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Current status of anxiety following total hysterectomy in endometrial cancer patients
A cross-sectional study

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Abstract

The aim of this study was to evaluate the prevalence of anxiety in endometrial cancer patients undergoing total hysterectomy and to analyze socio-demographic and clinical factors contributing to anxiety, with the goal of informing targeted psychological support and interventions in clinical settings. The study employed a cross-sectional survey design, including 74 patients who underwent total hysterectomy between January 2019 and January 2024 at our hospital. Data were collected through a combination of face-to-face interviews and self-administered questionnaires, conducted by specially trained research assistants or nurses to ensure standardized data collection. Anxiety levels were assessed using the Self-Assessment Scale for Anxiety, categorizing patients into no anxiety, mild anxiety, moderate anxiety, and severe anxiety based on standard scores. Results indicated that 33.78% of the 74 patients experienced varying levels of anxiety: 18.92% had mild anxiety, 12.16% had moderate anxiety, and 2.70% had severe anxiety. Univariate analysis showed significant associations between anxiety and factors such as education level, living arrangement, social support, tumor size, and International Federation of Gynaecology and Obstetrics (FIGO) stage. Multivariate logistic regression analysis further confirmed that low education level (OR = 1.866, $P = .014$), unstable living conditions (OR = 2.285, $P = .016$), inadequate social support (OR = 2.806, $P = .044$), larger tumor size (OR = 3.328, $P = .021$), and advanced FIGO stage (OR = 3.762, $P = .01$) were independent predictors of postoperative anxiety. This study revealed a high prevalence of anxiety among postoperative endometrial cancer patients and identified key influencing factors, including low educational attainment, unstable living arrangements, insufficient social support, larger tumors, and advanced disease stage. These findings underscore the importance of healthcare professionals focusing on high-risk groups to effectively reduce anxiety, improve mental health, and enhance quality of life. Strategies such as enhanced health education, establishment of support groups, provision of psychological counseling, and comprehensive mental health assessments are recommended to address the psychological needs of these patients.

Abbreviations: FIGO = International Federation of Gynaecology and Obstetrics, SAS = Self-Assessment Scale for Anxiety.

Keywords: anxiety, cross-sectional study, endometrial cancer, hysterectomy, influencing factors, social support

1. Introduction

Endometrial cancer is one of the most common malignant tumors of the female reproductive system, with its incidence rising significantly over the past few decades due to global population aging and lifestyle changes.[1,2] According to the World Health Organization (WHO), endometrial cancer is the fourth most common cancer among women worldwide, with both incidence and mortality rates increasing in China in recent years.[3] While endometrial cancer primarily affects postmenopausal women, its prevalence in younger women is also rising due to shifts in lifestyle and environmental factors.[4] The main risk factors for endometrial cancer include excess estrogen, obesity, hypertension, and polycystic ovary syndrome.[5,6] In clinical practice, surgical resection, particularly total hysterectomy, remains the primary treatment for endometrial cancer.[7] This approach is effective in controlling local tumor spread and significantly improves patient survival rates.[8] With advancements in minimally invasive techniques, laparoscopic surgery is increasingly replacing traditional open procedures due to its benefits of reduced trauma, quicker recovery, and fewer complications.[9] Despite these improvements in surgical techniques, postoperative patients continue to face significant psychological challenges, with anxiety being highly prevalent.[10]

Anxiety, a common psychological response to stress, is prevalent among patients with chronic diseases, particularly cancer patients.[11] Postoperative anxiety not only impacts patients' quality of life but can also delay recovery and negatively influence treatment outcomes.[12] Research has shown that anxiety levels in cancer patients are influenced by several factors, including social support, economic status, education level, disease severity, and type of surgery.[13] In endometrial cancer patients specifically, the incidence of postoperative anxiety varies across studies, but it is consistently recognized as being high and requiring prompt attention from healthcare providers.[14]

Existing literature indicates that socio-demographic factors such as age, marital status, occupation, education level, and economic status significantly impact anxiety levels in patients.[10] For instance, younger patients may experience greater psychological stress due to concerns related to childbearing and family responsibilities, whereas higher education levels and strong social support can help mitigate anxiety.[15] Clinical characteristics, including tumor size, stage, presence of metastases, and surgical approach, also influence patients' psychological well-being. In particular, patients with larger tumors or advanced-stage disease often face a higher risk of anxiety due to poorer prognosis and more complex treatment requirements.[16,17]

