ORIGINAL PAPER

UROLITHIASIS

Treatment patterns for urolithiasis and renal colic-like pain symptoms in Poland: The POLSTONE Study

Jakub Szymanski[1], Pawel Rajwa[2], Wojciech Krajewski[3], Piotr Bryniarski[4], Przemyslaw Dudek[1], Piotr Chlosta[1], Mikolaj Przydacz[1*]

[1]Department of Urology, Jagiellonian University Medical College, Krakow, Poland
[2]Second Department of Urology, Centre of Postgraduate Medical Education, Warsaw, Poland
[3]Department of Urology and Oncologic Urology, Wroclaw Medical University, Wroclaw, Poland
[4]Department of Urology, Division of Medical Sciences in Zabrze, Medical University of Silesia in Katowice, Zabrze, Poland

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Corresponding author
Mikolaj Przydacz
Department of Urology,
Jagiellonian University
Medical College,
2 Jakubowskiego St.,
30-688 Krakow, Poland
mikolaj.przydacz@uj.edu.pl

Introduction The aim of this study was to determine population-level treatment patterns for urolithiasis and renal colic-like pain symptoms in Poland.

Material and methods We used data from POLSTONE, a survey representative of the entire Polish population stratified by age, sex, and place of residence. We identified and evaluated non-surgical and surgical treatment patterns for urolithiasis and renal colic-like pain symptoms.

Results In this nationally representative survey of 10,029 Polish adults, the lifetime prevalence of urolithiasis was 12.85% (n = 1,289) and 43.05% (n = 4,317) reported renal colic-like pain symptoms. Ultrasound was the most used diagnostic method for urolithiasis (73.78%; n = 951), followed by computed tomography (22.11%; n = 285). Conservative treatment predominated in the management of urolithiasis, with 58.73% (n = 757) of patients receiving prescription drugs and 29.87% (n = 385) using over-the-counter medications. Among surgical interventions, transurethral procedures were most frequent (13.42%; n = 173), followed by shockwave lithotripsy (11.48%; n = 148), laparoscopic or open surgery (6.75%; n = 87), and percutaneous nephrolithotripsy (6.05%; n = 78). Physicians gave preventive advice to 88.98% (n = 1,147) of respondents who had urolithiasis, most often recommending increased fluid intake (58.65%; n = 756). For renal colic-like pain, medications were the mainstay of treatment, with nearly 90% of patients reporting satisfaction. Some treatment patterns varied by age, sex, and/or residence, highlighting the influence of sociodemographic factors on care.

Conclusions This study offers the first in-depth, population-level evaluation of how urolithiasis and renal colic-like pain symptoms are treated in Poland. The results can guide healthcare policy, support cost-effectiveness studies, and inform targeted strategies for management of urolithiasis and renal colic-like pain symptoms.

Key Words: Poland ‹› urolithiasis ‹› renal colic ‹› treatment ‹› diagnosis

INTRODUCTION

Urolithiasis, marked by the formation of urinary tract stones, is a major global health concern. Urolithiasis occurrence is influenced by a complex interplay of geography, climate, diet, genetics, and lifestyle. Urolithiasis is highly prevalent [1]. In the first population-based study of its kind in Central and Eastern Europe, conducted in Poland, we established that lifetime prevalence was 12.85%, with 43.05% of participants experiencing renal colic-like symptoms [2]. The condition ranges from mild symptoms to serious complications such as hydronephrosis and kidney dysfunction. Urolithiasis also impairs mental health and social behavior, and it creates economic burdens such

as reduced productivity and substantial healthcare costs [3].

Globally, healthcare costs for urolithiasis and renal colic symptoms are projected to rise to $1.24 billion annually by 2030 [4]. Most affected individuals seek and receive treatment [2]. Although obtaining treatment is encouraging, treatment is a major contributor to the global financial burden. Treatment varies by stone size, location, and healthcare access. Common treatment modalities include medical expulsive therapy, ureterorenoscopic lithotripsy (URSL), shockwave lithotripsy (SWL), percutaneous nephrolithotomy (PCNL), and, in some settings, laparoscopic or even open surgery, still prevalent in regions that have limited access to modern technology [5, 6]. Treatment costs also vary widely [7]. As a result, treatment patterns can differ significantly between countries and regions. Therefore, reliable population-level assessments are essential to understand current trends. This understanding supports effective resource allocation, treatment planning, and informed policy-making. Accurate data can also improve healthcare system efficiency, guide appropriate funding, and aid in developing targeted public health strategies. Additionally, such insights provide valuable education for healthcare professionals by highlighting real-world use of recommended and non-recommended therapies.

