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A Study on the Correlation between Anxiety Levels, Family Resilience and Hope Levels in Patients after Benign Prostatic Hyperplasia Surgery

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Abstract: *Objective:* This study aims to explore the correlations between anxiety levels, family resilience, and hope levels in postoperative patients with benign prostatic hyperplasia, providing a theoretical basis for reducing anxiety in postoperative patients. *Methods*: Convenience sampling was used to conduct a questionnaire survey among 150 patients who underwent prostatic hyperplasia resection in our hospital from June 2024 to December 2025. The questionnaire included a general information questionnaire, an anxiety scale, a family resilience scale, and a hope level scale. Multiple linear regression was used to analyze the factors influencing anxiety after prostatic hyperplasia surgery. *Results*: A total of 140 questionnaires were retrieved, with an effective recovery rate of 93.33%. Patients scored 51.71 ± 16.49 in anxiety level, 29.67 ± 10.44 in family resilience, and 29.67 ± 11.44 in hope level. Anxiety level was negatively correlated with erectile function (r = -0.379, p < 0.001*)*. Negatively correlated with family resilience (r = -0.380, p < 0.001), negatively correlated with hope level (r = -0.476, p < 0.001), The results of multiple linear regression showed that age, chronic disease status, smoking status, family resilience, and hope level were factors influencing anxiety levels in patients after benign prostatic hyperplasia surgery (p < 0.05). *Conclusion*: The anxiety level of patients after prostatic hyperplasia surgery is at a moderate level. The improvement of family resilience and hope level is of great significance in postoperative rehabilitation. It is recommended to strengthen psychological support and family intervention in clinical management, and pay attention to older patients, those with chronic diseases and smokers to improve the overall quality of life and treatment effect of patients.

Keywords: Benign prostatic hyperplasia; Sexual dysfunction; Anxiety; Family resilience; Hope level

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1. Introduction

Benign Prostatic Hyperplasia (BPH) is a common benign disease among older men, and its incidence is increasing

year by year worldwide. Studies have reported that the prevalence of BPH in men aged 60 and above is as high as 50%, and in men aged 80 and above it can reach 90% [1]. The disease not only affects the physical health of patients, but also their mental state and quality of life, especially after surgical treatment, many patients often face problems such as postoperative sexual dysfunction, anxiety and depression, further increasing the psychological burden of patients [2].

At present, the treatment methods for benign prostatic hyperplasia mainly include drug therapy and surgical treatment, among which surgical treatment is considered the most effective approach. However, despite the continuous advancement of surgical techniques, the incidence of postoperative complications and psychological problems remains high. Studies show that about 40 percent of patients experience varying degrees of anxiety and depression after surgery, which not only affects their recovery process but also reduces their quality of life [3]. Transurethral resection of the prostate for benign prostatic hyperplasia is not only a physical challenge, but also intensifies patients' negative emotions, inducing psychological problems such as anxiety and depression, thus forming a vicious cycle. In the field of mental health, negative emotions are widely regarded as an important factor affecting patients' recovery paths. Negative emotions can not only exacerbate disease symptoms, but also reduce patients' treatment compliance and life satisfaction. At the same time, family resilience, as the family's ability to cope with adversity, can provide emotional support and resource security for patients, enhancing their confidence and ability to cope with the disease. The level of hope reflects the patient's positive expectations for the future and is an important psychological resource for promoting disease recovery and psychological adaptation. The existing literature has initially revealed the role of negative emotions, family resilience and hope levels in the management of chronic diseases, but there is a lack of research on the correlation in patients after benign prostatic hyperplasia surgery.

Therefore, this study investigated the current status of anxiety and depression, family resilience and hope levels in patients after BPH surgery in our hospital through questionnaires, explored the intrinsic correlations among negative emotions, family resilience and hope levels, and through systematic quantitative analysis, comprehensively revealed the psychosocial characteristics and influencing mechanisms of patients after benign prostatic hyperplasia surgery To gain a deeper understanding of the psychological state and family support of patients, to provide a scientific basis for clinical intervention, to promote the overall improvement of patients' physical and mental health, and to promote the interdisciplinary integration of urology and psychology.

2. Subjects and methods of study

2.1. Research subjects

Convenience sampling was used to select patients after prostatic hyperplasia surgery in the Department of Urology, First People's Hospital of Linchuan District, Jiangxi Province from June 2024 to December 2025 as the research subjects. A mixed online and offline questionnaire survey was adopted.

2.1.1. Inclusion criteria

(1) Age ≥ 18 years;
(2) Benign prostatic hyperplasia and male sexual dysfunction met the diagnostic criteria in Surgery (9th Edition);
(3) Complete transurethral resection of the prostate;

(4) Be aware of your condition and cooperate with the study.