In China, despite the rising incidence of endometrial cancer, relatively few studies have explored the prevalence of postoperative anxiety and its influencing factors. Differences in social support structures, family dynamics, and healthcare resource distribution between Chinese patients and those in Western countries may result in distinct patterns and contributing factors for anxiety.[18] Thus, gaining an in-depth understanding of anxiety and its determinants in postoperative endometrial cancer patients is crucial for developing targeted psychological interventions and enhancing patients' quality of life.

The role of psychological intervention in cancer treatment is increasingly acknowledged.[19] Appropriate psychological support can effectively reduce anxiety, encourage positive coping strategies, and enhance quality of life. Understanding the prevalence and contributing factors of postoperative anxiety is crucial for developing targeted interventions.[20] By identifying high-risk groups, healthcare professionals can provide tailored psychological support and optimize care plans, ultimately improving the overall treatment experience and prognosis of patients.[21]

This study aims to evaluate the prevalence of postoperative anxiety and analyze its socio-demographic and clinical determinants through a cross-sectional survey of 74 endometrial cancer patients who underwent total hysterectomy. The findings will serve as a valuable reference for clinical staff to better identify and manage high-risk patients during postoperative care, ultimately enhancing the overall treatment experience and prognosis.

2. Materials and methods

2.1. Study design

This study was approved by the Ethics Committee of The Central Hospital of Enshi Tujia and Miao Autonomous Prefecture. This study employed a cross-sectional design to assess the prevalence of anxiety and its influencing factors in endometrial cancer patients following total hysterectomy. The study protocol received approval from the hospital's Ethics Committee, and all participants provided informed consent, ensuring their understanding of the study's purpose, procedures, and potential risks, as well as guaranteeing their right to voluntary participation. Participant privacy was strictly protected, with data used exclusively for research purposes and not disclosed publicly or used for other purposes. The study was conducted in the Department of Obstetrics and Gynecology of our hospital, ensuring a diverse sample and representative results. Data collection took place from January 2019 and January 2024, covering a complete clinical cycle and reflecting the immediate psychological status of postoperative patients.

2.2. Study subjects

Inclusion criteria: Age: female patients aged 18 years and older. Diagnosis: diagnosed with endometrial cancer and have undergone total hysterectomy. Cognitive ability: able to read, comprehend, and independently complete questionnaires. Consent: voluntary participation with signed informed consent to ensure ethical compliance.

Exclusion criteria: History of mental illness: patients with a history of mental illness or undergoing psychiatric treatment, to avoid interference in anxiety assessment. Serious physical illness: patients with comorbidities of other serious physical conditions (e.g., advanced heart disease, hepatic or renal failure) that could impact questionnaire administration and result accuracy. Cognitive dysfunction: patients with cognitive impairments (e.g., dementia, severe memory loss) unable to understand the questionnaire content. Recent major life events: patients who have recently experienced significant life events (e.g., death of a loved one, divorce) to minimize the impact of external factors on anxiety levels and ensure the internal validity of the study results.

2.3. Data collection

Data collection involved a combination of face-to-face interviews and self-administered questionnaires. For patients unable to complete the questionnaire independently, face-to-face interviews were conducted as an alternative. Self-administered questionnaires improved the efficiency and convenience of data collection. A specially trained research assistant or nurse ensured standardization and consistency throughout the data collection process, minimizing potential human error.

Survey content included: Socio-demographic characteristics (see Table 1), such as age, marital status, education, occupation, income level, and place of residence (urban/rural). Disease-related factors (see Table 2), including International Federation of Gynaecology and Obstetrics (FIGO) stage of endometrial cancer, surgical method (laparoscopic or open surgery), postoperative treatment (e.g., chemotherapy, radiotherapy, and observation), treatment regimen and number of cycles, time of diagnosis, and comorbidities (e.g., hypertension, diabetes). Psychometric tools (see Table 3), specifically the Self-Assessment Scale for Anxiety (SAS). The SAS is a widely used instrument with strong reliability and validity, suitable for assessing patients' anxiety levels.