Until now, there has been no population-level data on treatment patterns for urolithiasis and renal colic-like symptoms in Poland. To address this gap, we assessed current management practices within a representative cohort of Polish adults, providing critical insights into national treatment trends and informing future healthcare strategies.

MATERIAL AND METHODS

This study is a further analysis of data from POLSTONE, a population-based, cross-sectional survey of the prevalence of urolithiasis and renal colic-like pain symptoms in Poland. A detailed description of the study's framework, design, and methodology is available elsewhere [2], hence, only a brief summary is provided here.

The POLSTONE study surveyed a representative sample of adults aged 18 and over from both urban and rural areas across all 16 Polish states/voivodships. Data were collected via computer-assisted web interviews conducted by a certified research agency. Online surveys are practical for nationwide research in Poland because the recent 2022 census data indicate that 93.3% of Polish households had internet access [8]. To ensure data accuracy, stratification checks were performed regularly, and post-stratification weights were applied based on age, sex, and location to correct for response rate disparities. We used 2021 census data [9] to design the sample, with a proportionate quota sampling approach to ensure demographic representativeness by age, sex, and residence. Urban and rural classifications followed definitions by the Central Statistical Office of Poland [10]. Importantly, the subset analysis of treatment patterns was pre-specified in the statistical analysis plan before the survey began.

Measures

General sociodemographic data were collected from all respondents. Information on the history, diagnosis, treatment, and prevention of urolithiasis and renal colic-like pain symptoms was gathered using questions outlined in Table 1.

Table 1. *Questionnaire*

Urolithiasis
Have you ever been diagnosed with urinary tract stones/urolithiasis? 1. Yes 2. No
How was your urinary tract stone diagnosed? 1. Ultrasound (USG) 2. Computed tomography (CT scan) 3. Abdominal X-ray (RTG) 4. No additional tests
How was your urinary tract stone treated? 1. Observation (without pharmacological or surgical treatment) 2. Over-the-counter medication 3. Prescribed medication 4. Surgical procedure through the urethra (URS, RIRS, cystolithotripsy) 5. Surgical procedure through a puncture in the back (PCNL) 6. Surgical procedure through an abdominal incision (laparoscopic or open surgery) 7. Stone fragmentation using external shock wave therapy (ESWL) 8. Not treated
Was urinary tract stone prevention suggested to you? 1. Increased fluid intake 2. Dietary changes (dietary recommendations) 3. Over-the-counter medication 4. Prescribed medication 5. No prevention applied
Renal colic-like pain symptoms
Have you ever experienced back pain (in the kidney area) that was cramp-like, intermittent, coming and going, and possibly radiating to the groin (commonly referred to as "renal colic")? This pain is typically located along the sides of the back and is unrelated to movement or changes in body position. The pain may also be accompanied by nausea or vomiting. 1. Yes 2. No
What type of treatment did you receive? 1. Over-the-counter medication 2. Prescribed medication 3. Surgical treatment 4. Other

Statistical analysis

Descriptive statistics for quantitative variables included mean, standard deviation, median, quartiles, and range; categorical data were presented as counts and percent. Group comparisons were based on χ^2 or Fisher's exact test for categorical data and the Mann-Whitney or Kruskal-Wallis test for quantitative data. A p-value <0.05 was considered significant. Analyses were conducted using R software, version 4.4.1.

Bioethical standards

The Research Ethics Committee of Jagiellonian University Medical College approved the study (118.6120.94.2023), which is also registered at ClinicalTrials.gov (NCT06176469). All participants gave informed consent after being fully briefed on the study.

