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Association of urinary tract endometriosis with physical and mental health: a cross-sectional study

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Abstract

Background Urinary tract endometriosis (UTE) is a special type of endometriosis affecting the urinary system, yet the physical and mental health of UTE patients remain unexplored.

Methods We enrolled 92 women with UTE and another 234 with deep infiltrating endometriosis from the First Affiliated Hospital of Sun Yat-sen University. Personal information was collected via paper questionnaires. Health-related quality of life, including physical and mental health, was measured by physical component summary scale (PCS) and mental component summary scale (MCS) of the 12-item Short Form Health Survey (SF-12). Multiple linear regression analysis was conducted to identify factors influencing physical and mental health.

Results Patients in the UTE group had a higher creatinine level and detection rate of urinary leukocyte, erythrocyte and protein. The PCS score was lower in the UTE group, while the MCS was similar between two groups. Multiple linear regression analysis shown that patients using painkillers had lower PCS scores, while those aware of urologic abnormalities before surgery or with a history of more than two miscarriages had lower MCS scores.

Conclusions Our study explores the quality of life in UTE patients and identifies influencing factors. Individualized and targeted care should be added to clinical practice to prevent negative outcomes for UTE patients.

Keywords Urinary tract endometriosis, Health-related quality of life, Physical health, Mental health, SF-12

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Background

Endometriosis is a frequent estrogen-dependent benign tumor affecting over 10% of women of reproductive age [1]. Deep infiltrating endometriosis (DIE) is the most severe form, characterized by lesions that infiltrate the peritoneum beyond 5 mm. DIE can affect various anatomical sites, including the uterosacral ligament, rectovaginal septum, bladder, ureter, and colon-rectum [2]. Among them, DIE involving the urinary system including the urethra, bladder, ureters, or kidney is called urinary tract endometriosis (UTE). The most common form of UTE is bladder endometriosis (70–85% of cases), followed by ureteral endometriosis (9–23%), while urethra and kidney endometriosis are very rare [3, 4]. It is estimated that 0.3–12% of women with endometriosis suffer from UTE, and one-third of them remain asymptomatic or experience only mild discomfort [5]. Symptoms of UTE include such as dysuria, urinary urgency and frequency, painful micturition, burning sensation in the urethra or discomfort in the retropubic area. Without proper diagnosis and treatment, these patients would eventually develop hydronephrosis, hydroureter, and even kidney function loss [6, 7]. Currently, surgical treatment is often recommended, especially in cases with urinary function impairment [8].

Endometriosis, particularly DIE and UTE, can lead to dysmenorrhea, dyspareunia, intolerable chronic pelvic pain, urinary tract symptoms, and infertility, significantly affecting patients' health-related quality of life (HQoL) and damaging their physical and mental health [9, 10]. Increasing research has highlighted the impact of endometriosis on quality of life, mood disorders, and sexual function [11, 12]. Many studies indicates that pain associated with endometriosis is the main factor of those negative outcomes [13]. Chronic pain can seriously disrupt daily life and work, sleep quality, sexual satisfaction, and physical and mental health [14–16]. This long-term impairment can contribute to mood disorders such as anxiety, depression, and even suicidal tendencies [17]. Research has shown that more invasive surgical procedures in UTE cases are associated with higher rate of severe postoperative complications, which may further affect their quality of life [18]. However, the impact on quality of life of UTE still remains unclear, underscoring the necessity of great attention to their physical and mental health.

In this study, we assessed the quality of life in UTE patients, including both physical and mental health, and discovered their potential influence factors, thus enhancing their quality of life and providing valuable evidence and guidance for clinical and nursing work.

Methods

Study design and participants

A total of 326 participants were enrolled from July 2020 to December 2023 at the First Affiliated Hospital of Sun Yat-sen University, Guangzhou, China. Inclusion criteria were: aged 18 or above, underwent laparoscopic surgery in our hospital and were diagnosed with DIE by at least two pathologists, able to read the questionnaire and voluntarily participate in this survey, and no history of other mental disorders. Exclusion criteria were: diagnosis of any psychiatric disorders or long-term use of antipsychotic medications, and refusal to cooperate with follow-up or withdrawal from this survey. Based on operative findings and pathological results, 92 patients were divided into the UTE group, while 234 DIE patients were divided into the control group.