2.4. Variables

The dependent variable (outcome) was the level of anxiety, categorized as no anxiety, mild anxiety, moderate anxiety, or severe anxiety based on SAS scores (see Table 3). Independent variables included sociodemographic factors (see Table 1), disease-related factors (see Table 2), and psychosocial factors (see Table 1).

2.5. Statistical analyses

All data analyses were conducted using SPSS 25.0 software. Continuous variables were expressed as mean ± standard deviation (mean ± SD) if normally distributed, or as median (quartiles) if not normally distributed. Categorical variables were presented as frequencies and percentages (n, %) to describe the sample characteristics (see Tables 1–3). Differences among groups with varying anxiety levels were compared using 1-way analysis of variance (ANOVA). For continuous variables, t tests or ANOVA were applied for comparison, while categorical variables were analyzed using the chi-square test to assess associations with

Table 1

Sociodemographic characteristics of postoperative patients with endometrial cancer (N = 74).

Variable	Number (n)	Percentage (%)
Age (yr)		
≤45	4	5.41
46–55	21	28.38
≥56	49	66.22
Marital status		
Single	2	2.70
Married	63	85.14
Divorced	6	8.11
Widowed	3	4.05
Occupation		
Farmers or migrant workers	32	43.24
Company employees	14	18.92
Civil servants/public institution employees	9	12.16
Freelancers	2	2.70
Unemployed or retired	17	22.97
Educational level		
Primary School or below	11	14.86
Junior High School	27	36.49
Senior High School	24	32.43
University or above	12	16.22
Place of residence		
Urban	34	45.95
Rural	40	54.05
Living arrangements		
Living with family	63	85.14
Other living arrangements	11	14.86
Average monthly household income		
<6000 CNY/mo	18	24.32
6000–12,000 CNY/mo	44	59.46
>12,000 CNY/mo	12	16.22
Medical insurance status		
Self-paid	3	4.05
New rural cooperative medical scheme	41	55.41
Urban medical insurance	23	31.08
Commercial insurance	7	9.46
Social support		
Low, ≤22	25	33.78
Moderate, 23–44	21	28.38
High, >44	28	37.84

Table 2

Clinical characteristics of postoperative patients with endometrial cancer (N = 74).

Variable	Number (n)	Percentage (%)
Surgical approach		
Laparoscopy	65	87.84
Laparotomy	9	12.16
Extent of hysterectomy		
Total hysterectomy	48	64.86
Radical hysterectomy	26	35.14
Adjuvant chemotherapy/radiotherapy		
Yes	39	52.70
No	35	47.30
Tumor size (cm)		
<4	57	77.03
≥4	17	22.97
FIGO stage		
I	56	75.68
II	7	9.46
III + IV	11	14.86
Histological type		
Adenocarcinoma	68	91.89
Endometrial stromal sarcoma	5	6.76
Others	1	1.35
Metastasis		
No	69	93.24
Yes	5	6.76
Chronic disease history		
Yes	27	36.49
No	47	63.51

FIGO = International Federation of Gynaecology and Obstetrics.

Table 3

SAS assessment of postoperative patients with endometrial cancer (N = 74).

Variable	Number (n)	Percentage (%)
Anxiety		
Yes	25	33.78
No	49	66.22
Degree of anxiety		
Mild	14	18.92
Moderate	9	12.16
Severe	2	2.70

SAS = Self-Assessment Scale for Anxiety.

anxiety levels (see Tables 4 and 5). Multifactorial analysis was performed using logistic regression to identify independent factors affecting anxiety, with anxiety as the dependent variable and including significant independent variables from univariate analyses (see Table 7). A significance level of $P < .05$ was set, and all statistical tests were 2-sided.

3. Results

3.1. Sociodemographic and clinical characteristics of the study subjects

A total of 74 endometrial cancer patients who underwent total hysterectomy were included in this study. The majority of patients were aged 56 years or older (66.22%), with 85.14% being married, and 43.24% working as farmers or migrant workers. Educational levels were predominantly middle school (36.49%) and high school (32.43%), with 54.05% residing in rural areas. Most patients had a monthly family income between RMB 6000 and 12,000 (59.46%), and medical insurance was primarily covered by the new rural cooperative medical care system (55.41%). Low social support was reported by 33.78% of participants (see Table 1 for details). In terms of disease characteristics, laparoscopic surgery was performed in most cases (87.84%), with total hysterectomy in 64.86%, and 52.70% receiving adjuvant therapy postsurgery. Tumor size was <4 cm in 77.03% of patients, 75.68%

were in stage I, 91.89% had adenocarcinoma, and 36.49% had a history of chronic disease (see Table 2 for details).

