable urge to urinate?	0	1	2	3	4	5
3. A sudden urge to urinate with little or no warning?	0	1	2	3	4	5
4. Accidental loss of small amounts of urine?	0	1	2	3	4	5
5. Nighttime urination?	0	1	2	3	4	5
6. Waking up at night because you had to urinate?	0	1	2	3	4	5
7. An uncontrollable urge to urinate?	0	1	2	3	4	5
8. Urine loss associated with a strong desire to urinate?	0	1	2	3	4	5
Are you male?	If male, add 2 points to your score					
(B) Treatment-related behaviours						
1. Have you sought medical attention for your urinary or bladder problems?						
Yes/No						
2. Have you received any treatment for your urinary or bladder problems?						
Yes/No						
3. Which of the following methods of treatment did you use?						
Lifestyle changes/Exercise and physiotherapy/Non-prescription drugs/Prescription drugs/Surgical treatment						
4. Do you continue the treatment?						
Yes/No						
5. Are/Were you satisfied with the treatment?						
Yes/No						
(C) Quality of life						
1. If you were to spend the rest of your life with your urinary condition just the way it is now, how would you feel about that?						
Delighted/Pleased/Mostly satisfied/Mixed/Mostly dissatisfied/Unhappy/Terrible						

ticipants used Likert-like scales to rate the occurrence of all these symptoms during the preceding month (none, less than 1 in 5 times, less than half the time, about half the time, more than half the time, almost always), and the bother associated with these symptoms (not at all, a little bit, somewhat, quite a bit, a great deal, a very great deal) [16]. The survey was administered by Ipsos Poland, which represented itself with relevant quality certificates (PKJPA, PKJBI, OFBOR, ESOMAR) [17].

Study objectives

The primary objective of this analysis was to investigate treatment-related behaviour (treatment seeking, treatment receiving, treatment satisfaction, and treatment continuation) in a representative population of Polish individuals aged ≥ 40 years with possible diagnoses of OAB.

Secondary study objectives were to analyse the effect of OAB on quality of life and the effects of individual lower urinary tract symptoms on specific outcomes in this population. Specifically, we measured the impact of individual lower urinary tract symptoms on treatment seeking, treatment receiving, treatment dissatisfaction, and treatment discontinuation in the population that reported symptoms of OAB. The primary objective for this analysis was prespecified in the

statistical analysis plan, before the survey was undertaken.

Ethics

The study was performed in compliance with Good Clinical Practice and in accordance with the Declaration of Helsinki. The study was approved by the local research ethics committee.

Statistical analysis

Associations between categorical variables were measured using Pearson's χ^2 test, and descriptive statistics were used to obtain a general understanding of the data and the characteristics of the sample. Logistic regression (non-linear) models were constructed to analyse the association of symptom frequency and symptom inconvenience with outcomes related to quality of life and treatment patterns. Parameters included in the models were sex, age, educational status, working situation, marital status, type of place of living (urban vs. rural), and frequency and bother of each lower urinary tract symptom. Models for men and women were adjusted individually. Data analysis was conducted using SPSS Statistics software (IBM Corporation, Armonk, NY, USA, version 24.0).

For sample size calculation, we followed the methodology that was used in other studies of the prevalence of lower urinary tract symptoms [18]. Therefore, the sample size was calculated based on the population age distribution and expected symptom prevalence [19]. Age standardization depended on the recent census [12].

Results

Overall, 6005 respondents from across Poland participated in the survey. The OAB prevalence (≥ 8 points from the OAB-V8 questionnaire) was 33.9% (Table II). OAB was statistically more prevalent in women than in men (39.5% vs. 26.8%, $p < 0.01$). Also, more women (30.7% of all women with OAB) than men (13.2% of all men with OAB) had OAB wet syndrome (i.e. with concurrent urge urinary incontinence). Furthermore, OAB was statistically more common with advanced age in both sexes ($p < 0.01$).