Surgical intervention

All 326 participants in this study underwent laparoscopic surgery. The primary surgical goal for DIE patients was to excise as much of the lesion as possible, relieve dysmenorrhea, prevent recurrence, and preserve fertility for those desiring pregnancy. For UTE patients, an additional focus was to alleviate urologic abnormalities, particularly urinary obstruction caused by endometriosis [5, 8]. Depending on the UTE lesions observed during surgery, surgeons might perform ureterolysis, ureterectomy with end-to-end anastomosis or ureteroneocystostomy for lesion removal. Partial cystectomy was commonly performed for bladder endometriosis [19]. Ureteral stent implantation was usually done preoperatively to relieve obstruction or intraoperatively to prevent postoperative complications.

Data collection

All researchers, including gynaecological doctors and nurses, received training on data collection before this study. The name, age, body weight, height, educational experience, family monthly income, reproduction history, fertility requirements, condition of dysmenorrhea and painkillers, and other basic information were collected via paper questionnaires within one week before surgery. Body mass index (BMI) was calculated as weight divided by height squared. Blood and urine test results were also collected within this period. Before surgery, participants underwent abdominal type B ultrasonic examination or magnetic resonance imaging (MRI) to assess urologic abnormalities such as hydronephrosis, ureter obstruction, stricture, dilation, hydroureter, or other pathological changes. All data was reviewed by at least two researchers.

Main outcome measures

In this study, we measured the HQoL of participants by the 12-item Short Form Health Survey (SF-12). The SF-12, which derived from the 36-item Short-Form Health Survey (SF-36) in 1996, includes 12 items involving physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional and mental health [20]. In China, the SF-12 has been shown to perform similarly to the SF-36 [21]. The physical component summary scale (PCS) and mental component summary scale (MCS) are calculated by the score of 12 items and reflect the physical and mental health, respectively. Higher PCS and MCS scores indicate better HQoL. The SF-12 was collected within one week before surgery by well-trained gynaecological doctors or nurses.

Statistical analysis

Statistical analysis was performed by Statistical Package for the Social Sciences (SPSS) 23.0. Continuous variables were described using means and standard deviations, while categorical variables were described by constituent ratios. Comparisons of continuous and unordered categorical variables were conducted by an independent sample t-test and rank-sum test, while binary variables and ordered categorical variables were compared using chi-square test. Univariate analysis and multiple linear regression analysis were used to identify factors associated with mental or physical health and UTE. A P-value < 0.05 was considered statistically significant.

Results

Analysis of baseline data between two groups

Baseline data were compared between 92 UTE patients and 234 DIE patients in the control group. As shown in Table 1, the incidence of complication was higher t s in UTE group, but no significant difference was found in other baseline information. For SF-12 scores, the PCS was significantly lower in the UTE group ($P < 0.05$), while the MCS was similar between two groups.

We also compared the laboratory tests between the two groups. As shown in Table 2, the UTE group had higher creatinine level as well as a greater detection rate of urinary leukocyte, erythrocyte and protein ($P < 0.05$). Additionally, patients in the UTE group were more likely to have urologic abnormalities, including hydronephrosis and ureter lesions, and had a higher incidence of ureteral stent implantation before surgery.

All 92 patients in the UTE group underwent laparoscopic surgery. Most underwent ureterolysis (55.43%) or ureterectomy with end-to-end anastomosis (29.35%), while a small portion received ureteroneocystostomy or partial cystectomy (Table 3). Additionally, 70.65% of UTE patients received ureteral stent implantation on one or both sides of ureter to promote wound healing or prevent postoperative complications.

Influence factors of PCS and MCS in UTE group

To identify the factors affecting physical and mental health in UTE patients, we conducted a univariate analysis of PCS and MCS for 92 patients. Our results suggested that the need for painkillers significantly impacted PCS, while miscarriage times, the need for painkillers, presence of urine occult blood and detection of urologic abnormalities before surgery were significant factors of MCS in the UTE group (Table 4 and Supplementary Table 1).

We further conducted multiple linear regression analysis to investigate the influence factors of PCS and MCS in UTE group. As shown in Tables 5 and 6, that UTE patients requiring painkillers had lower PCS scores, and those with more than two times of miscarriage or urologic abnormalities before surgery had lower MCS, reflecting worse physical or mental health, respectively.