3.2. SAS assessment of the study subjects

The mean SAS score for the 74 endometrial cancer patients who underwent total hysterectomy was 43.62 ± 8.27. Based on the SAS evaluation criteria, 33.78% of patients experienced anxiety, with 18.92% (14/74) having mild anxiety, 12.16% (9/74) moderate anxiety, and 2.70% (2/74) severe anxiety. See Table 3 and Figure 1 for details.

3.3. Anxiety distribution by sociodemographic characteristics of the study subjects

Anxiety distribution across different socio-demographic characteristics showed that education level, lifestyle, and social support were significantly associated with anxiety (Table 4). Specifically, anxiety was most prevalent among those with lower secondary education (55.56%), while the lowest anxiety prevalence was observed in patients with tertiary education (25.00%), indicating that lower education levels may increase the risk of anxiety.

Anxiety distribution by sociodemographic characteristics of postoperative patients with endometrial cancer.

Variable	Number (n)	Percentage (%)	χ^2	*P* value
Age (yr)			0.502	.778
≤45	2	50.00		
46–55	7	33.33		
≥56	16	32.65		
Marital status			2.016	.569
Single	0	0.00		
Married	23	36.51		
Divorced	1	16.67		
Widowed	1	33.33		
Occupation			4.982	.289
Farmers or migrant workers	15	46.88		
Company employees	4	28.57		
Civil servants/public institution employees	2	22.22		
Freelancers	0	0.00		
Unemployed or retired	4	23.53		
Educational level			9.127	.028
Primary school or below	2	18.18		
Junior high school	14	55.56		
Senior high school	6	20.83		
University or above	3	25.00		
Place of residence			0.058	.81
Urban	11	32.35		
Rural	14	35.00		
Living arrangements			5.144	.023
Living with family	17	28.57		
Other living arrangements	8	63.64		
Average monthly household income			1.54	.463
<6000 CNY/mo	4	22.22		
6000–12,000 CNY/mo	17	38.64		
>12,000 CNY/mo	4	33.33		
Medical insurance status			4.557	.207
Self-paid	1	33.33		
New rural cooperative medical scheme	18	43.90		
Urban medical insurance	5	21.74		
Commercial insurance	1	14.29		
Social support			8.36	.015
Low, ≤22	13	56.00		
Moderate, 23–44	6	23.81		
High, >44	6	21.43		

Regarding lifestyle, patients with unstable living situations had significantly higher anxiety rates compared to those living with family members (63.64% vs 28.57%), suggesting that an unstable lifestyle may elevate anxiety risk. Additionally, anxiety prevalence was significantly higher among those with low social support (56.00%) compared to those with high social support (21.43%), indicating inadequate social support as a key factor in anxiety. Other variables, such as age, marital status, occupation, place of residence, family income, and health insurance status, were not significantly associated with anxiety.

3.4. Anxiety distribution by disease characteristics of the study subjects

Anxiety distribution among patients with different disease characteristics showed that tumor size and FIGO stage were significantly associated with anxiety (Table 5). Anxiety prevalence was significantly higher in patients with tumors ≥4 cm (58.82%) compared to those with tumors <4 cm (26.32%), suggesting that larger tumors may increase the risk of anxiety. Similarly, anxiety was significantly more common in patients with FIGO stage III + IV (72.73%) compared to those with stage I (28.57%), indicating that advanced disease stage is a key factor in anxiety. Other variables, such as surgical approach, extent of hysterectomy, postoperative treatment, histological type, presence of metastasis, and history of chronic disease, were not significantly associated with anxiety.