Treatment seeking and treatment receiving

Almost 40% (n = 810) of the respondents with possible diagnoses of OAB were seeking treatment, and most received treatment (37.7%, n = 770; Table III). Statistically more men than women (51.1% vs. 33.7%) were seeking treatment, and more men than women received treatment (48.4% vs. 32.2%). Urban/rural status had no effect on treatment seeking or treatment receiving.

Men with bothersome urgency, frequency, and slow stream were more likely to seek treatment compared with men without these symptoms (Table IV). Further, the chance of seeking treatment for OAB symptoms was also greater for men who were married or living with a partner. In women, bothersome urgency, urge urinary incontinence, and post-micturition dribble were correlated with a higher likelihood of treatment seeking. For treatment seeking by women, we also noted a 3% increase with each additional year of age.

For both men and women, bothersome urgency was associated with a greater chance of receiving treatment (Table IV). Moreover, there was an increase in the prospect of receiving treatment for OAB symptoms with each additional year of age in both sexes (an increase of 9% with each additional year for men and 4% for women).

Most participants who obtained treatment received prescription drugs (n = 535; 69.5%), followed by over-the-counter drugs (n = 178; 23.1%), physiotherapy (n = 165; 21.4%), lifestyle changes (n = 124; 16.1%), and surgery (n = 120; 15.6%). Combined treatment, i.e. at least 2 of the aforementioned treatment methods, was used for 33.6% (n = 259) of the participants.

Table II. Data from the OABV8 (prevalence of OAB) questionnaire completed by men and women

OAB-V8	Sex				Total		*P*-value
	Men		Women				
	n	%	*n*	%	*n*	%	
OAB-V8 score ≥ 8 (all participants)	701	26.8	1340	39.5	2041	33.9	< 0.01
Age category:							< 0.01
40–49	86	13.6	164	28.1	250	20.6	
50–59	141	22.5	312	37.1	453	30.8	
60–69	247	31.4	450	41.1	697	37	
70–79	160	37.5	308	45.9	468	42.6	
≥ 80	67	48.6	106	52.7	173	51	

Table III. Treatment-related behaviours

Possible diagnosis of OAB^	Sex				Place of living				Total	
	Men		Women		Urban		Rural			
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Treatment seeking	358	51.1**	452	33.7	518	34.0	292	31.3	810	39.7
Treatment receiving:	339	48.4**	431	32.2	492	32.3	278	29.8	770	37.7
Treatment satisfaction	266	78.5	305	70.8	360	73.2	211	75.9	571	74.2
Treatment dissatisfaction	73	21.5	126	29.2	132	26.8	67	24.1	199	25.8
Treatment continuation	265	78.2**	168	39.0	273	55.5	160	57.6	433	56.2
Treatment discontinuation	74	21.8**	263	61.0	219	44.5	118	42.4	337	43.8
Treatment satisfaction with continuation	214	63.1**	127	29.5	213	43.3	128	46.0	341	44.3
Treatment satisfaction with discontinuation	52	15.3*	178	41.3	147	29.9	83	29.9	230	29.9
Treatment dissatisfaction with continuation	51	15.1	41	9.5	60	12.2	32	11.5	92	11.9
Treatment dissatisfaction with discontinuation	22	6.5*	85	19.7	72	14.6	35	12.6	107	13.9

*^≥ 8 points from the OAB-V8 questionnaire, *p < 0.05 between men and women, **p < 0.01 between men and women.*

Treatment satisfaction and dissatisfaction

We did not find a statistical difference in treatment satisfaction or dissatisfaction between men and women; however, men tended to be more satisfied with their treatment compared with women (78.5% vs. 70.8%) (Table III). In addition, there was no association between treatment satisfaction/dissatisfaction and urban/rural status.