Discussion

Arion investigated 275 endometriosis patients and found that bladder pain was linked to poorer sleep quality and overall quality of life [22]. Pontis demonstrated that surgery improved the quality of life for 16 patients with bladder endometriosis [23], but yet now, few studies have focused on the quality of life in UTE patients. To explore this further, we enrolled 92 women with UTE and 234 women with DIE in our study. Compared to the control group, UTE patients had higher creatinine levels and elevated detection rates of urinary leukocyte, erythrocyte and protein. Besides, UTE patients shown a higher rate of hydronephrosis and ureter abnormalities, likely due to UTE's impact on bladder and ureter, causing urinary obstruction and even renal function damage. Elevated creatinine and abnormal urine tests are common accompanying symptoms of UTE. Similarly, because of the higher incidence of ureteral abnormalities, UTE patients in our study also had a higher rate of ureteral stent implantation before surgery, consistent with previous research [7, 24].

To further investigate the HQoL of UTE patients, we analyzed the PCS and MCS of SF-12 among those candidates, respectively. Our data show that UTE patients had lower PCS scores compared to the control group, indicating poorer physical health. We also found that the need for painkillers was an influential factor of physical health in UTE patients. Those requiring painkillers had lower PCS scores, which may be related to their more severe physical symptoms. Facchin's research also suggested that pain from endometriosis severely affects physical health, which aligns with our findings [25]. Management of pain in endometriosis remains a significant challenge.

Table 1 Comparison of personal characteristics between two groups

Variables	UTE group Mean ± SD / *N* (%)	Control Group Mean ± SD / *N* (%)	t or χ^2	*P*-value
Age (year)	35.90 ± 6.77	36.65 ± 6.52	0.926	0.355
BMI (kg/m^2)	21.99 ± 3.48	21.26 ± 2.93	-1.911	0.057
Education experience (year)	14.25 ± 3.06	14.13 ± 3.77	-0.276	0.783
Nationality				
Han	88(95.65%)	222(94.87%)	0.000	0.993
Other nationality	4(4.35%)	12(5.13%)		
Residence				
Rural	25(27.17%)	66(28.21%)	0.002	0.960
Urban	67(72.83%)	168(71.79%)		
Employment situation				
Employed	77(83.70%)	202(86.32%)	0.188	0.665
Unemployed	15(16.30%)	32(13.68%)		
Family monthly income				
< 10,000 yuan	46(50.00%)	89(38.03%)	4.890	0.180
10,000–19,999 yuan	25(27.17%)	66(28.21%)		
20,000–29,999 yuan	8(8.70%)	31(13.25%)		
≥ 30,000 yuan	13(14.13%)	48(20.51%)		
Caring from family				
Cared	84(91.30%)	215(91.88%)	0.000	1.000
Not cared or living alone	8(8.70%)	19(8.12%)		
Marriage and childbearing				
Married with children	52(56.52%)	134(57.26%)	0.442	0.932
Married but childless	20(21.74%)	47(20.09%)		
Unmarried and childless	17(18.48%)	45(19.23%)		
Divorced	2(2.17%)	8(3.42%)		
Pregnancy times				
0	34(36.96%)	82(35.04%)	0.191	0.662
1	21(22.83%)	73(31.20%)		
≥ 2	37(40.22%)	79(33.76%)		
Miscarriage times				
0	61(66.30%)	170(72.65%)	1.414	0.234
1	18(19.57%)	40(17.09%)		
≥ 2	13(14.13%)	24(10.26%)		
Cesarean times				
0	67(72.83%)	157(67.09%)	1.001	0.317
1	19(20.65%)	58(24.79%)		
≥ 2	6(6.52%)	19(8.12%)		
Children number				
0	42(45.65%)	94(40.17%)	0.504	0.478
1	32(34.78%)	93(39.74%)		
≥ 2	18(19.57%)	47(20.09%)		
Need for fertility				
Yes	48(52.17%)	104(44.44%)	1.290	0.256
No	44(47.83%)	130(55.56%)		
Time until diagnosis (month)	25.11 ± 33.14	35.38 ± 49.72	1.826	0.069
Dysmenorrhea				
Yes	75(81.52%)	194(82.91%)	0.018	0.893
No	17(18.48%)	40(17.09%)		
Need for painkillers				
Yes	44(47.83%)	122(52.14%)	0.333	0.564
No	48(52.17%)	112(47.86%)		
Dyspareunia				

Table 1 (continued)