2.1.2. Exclusion criteria

(1) Patients with concurrent malignant tumors in other parts of the body;

(2) Patients with complications such as urinary incontinence;

(3) Patients with severe mental disorders;

(4) Patients with consciousness disorders.

In a multivariate analysis of a cross-sectional study, the sample size is calculated at 5 to 10 times the number of variables or dimensions of the scale according to the sample estimation method. There were a total of 24 study variables in this study, taking into account 10% of invalid questionnaires. Therefore, based on the statistical formula: sample size N = [24 × (5–10) × [1 + 10%], the total sample size was 132–264 cases. A total of 150 questionnaires were distributed in this survey, and 140 were effectively retrieved, with an effective recovery rate of 93.3%.

2.2. Research methods

2.2.1. General demographic data and disease information questionnaires

This questionnaire is self-compiled and designed with reference to literature review and practical experience. The demographic information mainly covered the following variables: age, marital status, educational attainment, economic status, medical expense payment method, residence pattern, family relationship. The questionnaire for disease-related information includes: erectile function score, whether one has a chronic disease (hypertension or diabetes), whether one smokes, etc.

2.2.2. Self-rating anxiety scale

The Self-rating Anxiety Scale (SAS) was developed by Zung in 1971. It has good reliability and validity and is mainly used to assess the frequency of subjective symptoms of anxiety subjects in the past week. The SAS consists of 20 multiple-choice questions, with each item on the test scale representing the frequency of a symptom, and it is scored on a 4-point scale (1 to 4 points per item). The SAS score is calculated as a total score. The sum of the scores of all the questions on the test sheet equals the rough score, which is converted according to the formula, that is, the rough score is multiplied by 1.25 and rounded to the nearest whole number to get the standard anxiety score. The lower the score, the milder the anxiety symptoms.

2.2.3. Chinese version of family hardiness index (FHI)

The scale, developed by McCubbin et al., was translated into Chinese by Chinese scholars in 2014. It consists of three dimensions: responsibility, control, and challenge, and has 20 items. It uses a Liker 4-level rating system, with values ranging from 1 to 4 from “strongly disagree” to “strongly agree”. Items 1, 2, 3, 8, 10, 14, 16, 19, and 20 are scored in reverse, with a total score ranging from 12 to 48 points. The higher the score, the better the resilience of the family, the scale A Cronbach’s α coefficient of 0.8 indicates good reliability.

2.2.4. Herth hope index scale

The Hope Level Scale (HHI) is an assessment tool developed by American nurse Kathryn Herth in 1991 to measure an individual’s sense of hope for the future and positive emotions. The Chinese version of the Hope Scale,

translated by Zhao Haiping, is mainly used for the expression of an individual's attitude towards life and beliefs. It consists of 12 items and 3 dimensions (attitude towards life, taking positive action, maintaining close relationships with others), and is scored using the Liker 4 scale, where 1 indicates strong opposition and 4 indicates strong agreement, with scores ranging from 12 to 48. The higher the score, the more positive the individual's attitude towards life and firm confidence. Items 3 and 6 are the reverse ones. The Cronbach's α coefficient of the scale was 0.870, indicating good credibility.

2.3. Data collection

Data collection was conducted using a combination of online and offline methods to investigate patients who met the inclusion and exclusion criteria. Informed consent forms were sent to the study subjects first, stating the purpose and significance of the study, ensuring the voluntariness and confidentiality of the participants, and the correct filling method. Questionnaires were then distributed to the study subjects after obtaining the informed consent of the patients. At the same time, to ensure the accuracy of the data, each device or IP address was limited to filling out the questionnaire only once, and all options were required to be filled in to ensure no data was omitted for the successful submission of the questionnaire.

2.4. Statistical analysis

Statistical description and analysis of variables were performed using SPSS 26.0. Qualitative data were described using frequency (n) and percentage (%). Quantitative data conforming to normal distribution were described using mean ± standard deviation ($\overline{x} \pm s$). Differences between groups were compared using independent sample *t*-tests and one-way analysis of variance. For data that did not satisfy homogeneity of variance and normal distribution, the arbitrary distribution test was used, and the LSD test was used for comparative analysis after analysis of variance. Pearson correlation was used to measure the degree of linear correlation between two variables. Take the test level $\alpha = 0.05$.

3. Results

3.1. General information of the respondents

A total of 150 questionnaires were distributed and 140 were retrieved, with an effective recovery rate of 93.33%. The age range of the respondents was 45–84 (63.83 ± 7.52), and other general information is shown in **Table 1**.