RESULTS

The POLSTONE survey included 10,029 Poles representative of the general population in terms of age, sex, and place of residence. The lifetime prevalence of urolithiasis was 12.85% (n = 1,289), and renal colic-like pain symptoms during lifetime were reported to be 43.05% (n = 4,317). A significant proportion of respondents with renal colic-like symptoms sought (68.4%, n = 2,853) and received (65.32%, n = 2,820) treatment.

Urolithiasis

Diagnostic methods for urolithiasis

Ultrasound was the most commonly used diagnostic tool, accounting for 73.78% of respondents (n = 951), followed by computed tomography (CT) for 22.11% (n = 285) and X-ray for 19.94% (n = 257). Notably, 9.39% of respondents (n = 121) reported being diagnosed based solely on medical history and clinical examination, without additional testing. For over half of the respondents, ultrasound alone was used to diagnose urolithiasis (54.62%; n = 704). Computed tomography (9.31%; n = 120) and X-ray (6.75%; n = 87) were less commonly used as standalone methods. For the remaining patients, multiple diagnostic tools were combined. Full details are provided in the Figure 1.

Interestingly, ultrasound was used most often in the 50–59 age group and least often for persons aged 30–39 (p <0.001). In contrast, CT was most commonly used for respondents aged 30–39 and least for the 50–59 group (p <0.001). Ultrasound was also more frequently employed in rural areas and least used in large cities with at least 100,000 inhabitants (79.72 vs 66.06%; p = 0.001). Computed tomography tended to be more frequently used in urban than in rural areas, but the relation was not statistically significant (22.64% vs 19.44; p = 0.622). We did not find significant differences between sexes in the choice of diagnostic method.

Treatment for urolithiasis

Non-surgical approaches were more commonly used than surgical approaches (Figure 2). Prescription medications were the most frequent treatment for urolithiasis (58.73%; n = 757), followed by over-the-counter (OTC) drugs (29.87%; n = 385) and observation (19.78%; n = 255). Among surgical options, surgical procedures through the urethra (URSL, RIRS, cystolithotripsy) were the most common (13.42%; n = 173), followed by SWL (11.48%;

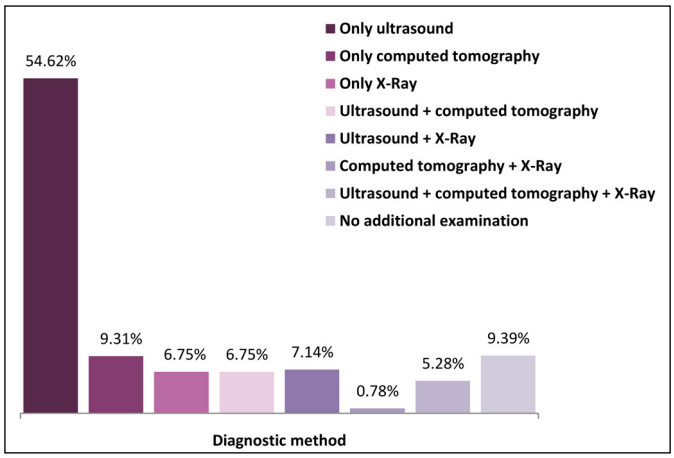

Figure 1. *Diagnostic methods used to confirm the diagnosis of urolithiasis.*

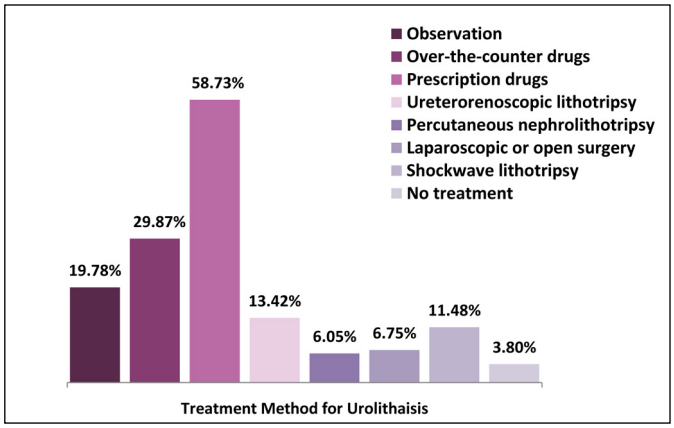

Figure 2. *Distribution of treatment methods for urolithiasis.*

n = 148), open or laparoscopic surgery (6.75%; n = 87), and PCNL (6.05%; n = 78). A small proportion of patients (3.80%; n = 49) reported receiving no treatment at all.