3.5. Analysis of factors influencing anxiety in the study subjects

Multifactorial logistic regression analysis indicated that education level, living arrangement, social support, tumor size, and FIGO stage were independent factors influencing postoperative anxiety (see Table 6 for assigned values). Specifically, patients with junior high school education had a higher risk of anxiety compared to those with primary education or below (OR = 1.866, *P* = .014). Those with unstable living arrangements had greater anxiety risk compared to those living with family (OR = 2.285, *P* = .016). Low social support was associated with increased anxiety risk compared to high social support (OR = 2.806, *P* = .044). Patients with tumors ≥4 cm had a higher risk of anxiety compared to those with tumors <4 cm (OR = 3.328, *P* = .021). Additionally, patients with FIGO stage III + IV had a higher risk of anxiety compared to those with stage I (OR = 3.762, *P* = .01). See Table 7 for further details.

4. Discussion

A cross-sectional survey of 74 endometrial cancer patients who underwent total hysterectomy found that 33.78% experienced anxiety, with 18.92% having mild anxiety, 12.16% moderate, and 2.70% severe. Univariate and multivariate logistic regression analyses identified education level, living arrangements, social support, tumor size, and FIGO stage as independent factors influencing postoperative anxiety.

Table 5

Anxiety distribution by disease characteristics of postoperative patients with endometrial cancer.

Variable	Number (n)	Percentage (%)	χ^2	P value
Surgical approach			0.613	.433
Laparoscopy	23	35.38		
Laparotomy	2	22.22		
Extent of hysterectomy			0.392	.532
Total hysterectomy	15	31.25		
Radical hysterectomy	10	38.46		
Adjuvant chemotherapy/radiotherapy			0.164	.685
Yes	14	35.90		
No	11	31.43		
Tumor size (cm)			6.182	.013
<4	15	26.32		
≥4	10	58.82		
FIGO stage			9.326	.009
I	16	28.57		
II	1	14.29		
III + IV	8	72.73		
Histological type			1.001	.606
Adenocarcinoma	24	35.29		
Endometrial stromal sarcoma	1	20.00		
Others	0	0.00		
Metastasis			1.647	.199
No	22	31.88		
Yes	3	60.00		
Chronic disease history			0.327	.567
Yes	8	29.63		
No	17	36.17		

FIGO = International Federation of Gynaecology and Obstetrics.

Table 6

Five possible factors contributing to anxiety in postoperative patients with endometrial cancer and their assigned values.
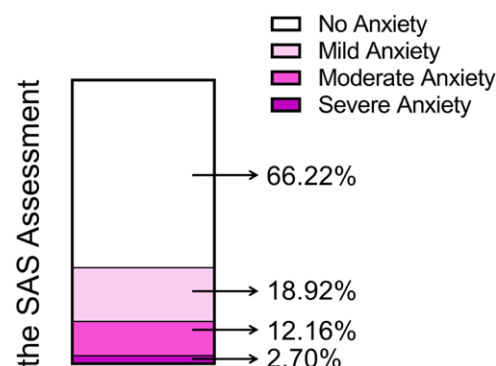
Factor	Variable name	Assignment description
Educational level	X1	Primary School or below = 1, Junior High School = 2, Senior High School = 3, University or above = 4
Living arrangements	X2	Living with family = 0, other living arrangements = 1
Social support	X3	High, >44 = 1; moderate, 23–44 = 2; low, ≤22 = 3
Tumor size (cm)	X4	<4 = 0, ≥4 = 1
FIGO stage	X5	I = 1, II = 2, III + IV = 3
Anxiety	Y	Yes = 1, no = 0

Choose the group considered to have lower risk or be more common in clinical practice as the reference group.

FIGO = International Federation of Gynaecology and Obstetrics.

Figure 1. Proportion of different anxiety types in the study population.

Approximately one-third of postoperative endometrial cancer patients in this study experienced anxiety, consistent with findings from previous research.[22] For instance, Wang et al[23] reported that postoperative anxiety in cancer patients ranged from 25% to 35%. The high prevalence of anxiety underscores the need for urgent attention and intervention for postoperative mental health issues.[24]

The effect of education level on anxiety was significant in this study. Patients with lower secondary education had a significantly higher risk of anxiety compared to those with tertiary education (OR = 1.866, P = .014). This finding aligns with existing literature, which suggests that low education levels are associated with reduced health literacy and coping strategies, potentially leading to greater uncertainty and fear when facing illness.[25] Additionally, patients with unstable living arrangements had a significantly higher risk of anxiety compared to those living with family members (OR = 2.285, P = .016). This may be because a stable home environment offers more

emotional support and security, thereby reducing anxiety.[26] Previous studies have demonstrated a strong link between home environment stability and mental health.[27,28]