For men with possible OAB, the likelihood of treatment dissatisfaction was greater among those who reported bother associated with urgency with fear of leaking and urge urinary incontinence (Table IV). The likelihood of treatment dissatisfaction by women was greater among those with bothersome urgency with fear of leaking and among those who were unemployed. For both sexes, the likelihood of treatment dissatisfaction was lower for widowed or single individuals.

Treatment continuation and discontinuation

Statistically more men than women reported continuation of treatment (78.2% vs. 39%; Table III). Consequently, statistically more women than men reported discontinuation of treatment (61.0% vs. 21.8%). We did not find any association between treatment continuation/discontinuation and urban/rural status.

The likelihood of treatment discontinuation by men with a possible diagnosis of OAB was lower for those who reported slow stream (Table IV). For women with possible OAB, the likelihood of treatment discontinuation was greater among those with bothersome urgency with fear of leaking and with bothersome leak for no reason. For men and women, the chance of treatment discontinuation increased with unemployment.

Quality of life

Among all respondents with possible OAB, 43% (n = 878) stated they would be "mixed", "mostly dissatisfied", "unhappy", or consider it "terrible" to spend the rest of their lives with their current urinary condition. Corresponding estimates for men were 45.9% (n = 322) and for women 41.5% (n = 1340). For persons who were seeking treatment, quality of life was even lower because more than a half (54.6%, n = 442) reported the foregoing attitudes with their current urinary condition.

Discussion

The assessments in this study are an extension of the LUTS Poland data with a representative pool of adults aged ≥ 40 years from all geographical regions of Poland. We found that OAB was highly prevalent, it had negative effects on quality of life, and a relatively low number of persons were seeking treatment. This study is the first in Eastern Europe to analyse treatment-related behaviours and quality of life for OAB at the population level. Furthermore, we measured the effect of OAB on treatment-related behaviours separately for urban and rural areas, an issue that was not considered in any other published study. We also documented that the likelihood of treatment seeking was markedly increased with the presence of specific lower urinary tract symptoms associated with possible OAB in both men and women.

Treatment-related behaviours have been investigated in some earlier analyses. The EpiLUTS

Table IV. Heat map of multiple regressions for treatment seeking, treatment receiving, treatment dissatisfaction, and treatment discontinuation in men and women

Covariates	Treatment seeking	Treatment receiving	Treatment dissatisfaction	Treatment discontinuation
Men:				
Storage symptoms:				
Nocturia[b]				
Nocturia[b] – bother				
Frequency				
Frequency – bother	2.24 (1.08–4.52)			
Urgency				
Urgency – bother	2.41 (1.20–4.83)	2.82 (1.53–5.02)		
Urgency with fear of leaking				
Urgency with fear of leaking – bother			6.21 (2.81–12.57)	
Urge urinary incontinence				
Urge urinary incontinence – bother			7.26 (2.55–16.11)	
Stress urinary incontinence				
Stress urinary incontinence – bother				
Mixed urinary incontinence [c]				
Mixed urinary incontinence[c] – bother				
Leak for no reason				
Leak for no reason – bother				
Voiding symptoms:				
Intermittency				
Intermittency –- bother		2.01 (1.33–2.86)		
Slow stream				0.41 (0.21–0.97)
Slow stream – bother	2.39 (1.15–3.82)			
Hesitancy				
Hesitancy – bother				
Straining				
Straining – bother				
Splitting/spraying				
Splitting/spraying – bother				
Terminal dribble				
Terminal dribble – bother				
Post-micturition symptoms:				
Incomplete emptying				
Incomplete emptying – bother				
Post-micturition dribble				
Post-micturition dribble – bother				
Demographics:				
Age		1.09 (1.07–1.12)		
Educational status				
Work situation – unemployed				3.23 (1.46–6.21)
Marital status	1.48 (1.11–2.01)		0.11 (0.02–0.60)	
Place of living (urban vs. rural)				

Table IV. Cont.