Most respondents (61.82%) received a single treatment method, with prescription drugs being the most common standalone option (31.26%, Suppl. Table 1). Among surgical procedures, transurethral procedures were the most frequently used alone (5.43%). Combined treatments were reported by 38.18%, most often involving OTC and prescription drugs (9.31%). Observation with prescription drugs (3.18%) and observation with OTC drugs (2.17%) were the next common treatments. For combinations involving surgery, SWL with prescription drugs was most common (2.09%), followed by surgical procedures through the urethra with prescription drugs (1.78%).

Treatment patterns varied by age group. Young respondents, especially those aged 30–39, more frequently reported observation or surgical interventions (mainly surgical procedures through the urethra and PCNL), whereas prescription drug use was most common among older individuals, particularly those aged 50–59 ($p < 0.05$, Table 2). Observation was also more frequently reported in rural areas compared with urban areas (25.28% vs 17.05%; $p = 0.013$). Although surgical treatments were more often used in urban settings, the differences were not statistically significant ($p > 0.05$ for all). We did not observe significant sex-based differences in treatment approaches.

We also analyzed treatment patterns based on stone location – kidney, ureter, and bladder. Across all locations, prescription drugs were the most commonly used treatment, followed by OTC drugs and observation. Among surgical options, SWL was most frequently reported for kidney stones, whereas transurethral procedures were most common for ureteral and bladder stones.

Prophylaxis of urolithiasis

Fortunately, 88.98% of respondents diagnosed with urolithiasis received advice on prophylactic measures. The most commonly recommended approach was increased fluid intake (58.65%; n = 756), followed by prescription medications (38.87%; n = 501), dietary changes (36%; n = 464), and OTC drugs (32.51%; n = 419). However, 11.02% (n = 142) of respondents reported receiving no prophylactic guidance.

Increased fluid intake was the most common standalone preventive measure, recommended in 14.97% of cases (Table 3). The most frequent combination was fluid intake with prescription drugs (8.61%).

Both fluid intake and prescription medications were more commonly used by older respondents, particularly those aged 60+ and 50–59 years ($p < 0.001$), whereas OTC drugs were most frequently used in the 40–49 age group ($p = 0.019$). Sex and place of residence did not have a significant impact on the use of prophylactic measures.

Renal colic-like pain symptoms

Prescription medications were the most commonly used treatment for renal colic-like pain symptoms (72.48%; n = 2,044), followed by OTC drugs (36.56%; n = 1,031) and surgery (17.27%; n = 487). An additional 6.06% (n = 171) reported receiving treatments not listed above. Use of prescription drugs increased with age, being most common among persons aged 60+ and least common among

Table 2. *Treatment methods for urolithiasis by age groups*

Treatment method for urolithiasis	Age group					p
	18–29 years (n = 129)	30–39 years (n = 243)	40–49 years (n = 213)	50–59 years (n = 201)	60+ years (n = 503)	
Observation	31 (24.03%)	59 (24.28%)	48 (22.54%)	33 (16.42%)	84 (16.70%)	0.04*
Over-the-counter drugs	33 (25.58%)	76 (31.28%)	69 (32.39%)	56 (27.86%)	151 (30.02%)	0.662
Prescription drugs	73 (56.59%)	119 (48.97%)	119 (55.87%)	144 (71.64%)	302 (60.04%)	<0.001*
Ureterorenoscopic lithotripsy	15 (11.63%)	46 (18.93%)	36 (16.90%)	15 (7.46%)	61 (12.13%)	0.003*
Percutaneous nephrolithotripsy	17 (13.18%)	32 (13.17%)	11 (5.16%)	5 (2.49%)	13 (2.58%)	<0.001*
Laparoscopic or open surgery	8 (6.20%)	23 (9.47%)	16 (7.51%)	7 (3.48%)	33 (6.56%)	0.162
Shockwave lithotripsy	7 (5.43%)	23 (9.47%)	33 (15.49%)	21 (10.45%)	64 (12.72%)	0.041*
No treatment	9 (6.98%)	6 (2.47%)	10 (4.69%)	9 (4.48%)	15 (2.98%)	0.171

p: χ^2 test or Fisher's exact test
*Statistically significant association ($p < 0.05$)