Variables	UTE group Mean ± SD / *N* (%)	Control Group Mean ± SD / *N* (%)	t or χ^2	*P*-value
Yes	37(40.22%)	85(36.32%)	1.577	0.455
No	46(50.00%)	133(56.84%)		
Asexual	9(9.78%)	16(6.84%)		
Accompany with adenomyosis				
Yes	41(44.67%)	114(48.72%)	0.305	0.581
No	51(55.43%)	120(51.28%)		
Accompany with ovarian endometriosis				
Yes	52(56.52%)	142(60.68%)	0.368	0.544
No	40(43.48%)	91(38.89%)		
Recurrent endometriosis				
Yes	24(26.09%)	56(23.93%)	0.070	0.792
No	68(73.91%)	178(76.07%)		
Complications [a]				
Yes	33(35.89%)	47(20.09%)	8.053	**0.005***
No	59(64.13%)	187(79.91%)		
SF-12 score				
PCS	38.54 ± 8.54	41.64 ± 9.58	2.703	**0.007***
MCS	43.62 ± 10.96	42.19 ± 11.37	-1.033	0.302

[a] Complications refer to existing diseases of another system, including but not limited to hypertension, diabetes mellitus and thyroid dysfunction. * Statistically significant. BMI, body mass index

Endometriosis-associated pain, including dysmenorrhea, chronic pelvic pain, dyspareunia and tenesmus, is the most common and influential symptom and affects 70-80% of patients [26]. However, due to the misconceptions about endometriosis, patients often receive insufficient understanding and support from friends, family members, and even their husbands, who often believe that pain during menstruation is normal and manageable and that women should be able to face it alone [27]. Therefore, patients with endometriosis often lack sufficient understanding and support from others. Through interactions with participants, we noticed that most women with dysmenorrhea experienced significant disruptions to their daily lives. While some relied on painkillers like nonsteroidal anti-inflammatory drugs, either orally or through injection, many chose to endure the pain due to concerns about side effects such as gastrointestinal reactions, cardiovascular effects, nephrotoxicity, and risk of addiction [28–30]. With prolonged painkiller use, some patients may develop drug resistance and diminish the effectiveness of pain relief. In our study, 47.83% of UTE patients required painkillers, but only 26.09% found them effective. Long-term, severe pain can significantly impact patients' physical health, mental health and quality of life.

Confusingly, our results show that UTE patients have lower PCS scores compared to other DIE patients without urinary system involvement in the control group, but there has been no significant difference in MCS scores. We speculate this may be due to DIE patients usually having a long duration of suffering pain and illness and continuously impacting their mental health, to the extent where no difference in MCS can be found between UTE and DIE patients. Another possible reason is that while the PCS is more directly influenced by physiological factors, MCS may also correlate with other influences, such as family or social factors. To further explore this, we conducted a multiple linear regression analysis of MCS scores in 92 UTE patients. Our analysis found that miscarriage times and the detection of urologic abnormalities before surgery were the influential factors of MCS. Preoperative imaging examinations such as type B ultrasound and MRI are meaningful for detecting renal and ureteral lesions, which are important for diagnosing UTE [31, 32]. Early diagnosis of UTE can optimize patient management, improve preoperative counseling, and facilitate better surgical planning. In our study, all participants underwent abdominal imaging examinations before surgery. Among the 92 UTE patients, 53 were found to have urologic abnormalities by type B ultrasound or MRI, including 49 with ureter lesions and 45 with hydronephrosis. Interestingly, we observed a significant correlation between the detection of urologic abnormalities and MCS in UTE patients. UTE primarily affects the urethra, bladder, ureters, or kidney, leading to urinary tract obstruction or renal dysfunction. In our study, UTE patients exhibited higher creatinine levels and a greater detection rate of urinary leukocyte, erythrocyte and protein than the DIE group, and they also had a higher incidence of hydronephrosis, consistent with previous studies [33]. However, only the detection of urologic abnormalities significantly impacted their mental

Table 2 Comparison of clinical examinations between two groups before surgery

Variables	UTE group Mean ± SD / *N* (%)	Control Group Mean ± SD / *N* (%)	t / χ^2	*P*-value
Hemoglobin	114.51 ± 19.00	115.75 ± 15.60	0.605	0.546
Creatinine	67.57 ± 28.44	57.41 ± 11.95	-4.542	**< 0.001***
AMH				
Normal	63(68.48%)	162(69.23%)	0.000	1.000
Abnormal	12(13.04%)	31(13.25%)		
CA-125				
Normal	22(23.91%)	63(26.92%)	0.229	0.632
Abnormal	70(76.09%)	168(71.79%)		
Urinary leukocyte				
Negative	60(65.22%)	182(77.78%)	4.810	**0.028***
Positive	32(34.78%)	52(22.22%)		
Urinary erythrocyte				
Negative	62(67.39%)	205(87.61%)	16.868	**< 0.001***
Positive	30(32.61%)	29(12.39%)		
Urinary protein				
Negative	79(85.87%)	224(95.73%)	8.339	**0.004***
Positive	13(14.13%)	10(4.27%)		
Urine occult blood				
Negative	44(47.83%)	138(58.97%)	2.891	0.089
Positive	48(52.17%)	96(41.03%)		
Ureteral stent implantation before surgery				
No	76(82.61%)	231(98.72%)	28.357	**< 0.001***
Yes	16(17.39%)	3(1.28%)		
Urologic abnormalities before surgery [a]				
No	39(42.39%)	215(91.88%)	91.134	**< 0.001***
Yes	53(57.61%)	19(8.12%)		