Covariates	Treatment seeking	Treatment receiving	Treatment dissatisfaction	Treatment discontinuation
Women				
Storage symptoms:				
Nocturia[b]				
Nocturia[b] – bother				
Frequency				
Frequency – bother				
Urgency				
Urgency – bother	2.23 (1.46–2.98)	2.62 (1.85–3.87)		
Urgency with fear of leaking				
Urgency with fear of leaking – bother			2.56 (1.04–5.32)	7.56 (2.01–21.43)
Urge urinary incontinence				
Urge urinary incontinence – bother	2.91 (2.02–4.14)			
Stress urinary incontinence				
Stress urinary incontinence – bother				
Mixed urinary incontinence [c]				
Mixed urinary incontinence[c] – bother				
Leak for no reason				
Leak for no reason – bother				4.11 (2.12–10.05)
Voiding symptoms:				
Intermittency				
Intermittency – bother				
Slow stream				
Slow stream – bother				
Hesitancy				
Hesitancy – bother				
Straining				
Straining – bother				
Splitting/spraying				
Splitting/spraying – bother				
Terminal dribble				
Terminal dribble – bother				
Post-micturition symptoms:				
Incomplete emptying				
Incomplete emptying – bother				
Post-micturition dribble				
Post-micturition dribble – bother	1.69 (1.01–2.96)			
Demographics:				
Age	1.03 (1.01–1.05)	1.04 (1.01–1.07)		
Educational status				
Work situation – unemployed			5.22 (1.48–16.15)	4.98 (1.23–14.22)
Marital status			0.31 (0.09–0.85)	
Place of living (urban vs. rural)				

Red cells indicate an increase and blue cells indicate a decrease. Numbers show adjusted odd ratios (95% confidence interval).

study, an Internet-based population inquiry, determined that 34.6% of persons with bothersome OAB symptoms in the UK and 23.8% in Sweden were looking for treatment because of their bladder condition [2]. Interestingly, whereas in the UK more men than women sought treatment, in Sweden women were more likely than men to see a healthcare provider specifically to address their urinary symptoms. A similar rate of treatment seeking was reported in the EPIC study, which included data from Canada, Germany, Italy, Sweden, and the UK; 38% of patients with possible OAB were seeking treatment [20]. In a telephone interview study in 5 major cities in Brazil, the rates of treatment seeking were also low, about 40% for both sexes [21]. Our observation that 39.7% of Polish adults with possible OAB were seeking treatment is similar to estimates from other countries. Therefore, the low rate of healthcare seeking related to OAB is a significant worldwide concern.

Multiple reasons have been proposed for the variability in rates of treatment seeking by persons with OAB symptoms. Studies have varied by methodology and cultural differences, but OAB is also often dismissed without adequate management because of social stigma and opinions that OAB and its symptoms are a natural consequence of age without adequate management [22]. Nonetheless, 2 population-based surveys of Swedish women undertaken 16 years apart (1991 and 2017) showed that treatment-seeking for urinary symptoms had not ameliorated over time, even though there was a statistical increase in the number of women who reported limitations in their social life because of their bladder problems [23]. In our study, statistically more men than women were seeking treatment. Qualitative research suggests that men more often seek treatment for their urinary problems because of fears about serious illness, including cancer; conversely, women may be less likely to mention their symptoms during a routine clinical visit and relate their symptoms to non-oncological disorders such as urinary tract infection or ageing [24]. These findings suggest that there is an ongoing need to improve awareness of the nature of OAB. Because treatment for OAB is not common, the lack of knowledge of treatment options may present barriers to healthcare seeking. Understanding OAB can affect a patient's motivation and adherence, which can influence the effect and outcome of treatment. Importantly, education and counselling of OAB can be provided by different types of clinicians, such as physicians (e.g. urologists, gynaecologists, general practitioners, geriatrists), nurses, and, in some cases, physiotherapists specialized in pelvic floor physiotherapy. Therefore, education of the general population regarding OAB and its treatment is a crucial factor for treatment-related behaviours, particularly for treatment seeking. Furthermore, adequate education should also pertain to different medical professionals that eventually support reaching the general population.