Table 3. *Prophylaxis for urolithiasis*

	n	%
Increased fluid intake	193	14.97%
Changes in diet	94	7.29%
Over-the-counter drugs	101	7.84%
Prescription drugs	134	10.40%
Increased fluid intake + changes in diet	84	6.52%
Increased fluid intake + over-the-counter drugs	82	6.36%
Increased fluid intake + prescription drugs	111	8.61%
Changes in diet + over-the-counter drugs	18	1.40%
Changes in diet + prescription drugs	18	1.40%
Over-the-counter drugs + prescription drugs	23	1.78%
Increased fluid intake + changes in diet + over-the-counter drugs	74	5.74%
Increased fluid intake + changes in diet + prescription drugs	94	7.29%
Increased fluid intake + over-the-counter drugs + prescription drugs	39	3.03%
Changes in diet + over-the-counter drugs + prescription drugs	3	0.23%
Increased fluid intake + changes in diet + over-the-counter drugs + prescription drugs	79	6.13%
No prophylaxis	142	11.02%

18–29-year-olds (79.3% vs 60.65%; p <0.001). Conversely, OTC drug use was highest in the 30–39 age group and lowest in the 60+ group (43.95% vs 30.15%; p <0.001). Surgical treatment was more frequently reported by men than women (19.08% vs 15.66%; p = 0.019). Place of residence had no significant impact on treatment type.

Notably, most respondents treated for pain reported satisfaction with their treatment (88.16%; n = 2,486 vs 11.84%; n = 334), with no significant differences in satisfaction rates across treatment types. Age, sex, and place of residence did not have a significant impact on satisfaction with treatment for renal colic-like pain symptoms.

DISCUSSION

The assessments in this investigation are an extension of the POLSTONE study, the first population-level investigation in Central and Eastern Europe to examine prevalence, correlates, and treatment patterns of urolithiasis and renal colic-like pain symptoms. The study enrolled a nationally representative adult sample stratified by age, sex, and place of residence.

Current guidelines suggest that the most appropriate imaging modality for urolithiasis is determined by the clinical situation [5]. In our study, ultrasound was the most frequently employed imaging modality for confirming urolithiasis, used for 73.78% of patients. For more than half of these patients, ultrasound served as the sole diagnostic method. This finding underscores the continued reliance on ultrasound despite its known limitations. Specifically, ultrasound's sensitivity and specificity for detecting ureteral stones are approximately 45% and 94%, respectively, and 45% and 88% for renal stones [11, 12]. Given these limitations, current guidelines recommend ultrasound primarily as the initial imaging tool in the diagnostic work-up of suspected urolithiasis, provided it does not delay pain relief or emergency interventions [5]. The continued preference for ultrasound may be explained by its advantages, namely, safety (no radiation exposure), widely available, reproducible, and cost-effective. However, because of the relatively low sensitivity of ultrasound, especially in the context of ureteral stones, non-contrast-enhanced CT has become the diagnostic gold standard for patients presenting with acute flank pain [5]. Computed tomography offers superior diagnostic accuracy. In a meta-analysis of prospective studies, Xiang et al. reported pooled sensitivity and specificity of 93.1% (95% CI: 91.5–94.4%) and 96.6% (95% CI: 95.1–97.7%), respectively, for CT in diagnosing urolithiasis [13]. In addition to high diagnostic accuracy, non-contrast-enhanced CT provides valuable information on stone location, size, burden, and density, factors critical in guiding treatment decisions and predicting outcomes. Importantly, in evaluating patients with suspected acute urolithiasis, non-contrast-enhanced CT is significantly more accurate than X-ray or ultrasound [14, 15]. Despite these advantages, CT was used for only 22.11% of patients in our cohort and as a standalone diagnostic tool in just 9.31%. Notably, 9.39% of participants reported receiving a diagnosis without any imaging examination. This image-free diagnosis may reflect either a clinical diagnosis based solely on symptoms or patient recall bias, but it also highlights variation in diagnostic practices that may not fully align with guideline recommendations. Another possible explanation for the limited use of CT is that not all physicians, particularly non-urologists, may be fully aware of its diagnostic superiority in suspected urolithiasis. Additionally, physicians may seek to balance diagnostic accuracy with concerns over radiation exposure. Although such caution is reasonable, it may contribute to underuse of CT in scenarios where it would offer clearer diagnostic value.