[a] Urologic abnormalities refer to unilateral or bilateral hydronephrosis or the obstruction, stricture, dilation, hydroureter, or other pathological changes of one or both sides of the ureters, detected by type B ultrasonic examination and MRI before surgery and ultimately confirmed during surgery. * Statistically significant. AMH, anti-Müllerian hormone

Table 3 Surgical procedure of 92 patients in UTE group

Surgical procedure	*n* (%)
Ureterolysis	51 (55.43%)
Ureterectomy with end-to-end anastomosis	27 (29.35%)
Ureteroneocystostomy	16 (17.39%)
Partial cystectomy	8 (8.70%)
Ureteral stent implantation	65 (70.65%)

health. Our data shown that UTE patients with explicitly urologic abnormalities before surgery had significantly lower MCS scores than those without abnormalities (41.26 ± 11.29 vs. 46.81 ± 9.74, $P = 0.016$), while their PCS shown no difference (38.16 ± 8.06 vs. 39.04 ± 9.25, $P = 0.629$). We speculate that this may be due to the

Table 4 Univariate analysis of SF-12 scores in UTE group

Variables	PCS	*P*-value	MCS	*P*-value
Miscarriage times				
0	38.85 ± 7.79	0.140	44.72 ± 10.30	**0.042***
1	41.33 ± 10.75		44.77 ± 11.66	
≥ 2	33.21 ± 6.60		36.83 ± 11.36	
Need for painkillers				
Yes	35.62 ± 8.37	**0.001***	40.94 ± 11.65	**0.024***
No	41.21 ± 7.87		46.06 ± 9.77	
Urine occult blood				
Negative	39.67 ± 8.35	0.226	46.32 ± 9.87	**0.023***
Positive	37.50 ± 8.68		41.14 ± 11.41	
Urologic abnormalities before surgery				
No	37.57 ± 10.76	0.742	46.81 ± 9.74	**0.013***
Yes	36.85 ± 9.61		41.26 ± 11.29	

* Statistically significant

Table 5 Multiple linear regression analysis of PCS in UTE group

Variables	β	95% CI	t	*P*-value
BMI	-0.388	-0.870 ~ 0.094	-1.599	0.113
Need for painkillers				
No (Reference)				
Yes	-5.721	-9.062~-2.381	-3.403	**0.001***
Intercept	49.809	38.885 ~ 60.733	9.060	**< 0.001***

* Statistically significant. β, standardized regression coefficient. 95% CI, 95% confidence interval. BMI, body mass index

Table 6 Multiple linear regression analysis of MCS in UTE group

Variables	β	95% CI	t	*P*-value
BMI	-0.461	-1.078 ~ 0.155	-1.487	0.141
Time until diagnosis (month)	0.059	-0.007 ~ 0.124	1.785	0.078
Miscarriage times				
0 (Reference)				
1	0.146	-5.273 ~ 5.566	0.054	0.957
≥ 2	-9.300	-15.592~-3.007	-2.938	**0.004***
Urine occult blood				
Negative (Reference)				
Positive	-3.499	-8.005 ~ 1.008	-1.544	0.126
Urologic abnormalities before surgery				
No (Reference)				
Yes	-5.562	-10.189~-0.935	-2.390	**0.019***
Intercept	58.597	44.549 ~ 72.646	8.293	**< 0.001***