It is important to stress that, in our study, not only storage symptoms consisting of OAB but also other symptoms from all 3 ICS symptom groups (storage, voiding, and post-micturition) correlated with treatment-related behaviours by persons with possible OAB. Therefore, comprehensive evaluation of all urological symptoms in patients suspected of OAB is always required to prevent the substantial negative impact of the disorder. This extensive approach is needed for effective treatment with a focus on personalized management [25]. Currently, for men presenting with lower urinary tract symptoms, management often concentrates on only voiding symptoms and may not address storage symptoms, even though multiple studies have disclosed that storage symptoms are more bothersome [2]. This finding highlights the fact that healthcare professionals who provide treatment for functional urology disorders need to be aware of the coexistence of multiple symptoms. The importance of physician-initiated conversations about OAB symptoms and the inconvenience that they cause also needs to be addressed.

In our study, most participants who obtained treatment received prescribed drugs, and one-third of the participants had combined treatment. Management by lifestyle changes was reported by only 16.1% of respondents. The paucity of lifestyle management approaches is a particular concern because lifestyle changes and behavioural therapies with patient education are currently recommended as first-line treatment options for OAB [26]. OAB is not a life-threatening condition; thus, all patients who desire treatment should start with some form of lifestyle change, because change is non-invasive and reversible. Moreover, lifestyle changes and behavioural therapies can be combined easily with other OAB treatments and should form part of any treatment plan. The low rate of offering these treatment methods that we observed can be explained by the fact that these forms of therapy require a significant time and effort commitment by the patient, with regular follow-up to achieve success [27]. Nonetheless, clinicians, especially non-urologists, e.g. primary care physicians, should be carefully educated about OAB, particularly with regard to treatment.

OAB is a symptom-syndrome, and treatment focuses mainly on mitigating symptoms [28]. OAB treatment compliance is an issue in routine clinical practice. About a quarter of OAB patients discontinue their treatment because of resolution of

bothersome symptoms, and another quarter because of adverse effects and/or failure of expected clinical outcome [29, 30]. In our study, 43.8% of participants reported treatment discontinuation. Interestingly, statistically more men than women continued their treatment (78.2% vs. 39.0%). Although other international studies also reported that men were more likely to continue treatment [31], this observation may be explained by different reasons. First, OAB symptoms are also attributed to benign prostatic hyperplasia. For men, treatment typically starts with α-blockers or 5α-reductase inhibitors with mild side-effect profiles [32]. Combination with anticholinergics, with significant drop-outs from the treatment because of adverse events (i.e. more severe side-effect profiles compared with α-blockers or 5α-reductase inhibitors), is recommended only for males with moderate-to-severe lower urinary tract symptoms, without risk factors for progression of benign prostatic hyperplasia, and if relief of storage symptoms is insufficient with α-blocker monotherapy [32]. For women, treatment of storage symptoms starts with anticholinergics [33]. Second, we speculate that storage symptoms might not be adequately controlled. In cases of ineffective treatment, the European Association of Urology recommends considering dose escalation or offering an alternative antimuscarinic formulation, or mirabegron, or a combination [33]. Notably, in recent international studies, compared with antimuscarinics, mirabegron was associated with a significantly longer time to discontinuation, greater persistence, and better adherence [34]. Finally, until now, public urological campaigns in Poland have been focused mainly on men, and women might not be adequately targeted. Thus, we speculate that men may be better educated about their symptoms compared with women. Nonetheless, future health improvement programs in functional urology in Poland need to reach both men and women.