Our findings also revealed age- and location-based variations in diagnostic practices for urolithiasis. Ultrasound was more commonly used in the 50–59

age group and in rural areas, likely due to its accessibility, lower cost, and lack of radiation exposure. In contrast, CT was most frequently used for patients aged 30–39 and in urban settings, reflecting broader availability and a preference for higher diagnostic accuracy. However, the urban–rural difference in CT use was not statistically significant, which suggests improved access in non-urban areas. No sex-based differences were observed, indicating consistent diagnostic choices between genders. These insights can inform future efforts to optimize diagnostic protocols and improve equitable access to care across different demographics and regions.

The selection of treatment modality for urolithiasis is based on various factors, often individual for each patient. The most important, decisive parameters are stone size, location, number, and symptoms. In this study, non-surgical management was more commonly reported than surgical treatment among individuals with urolithiasis. Prescription medications were the most frequently used intervention, followed by OTC drugs and passive observation or monitoring. These findings align with current treatment paradigms, where conservative appro- aches are often the first line of management, especially for small stones or those expected to pass spontaneously with concomitant absence of hydronephrosis and preserved renal function [5, 16]. Among surgical interventions, procedures performed via the urethra (URSL, RIRS, and cystolithotripsy) were the most common. This preference reflects global trends favoring endoscopic, minimally invasive methods because of their effectiveness and favorable safety profiles [17]. Shockwave lithotripsy was ranked as the second most frequently used surgical modality in our study, reflecting its continued role as a non-invasive, albeit equipment-dependent, treatment for select renal and proximal ureteral stones [5]. This finding also aligns with worldwide trends with per-urethral procedures for urolithiasis increasingly favored over SWL. This shift is evident in both general urology and high-volume stone centers, where use of URSL techniques have surpassed SWL, and SWL use has steadily declined in recent years [18]. More invasive procedures such as laparoscopic or open surgery and PCNL were less commonly reported, which is expected given their indication for large or complex stones and their higher procedural burden [19]. Interestingly, a small proportion of respondents reported receiving no treatment at all. This absence of treatment may reflect instances of asymptomatic stones, spontaneous passage, lack of healthcare access, or individual or physician decisions to monitor conservatively. Overall, these data highlight a predominant reliance on medical and conservative approaches in urolithiasis management, with surgical interventions used selectively and probably according to clinical need and available resources.

Treatment patterns for urolithiasis showed variation by age and place of residence. Young individuals, particularly those aged 30–39, were more likely to undergo surgical interventions, especially transurethral procedures and PCNL, or opt for observation. Prescription medications were most frequently used by older adults, especially those aged 50–59 ($p < 0.05$). We hypothesize that young adults may opt for surgery to resolve symptoms quickly, whereas older individuals prefer conservative treatment because of comorbidities or surgical risk [20]. Observation was significantly more common in rural areas than in urban settings (25.28% vs 17.05%; $p = 0.013$), whereas surgical interventions tended to be more prevalent in urban areas, although not to a statistically significant degree. Higher observation rates in rural areas may reflect limited access to urologic care, whereas urban populations more often pursue procedural options [21]. These findings further underscore the importance of tailoring urolithiasis management strategies to demographic and geographic contexts.