* Statistically significant. β, standardized regression coefficient. 95% CI, 95% confidence interval. BMI, body mass index

misunderstanding and fear of urologic abnormalities. The early symptoms of UTE, such as painful micturition, dysuria, urinary urgency and frequency, are often nonspecific and can easily be mistaken for symptoms of urinary tract infections. This can lead to delayed diagnosis and treatment, resulting in ureteral lesions, hydronephrosis and loss of kidney function [34–36]. Many patients in our study expressed confusion, puzzlement, and even panic about why their dysmenorrhea could progress to urinary system damage. Due to the misinterpretation of this disease, many patients believed that hydronephrosis and ureter lesions were synonymous with complete loss of kidney function or even uremia. The fear of irreversible kidney damage and the potential need for long-term hemodialysis significantly increased their psychological burden and damaged their mental health and quality of life. On the other hand, some patients were informed that their surgery might involve ureter partial resection, pyelostomy, or long-term indwelling catheterization, which could have a profound impact on their daily lives and sexual satisfaction. The great fear of surgery also further exacerbated the strain on their mental health. Therefore, doctors and nurses should pay more attention to the mental health of UTE patients with urologic abnormalities before their surgery. Integrating targeted psychological counseling into preoperative care should be fully considered for these patients.

In our study, 13 of 92 UTE patients (14.13%) experienced more than two miscarriages, which was identified as an influence factor of lower MCS. Accumulating evidence shows that endometriosis is an important cause of infertility, leading to reduced pregnancy rates and an increased risk of miscarriage [37–39]. Reproduction is very important in women's lives, and for many women, especially in developing countries, having their own children within their limited childbearing years is considered essential. Once diagnosed with endometriosis, the fear of infertility and miscarriage can bring heavy psychological pressure to them. Miscarriage is a common complication of endometriosis, which not only causes physical harm but also seriously affects mental health, increasing the incidence of anxiety and depression [40]. Recurrent miscarriages can have an obvious negative impact on both women and their husbands, straining their relationship and family unity, and even leading to divorce in some cases, which further damages women's quality of life. Therefore, it is important for doctors and nurses to identify those UTE patients with recurrent miscarriage early and offer personalized psychological support.

With development in technology, UTE patients now have more surgical options available. In addition to traditional laparoscopic surgery, Pavone has shown that robotic-assisted surgery systems can be advantageous in managing complex endometriosis cases [41]. This innovative surgical method can alleviate the symptoms of dysmenorrhea, dyschezia, dyspareunia and chronic pelvic pain associated with endometriosis. Moreover, several studies have also highlighted the reliability and effectiveness of image-guided robotic surgical procedures in urology operations, which can support intraoperative decision-making and potentially reduce the duration of minimally invasive procedures [42]. The choice of surgical procedures, time and extent of surgery, and postoperative complications can significantly impact the quality of life for UTE patients. In our study, we assessed the HQoL of all participants only before they underwent laparoscopic surgery. Further investigation should focus on evaluating the long-term physical and mental health outcomes of UTE patients after surgery.

There are some limitations to this study. First, personal information and HQoL were obtained through self-reported questionnaires, which may introduce measurement error and bias due to subjective factors. Additionally, all the endometriosis patients enrolled underwent laparoscopic surgery at our hospital, while patients who received conservative drug treatment were not included in this study. The findings of this study may be more applicable to the clinical care of UTE patients undergoing surgical treatment. Finally, all participants were recruited from a single hospital in China. Extrapolation of this study requires careful consideration and further investigation.

Conclusion

In conclusion, our study investigates the quality of life for UTE patients and demonstrates that the need for painkillers is the influence factor of PCS, while the detection of urologic abnormalities before surgery and miscarriage times are the influence factors of MCS. Our results provide clinicians with a new insight into improving medical care for UTE patients to prevent negative outcomes.

Abbreviations

DIE	Deep infiltrating endometriosis
UTE	Urinary tract endometriosis
HQoL	Health-related quality of life
PCS	Physical component summary scale
MCS	Mental component summary scale
BMI	Body mass index
CA-125	Carbohydrate antigen 125
AMH	Anti-müllerian hormone
MRI	Magnetic resonance imaging

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12905-025-03579-5.

Supplementary Material 1

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Author contributions
XC and TZ contributed to the analysis and interpretation of the data and revising of the manuscript under the guidance of JC. QZ were responsible for collection and entry of the data. GH and XW contributed to distribution of the questionnaires and follow-up with participants. JH and YM concepted and designed this study. TZ and JC provided support for this research. All authors read and approved the final manuscript.

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Data availability
The datasets analyzed during the current study available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
The study was performed in accordance with the Declaration of Helsinki and approved by the Ethics Committee for Clinical Research and Animal Trials of the First Affiliated Hospital of Sun Yat-sen University (Approval No. [2021] 237). All participants were informed and willing to participate in this study, and written informed consent was obtained from all patients. Personal information of the participants will be treated with the strictest confidence.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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