Treatment-related behaviours also depend on the availability of therapeutic options [35, 36]. The treatment availability has a particular effect on treatment receiving and treatment continuation. Currently in Poland there are multiple OAB treatment options available, including pharmacotherapy, onabotulinum toxin A injections, or sacral neuromodulation. However, these treatment modalities are sometimes not adequately covered by the national healthcare system (e.g. some OAB medications) or may be not fully available because of procedure limits (e.g. sacral neuromodulation). Therefore, there is a need to transfer adequate healthcare and financial resources for OAB patients in Poland.

We did not find differences between urban and rural status in treatment behaviours. Before conducting the study, we expected that people from urban areas would be more active in treatment seeking compared with persons from rural regions. This hypothesis emerged from data showing that people from rural areas in Poland were more hesitant to admit or discuss their health issues [37]. However, these data were published decades ago. Since 2004, Poland has been a member of the European Union, the organisation that initiated and funded several large health improvement programs in Polish rural areas [38]. Even without longitudinal analyses of this correlation, with our results, we hypothesize that the health differences between rural and urban areas in Poland are beginning to blur. Furthermore, given the growing population density in Poland, urban and rural areas have started to overlap [38].

This study is not free from limitations, including the nature of the data capture and the major limitation relating to self-reporting of OAB in the absence of a confirmed clinical diagnosis. In routine clinical practice, OAB can be diagnosed in the absence of urinary tract infection or other obvious pathology that can lead to storage symptoms. Even reliance on the validated OAB screening tool (OAB-V8) and ICS definitions used to define the study sample at the population level does not enable exclusion of storage symptoms secondary to other conditions unrelated to OAB. However, during a telephone survey, without clinical verification, such information would have been difficult to obtain reliably from a self-reporting participant. In addition, use of a bladder diary, a semi-objective instrument in diagnosing OAB, is broadly limited in population-based analyses. Furthermore, multiple approaches have been even proposed to estimate OAB prevalence at the population level. In some early investigations, authors analysed OAB prevalence from symptom combinations (e.g. urgency and urge urinary incontinence) [14, 39]. More recent analyses have been mostly based on validated OAB screening instruments [13, 22]. Therefore, the prevalence of OAB has been reported from as low as 2% to as high as 53% [4]. Because validated instruments measure relevant symptom burden, they may be more optimal for population-based analyses than rigid classification systems based only on symptom prevalence [19]. Therefore, we used the OAB-V8 questionnaire, which is characterized by high sensitivity and specificity in recognizing OAB [19], and it is used widely as a valid screening tool to estimate OAB prevalence in large population-based analyses [9]. We also did not collect data regarding causes of treatment discontinuation and drug-related adverse events.

In conclusion, despite the high prevalence of OAB and its detrimental effect on quality of life,

the rate of treatment seeking for OAB was low. In our large cohort of persons with a possible diagnosis of OAB, treatment-related behaviours were associated not only with storage symptoms but also with voiding or post-micturition symptoms. This finding underlines the importance of comprehensive assessment of patients with OAB to ensure appropriate and personalized management. Our study also indicated a need for increased awareness of OAB at the population level to improve treatment-related behaviour and for higher healthcare and financial resources for OAB patients.

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Conflict of interest

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MC has nothing to disclose.