Encouragingly, the vast majority of individuals diagnosed with urolithiasis received recommendations for prophylactic measures, with increased fluid intake being the most frequently advised strategy. This practice of recommending adequate fluid intake is consistent with established clinical guidelines that recommend fluid consumption sufficient to achieve a daily urine output of at least 2 liters, a measure shown to reduce the risk of kidney stone recurrence by approximately 60% [22]. However, it is notable that one in ten of respondents reported receiving no prophylactic guidance, which raises concerns about gaps in standard care or communication, especially given the chronic and recurrent nature of urolithiasis [23]. Therefore, our findings reflect both adherence to and variability in guideline-based management, potentially influenced by provider type, patient characteristics, or healthcare setting. Ensuring consistent implementation of evidence-based prophylaxis remains a key opportunity for improving long-term outcomes for patients with urolithiasis.

Finally, our findings revealed that prescription medications were the most commonly used treatment for renal colic-like pain symptoms, reported by 72.48% of affected individuals. This high reliance on prescription therapy aligns with standard pain management protocols for acute renal colic,

which often involve nonsteroidal anti-inflammatory drugs and, less commonly, opioids [5]. Over-the-counter drug use was also prevalent (36.56%), suggesting that many patients either initially self-manage symptoms or complement prescribed regimens with OTC options. Interestingly, prescription drug use for renal colic-like pain increased with age, likely reflecting greater healthcare access, comorbidity burden, and preference for physician-guided care among older adults. In contrast, OTC drug use peaked in the 30–39 age group, suggesting a tendency for younger adults to self-manage symptoms. Surgical interventions, although less common overall (17.27%), most probably reflect the subset of patients for whom pain symptoms were related to obstructive uropathy requiring procedural resolution. Most respondents (88.16%) treated for renal colic-like pain were satisfied with their care, with no significant differences by treatment type, age, sex, or residence. These findings highlight the widespread use and perceived effectiveness of both pharmacologic and surgical pain management strategies across demographic groups [24].

A key limitation of this study lies in its dependence on self-reported information that could not be clinically verified, a well-documented issue in urological research [25]. Although efforts were made to ensure question clarity, some participants may have misunderstood certain items, and the survey's length limited the ability to capture all relevant influencing variables. Moreover, the nature of data collection did not enable evaluation of the effectiveness of diagnostic, treatment, or preventive strategies. Lastly, because the study population was restricted to Central and Eastern Europe, the generalizability of the findings to other cultural or ethnic groups may be limited.

CONCLUSIONS

This study is the first population-based assessment of treatment patterns for urolithiasis and renal colic-like pain symptoms in Central and Eastern Europe. Ultrasound was the most common diagnostic tool for urolithiasis, with conservative management, mainly prescription and OTC medications, being the predominant treatment. Minimally invasive procedures were the most common surgical approach, and preventive measures for urolithiasis were widely recommended. Pharmacotherapy was central to renal colic-like pain management, with high patient satisfaction across all demographic groups. These findings can inform health policy and guide resource allocation in urolithiasis care.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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ETHICS APPROVAL STATEMENT

The study was performed in compliance with Good Clinical Practice and in accordance with the Declaration of Helsinki. The Research Ethics Committee of Jagiellonian University Medical College, Krakow, Poland approved the study (number of approval: 118.6120.94.2023). All participants provided informed consent.

The study was registered with ClinicalTrials.gov (NCT06176469).