Inadequate social support was also a significant factor contributing to postoperative anxiety in this study (OR = 2.806, P = .044). Social support helps patients cope with the stress and challenges of illness by providing emotional, informational, and practical assistance.[29] Lack of sufficient social support may increase anxiety by making patients feel isolated and helpless during recovery. Related studies have indicated that patients with higher levels of social support exhibit better psychological resilience when facing illness.[30]

Tumor size and FIGO stage significantly impacted patients' anxiety levels (OR = 3.328, P = .021; OR = 3.762, P = .01). Larger tumors and advanced stages often indicate a more complex treatment course and poorer prognosis, which can heighten concerns about disease recurrence and survival, thereby increasing anxiety.[31] Similar studies have demonstrated a positive correlation between disease severity and psychological stress in patients.[32]

Table 7

Unconditional logistic regression analysis of factors influencing anxiety in postoperative patients with endometrial cancer.

Variable	β	SE	Wald χ²	P	OR	95% CI
Educational level (reference: Primary School or below)						
Junior High School	0.624	0.255	6.008	.014	1.866	1.133–3.074
Living arrangements						
Other living arrangements	0.826	0.342	5.823	.016	2.285	1.168–4.470
Social support (reference: high)						
Low, ≤22	1.032	0.512	4.062	.044	2.806	1.029–7.650
Tumor size (cm)						
≥4	1.202	0.521	5.322	.021	3.328	1.198–9.231
FIGO stage (reference: I)						
III + IV	1.325	0.513	6.665	.01	3.762	1.377–10.279
Constant	−1.856	0.408	20.654	<.001	–	–

CI = confidence interval, FIGO = International Federation of Gynaecology and Obstetrics, OR = odds ratio, SE = standard error.

The findings of this study suggest that clinical attention should focus on endometrial cancer patients with low education levels, unstable living arrangements, insufficient social support, large tumors, and advanced stages to provide targeted psychological interventions. For instance, health education can be enhanced for patients with lower education levels to improve their understanding of the disease and treatment, thereby reducing anxiety caused by lack of information.[33]

For patients with unstable living arrangements and insufficient social support, coping skills and psychological resilience can be strengthened through support groups or psychological counseling services.[34] Additionally, comprehensive psychological assessments and interventions should be provided for patients with larger tumors and advanced stages to help alleviate disease-related stress.

This study has several limitations. Firstly, the cross-sectional design does not establish causal relationships between variables but only reveals correlations.[35] Secondly, the study had a small sample size, including only 74 patients, which may affect the extrapolation and statistical power of the results. Nevertheless, we believe that this study provides valuable preliminary data for understanding the prevalence and influencing factors of anxiety after surgery for endometrial cancer. However, future studies should consider expanding the sample size to improve the representativeness and statistical power of the findings and ensure their wide applicability and credibility.[36] Finally, the study did not account for certain potential confounding factors, such as patients' prior mental health status, specifics of family support systems, and personality traits, which may influence postoperative anxiety and affect the internal validity of the results. In addition, the assessment criteria of social support used in this study are relatively simple, and no specific quantitative measurement tools are used, which may limit the accurate assessment of the impact of social support on postoperative anxiety. Future studies should adopt more systematic and quantitative social support assessment methods, such as social support scales, to provide more accurate measurements. The potential effects of other clinical features, such as pathological types and risk of postoperative recurrence, on anxiety levels were not explored in depth. Studies have shown that the type of pathology and the risk of postoperative recurrence may be closely related to the psychological state of patients, so future studies should consider the impact of these factors on anxiety to obtain more comprehensive conclusions.

In conclusion, this study highlights the prevalence of anxiety in postoperative endometrial cancer patients and identifies key influencing factors, including education level, living arrangements, social support, tumor size, and FIGO stage. Clinical focus on these high-risk factors is crucial to improving patients' mental health and enhancing their quality of life through targeted psychological interventions and support.

Author contributions

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