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References

1. Abrams P, Cardozo L, Fall M, et al. The standardisation of terminology of lower urinary tract function: report from the Standardisation Sub-committee of the International Continence Society. Neurourol Urodyn 2002; 21: 167-78.
2. Coyne KS, Sexton CC, Kopp ZS, et al. The impact of overactive bladder on mental health, work productivity and health-related quality of life in the UK and Sweden: results from EpiLUTS. BJU Int 2011; 108: 1459-71.
3. Errando-Smet C, Müller-Arteaga C, Hernández M, Lenero E, Roset M. Healthcare resource utilization and cost among males with lower urinary tract symptoms with a predominant storage component in Spain: the epidemiological, cross-sectional MERCURY study. Neurourol Urodyn 2018; 37: 307-15.
4. Tikkinen KA, Tammela TL, Rissanen AM, et al. Is the prevalence of overactive bladder overestimated? A population-based study in Finland. PLoS One 2007; 2: e195.
5. Vaughan CP, Johnson TM 2nd, Ala-Lipasti MA, et al. The prevalence of clinically meaningful overactive bladder: bother and quality of life results from the population-based FINNO study. Eur Urol 2011; 59: 629-36.
6. Irwin DE, Milsom I, Chancellor MB, Kopp Z, Guan Z. Dynamic progression of overactive bladder and urinary incontinence symptoms: a systematic review. Eur Urol 2010; 58: 532-43.
7. Welch LC, Botelho EM, Tennstedt SL. Race and ethnic differences in health beliefs about lower urinary tract symptoms. Nursing Res 2011; 60: 165-72.
8. Wikipedia (Wiki), The Free Encyclopedia [Internet]; Publicated: 2004 [Updated: 2019, Cited: 2020 May]. Available from: https://en.wikipedia.org/wiki/Eastern_Europe.
9. Przydacz M, Golabek T, Dudek P, Lipinski M, Chlosta P. Prevalence and bother of lower urinary tract symptoms and overactive bladder in Poland, an Eastern European Study. Sci Rep 2020; 10: 19819.
10. Polska Agencja Rozwoju Przedsiebiorczosci (PARP), Raport metodologiczny z badan BKL [Internet]; Publicated: 2011 [Updated: 2020, Cited: 2020 May]. Available from: https://www.parp.gov.pl/component/publications.
11. Na Strazy Sondazy, Uniwersytet Warszawski [Internet]; Publicated: 2013 [Cited: 2020 May]. Available from: http://nastrazysondazy.uw.edu.pl/metodologia-badan.].
12. Glowny Urzad Statystyczny (GUS), Narodowe Spisy Powszechne [Internet]; Publicated: 2012 [Cited: 2020 May]. Available from: https://stat.gov.pl/spisy-powszechne/.
13. Soler R, Gomes CM, Averbeck MA, Koyama M. The prevalence of lower urinary tract symptoms (LUTS) in Brazil: results from the epidemiology of LUTS (Brazil LUTS) study. Neurourol Urodyn 2018; 37: 1356-64.
14. Irwin DE, Milsom I, Kopp Z, et al. Prevalence, severity, and symptom bother of lower urinary tract symptoms among men in the EPIC study: impact of overactive bladder. Eur Urol 2009; 56: 14-20.
15. Moreira ED Jr, Neves RC, Neto AF, et al. A population-based survey of lower urinary tract symptoms (LUTS) and symptom-specific bother: results from the Brazilian LUTS epidemiology study (BLUES). World J Urol 2013; 31: 1451-8.
16. Allen IE, Seaman CA. Likert scales and data analyses. Quality Progress 2007; 40: 64-5.
17. Program Kontroli Jakosci Pracy Ankieterow (PKJPA), Organizacja Firm Badania Opinii i Rynku (OBFOR) [Internet]; Publicated: 2000 [Updated: 2019; Cited: 2020 May]. Available from: https://www.pkjpa.pl.
18. Coyne KS, Sexton CC, Kopp ZS, et al. Rationale for the study methods and design of the epidemiology of lower urinary tract symptoms (EpiLUTS) study. BJU Int 2009; 104: 348-51.
19. Llorente C. New concepts in epidemiology of lower urinary tract symptoms in men. Eur Urol Suppl 2010; 9: 477-81.