SUPPLEMENTARY MATERIAL

Suppl. Table 1. *Combinations of treatments*

Treatment method for urolithiasis	n	%
Observation	104	8.07%
OTC drugs	114	8.84%
Prescription drugs	403	31.26%
URS	70	5.43%
PCNL	23	1.78%
Open or laparoscopic surgery	37	2.87%
SWL	46	3.57%
Observation + OTC drugs	28	2.17%
Observation + prescription drugs	41	3.18%
Observation + URS	3	0.23%
Observation + PCNL	1	0.08%
OTC drugs + prescription drugs	120	9.31%
OTC drugs + URS	5	0.39%
OTC drugs + PCNL	5	0.39%
OTC drugs + open or laparoscopic surgery	2	0.16%
OTC drugs + SWL	9	0.70%
Prescription drugs + URS	23	1.78%
Prescription drugs + PCNL	11	0.85%
Prescription drugs + open or laparoscopic surgery	12	0.93%
Prescription drugs + SWL	27	2.09%
URS + PCNL	1	0.08%
URS + open or laparoscopic surgery	2	0.16%
URS + SWL	9	0.70%
PCNL + open or laparoscopic surgery	1	0.08%
PCNL + SWL	1	0.08%
Open or laparoscopic surgery + SWL	1	0.08%
Observation + OTC drugs + prescription drugs	36	2.79%
Observation + OTC drugs + URS	2	0.16%
Observation + OTC drugs + SWL	4	0.31%
Observation + prescription drugs + URS	3	0.23%
Observation + prescription drugs + PCNL	3	0.23%
Observation + prescription drugs + open or laparoscopic surgery	2	0.16%
Observation + prescription drugs + SWL	1	0.08%
Observation + URS + PCNL	1	0.08%
Observation + URS + open or laparoscopic surgery	1	0.08%
Observation + URS + SWL	1	0.08%
Observation + PCNL + open or laparoscopic surgery	1	0.08%
OTC drugs + prescription drugs + URS	11	0.85%
OTC drugs + prescription drugs + PCNL	3	0.23%
OTC drugs + prescription drugs + open or laparoscopic surgery	3	0.23%
OTC drugs + prescription drugs + SWL	13	1.01%
OTC drugs + URS + SWL	2	0.16%
OTC Drugs + PCNL + open or laparoscopic surgery	1	0.08%
Prescription drugs + URS + PCNL	4	0.31%
Prescription drugs + URS + open or laparoscopic surgery	1	0.08%
Prescription drugs + URS + SWL	10	0.78%
Prescription drugs + PCNL + open or laparoscopic surgery	1	0.08%
Prescription drugs + open or laparoscopic surgery + SWL	1	0.08%
URS + PCNL + SWL	1	0.08%
URS + open or laparoscopic surgery + SWL	1	0.08%
Observation + OTC drugs + prescription drugs + URS	2	0.16%
Observation + OTC drugs + prescription drugs + open or laparoscopic surgery	2	0.16%
Observation + OTC drugs + prescription drugs + SWL	2	0.16%
Observation + OTC drugs + URS + open or laparoscopic surgery	1	0.08%
Observation + OTC drugs + PCNL + open or laparoscopic surgery	2	0.16%
Observation + OTC drugs + PCNL + SWL	1	0.08%
Observation + prescription drugs + URS + open or laparoscopic surgery	1	0.08%
Observation + prescription drugs + URS + SWL	1	0.08%
Observation + prescription drugs + PCNL + open or laparoscopic surgery	1	0.08%
OTC drugs + prescription drugs + URS + PCNL	1	0.08%
OTC drugs + prescription drugs + URS + SWL	3	0.23%
OTC drugs + prescription drugs + PCNL + SWL	1	0.08%
OTC drugs + URS + PCNL + open or laparoscopic surgery	1	0.08%
Prescription drugs + URS + open or laparoscopic surgery + SWL	1	0.08%
URS + PCNL + open or laparoscopic surgery + SWL	1	0.08%
Observation + OTC drugs + prescription drugs + URS + PCNL	1	0.08%
Observation + OTC drugs + prescription drugs + URS + SWL	1	0.08%
Observation + OTC drugs + prescription drugs + PCNL + open or laparoscopic surgery	1	0.08%
OTC drugs + prescription drugs + URS + PCNL + SWL	1	0.08%
OTC drugs + prescription drugs + PCNL + open or laparoscopic surgery + SWL	1	0.08%
Prescription drugs + URS + PCNL + open or laparoscopic surgery + SWL	1	0.08%
Observation + OTC drugs + prescription drugs + PCNL + open or laparoscopic surgery + SWL	1	0.08%
Observation + prescription drugs + URS + PCNL + open or laparoscopic surgery + SWL	1	0.08%
Observation + OTC drugs + prescription drugs + URS + PCNL + open or laparoscopic surgery + SWL	5	0.39%
No treatment	49	3.80%

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