20. Irwin DE, Milsom I, Kopp Z, Abrams P. Symptom bother and health care-seeking behavior among individuals with overactive bladder. Eur Urol 2008; 53: 1029-37.
21. Gomes CM, Averbeck MA, Koyama M, Soler R. Impact of OAB symptoms on work, quality of life and treatment-seeking behavior in Brazil. Curr Med Res Opinion 2020; 36: 1403-15.
22. Chapple C, Castro-Diaz D, Chuang YC, et al. Prevalence of lower urinary tract symptoms in China, Taiwan, and South Korea: results from a cross-sectional, population-based study. Adv Ther 2017; 34: 1953-65.
23. Wennberg AL, Molander U, Fall M, et al. Lower urinary tract symptoms: lack of change in prevalence and help-seeking behaviour in two population-based surveys of women in 1991 and 2007. BJU Int 2009; 104: 954-9.
24. Coyne KS, Sexton CC, Kopp Z, et al. Assessing patients' descriptions of lower urinary tract symptoms (LUTS) and perspectives on treatment outcomes: results of qualitative research. Int J Clin Pract 2010; 64: 1260-78.
25. Chapple CR, Drake MJ, Van Kerrebroeck P, et al. Total urgency and frequency score as a measure of urgency and frequency in overactive bladder and storage lower urinary tract symptoms. BJU Int 2014; 113: 696-703.
26. Corcos J, Przydacz M, Campeau L, et al. CUA guideline on adult overactive bladder. Canad Urol Assoc J 2017; 11: E142-73.
27. Borello-France D, Burgio KL, Goode PS, et al. Adherence to behavioral interventions for urge incontinence when combined with drug therapy: adherence rates, barriers, and predictors. Phys Ther 2010; 90: 1493-505.
28. Przydacz M, Chłosta P. The pharmacotherapy time-to-effect of overactive bladder medications and treatment duration. Acta Pol Pharm Drug Res 2020; 77: 411-6.
29. Krhut J, Gartner M, Petzel M, et al. Persistence with first line anticholinergic medication in treatment-naive overactive bladder patients. Scand J Urol 2014; 48: 79-83.
30. Tanaka Y, Tanuma Y, Masumori N. Long-term prospective study of the persistence of solifenacin succinate in previously untreated Japanese female patients with overactive bladder. Int J Urol 2016; 23: 866-72.
31. Norby B, Nordling J, Mortensen S. Lower urinary tract symptoms in the danish population: a population-based study of symptom prevalence, health-care seeking behavior and prevalence of treatment in elderly males and females. Eur Urol 2005; 47: 817-23.
32. European Association of Urology (EAU), Non-Oncology Guidelines [Internet]; Management of Non-neurogenic Male LUTS, Publicated: 2020 [Accessed: 2020 May]. Available from: https://uroweb.org/guideline/treatment-of-non-neurogenic-male-luts/.
33. European Association of Urology (EAU), Non-Oncology Guidelines [Internet]; Urinary Incontinence, Publicated: 2020 [Accessed: 2020 May]. Available from: https://uroweb.org/guideline/urinary-incontinence/.
34. Wagg AS, Foley S, Peters J, et al. Persistence and adherence with mirabegron vs antimuscarinics in overactive bladder: retrospective analysis of a UK General Practice prescription database. Int J Clin Pract 2017; 71: doi: 10.1111/ijcp.12996.
35. Persu C, Braschi E, Lavelle J. A review of prospective Clinical Trials for neurogenic bladder: pharmaceuticals. Centr European J Urol 2014; 67: 264-9.
36. Persu C, Braschi E, Lavelle J. A review of prospective Clinical Trials for neurogenic bladder: the place of surgery, experimental techniques and devices. Centr European J Urol 2014; 67: 270-6.
37. Branowitzer Z. Number of patients seeking medical advice and morbidity in Poland (July 1967-June 1968). VII. Morbidity in urban and rural population in Poland based on a representative study. Przegl Epidemiol 1974; 28: 195-204.
38. Europejski Fundusz Rozwoju Wsi Polskiej (EFRWP), Programs [Internet]; Publicated: 2004 [Cited: 2020 May]. Available from: https://www.efrwp.pl.
39. Herschorn S, Gajewski J, Schulz J, Corcos J. A population-based study of urinary symptoms and incontinence: the Canadian Urinary Bladder Survey. BJU Int 2008; 101: 52-8.