Table 1. General Information and Univariate analysis of anxiety after Benign prostatic hyperplasia surgery (n = 140)

Items	Number of cases	Composition (%)	Anxiety score ($\overline{x} \pm s$, points)	Test statistic (*F* value)	*p* value
Age (years)					
< 60	36	25.714	47.868 ± 13.156	3.205	0.044*
60–69	74	52.857	52.116 ± 13.296		
≥ 70	30	21.429	56.398 ± 15.066		
Marital status					
unmarried	12	8.571	53.990 ± 11.716	1.227	0.302
Married	100	71.429	52.892 ± 14.455		

Table 1 (Continued)

Items	Number of cases	Composition (%)	Anxiety score ($\bar{X}$ ± s, points)	Test statistic (*F* value)	*p* value
Divorced	11	7.857	49.382 ± 15.634		
Widower	17	12.143	46.561 ± 9.348		
Educational attainment					
Primary school	50	35.714	52.103 ± 14.613	0.315	0.814
Junior high school	42	30.000	51.220 ± 12.580		
High school or technical secondary school	36	25.714	51.379 ± 14.645		
College and above	12	8.571	55.941 ± 13.813		
Family financial status (yuan/month)					
< 2000	43	30.714	52.904 ± 13.255	0.155	0.857
2000–4000	62	44.286	51.387 ± 13.807		
> 4000	35	25.000	51.740 ± 15.024		
Medical payment ways					
Rural	67	47.857	51.485 ± 13.760	0.560	0.573
Town	38	27.143	55.172 ± 16.177		
Workers	35	25.000	50.980 ± 5.372		
Family relations					
Good	59	42.143	53.989 ± 14.850	1.424	0.244
General	54	38.571	51.300 ± 12.479		
Poor	27	19.286	48.750 ± 14.079		
Living style					
Live with a spouse	72	52.857	50.613 ± 13.243	0.581	0.628
Live with children	29	20.714	52.117 ± 15.327		
Living alone	35	15.714	54.221 ± 14.640		
Others	4	10.714	54.621 ± 5.328		
Do you have a chronic illness					
have	84	60.000	54.941 ± 13.911	10.489	0.002*
no	56	40.000	47.442 ± 12.643		
Whether or not to smoke					
no	100	71.429	49.779 ± 13.462	8.990	0.003*
have	40	28.571	57.941 ± 13.553		

3.2. Results of a univariate analysis of anxiety in patients after prostatic hyperplasia surgery

The results of the univariate analysis showed that there were statistically significant differences in total anxiety scores among patients of different age groups, with or without chronic disease, and with or without smoking ($p < 0.05$), as shown in **Table 1**.

3.3. Scores and correlation analysis of anxiety, erectile function, family resilience and hope level in patients after benign prostatic hyperplasia surgery

The self-rated anxiety score of patients after prostatic hyperplasia surgery was (51.71 ± 16.49), the score of erectile function was (12.35 ± 6.68), the score of family resilience was (29.67 ± 11.44), and the score of hope level was (29.77 ± 10.41). The results of the correlation analysis showed that anxiety was negatively correlated with erectile function score (r = -0.379, $p < 0.001$), anxiety level was negatively correlated with family resilience score (r = -0.380, $p < 0.001$), and anxiety score was negatively correlated with hope level score (r = -0.476, $p < 0.001$).

3.4. Results of multivariate linear model analysis of anxiety levels in patients after benign prostatic hyperplasia surgery

The total score of the Self-Rating Anxiety Scale for patients after prostatic hyperplasia surgery was used as the dependent variable, and the statistically significant variables in the univariate analysis and correlation analysis were included as independent variables in the multivariate linear model. The assignment of independent variables is shown in **Table 2**. The analysis results showed that age, presence of chronic disease, smoking status, family resilience, and level of hope were independent factors affecting anxiety in patients after prostatic hyperplasia surgery, as shown in **Table 3**.

Table 2. Assignment of independent variables

Independent variables	Assignment method
Age (years)	< 60 ($Z_1 = 1$, $Z_1 = 0$), 60–69 ($Z = 0$, $Z = 1$), ≥ 70 ($Z = 0$, $Z = 0$))
Are there any chronic diseases	Yes ($Z_1 = 1$, $Z_0 = 0$), no ($Z = 0$, $Z = 1$)
Whether or not smoking	Yes ($Z_1 = 1$, $Z_0 = 0$), no ($Z = 0$, $Z = 1$)
Erection function	Original value input
Family resilience	Original value input
Hope level	Original value input

Table 3. Results of general linear model analysis of anxiety levels in patients after prostatic hyperplasia surgery

Variables	Regression coefficient *B*	Standard error *SE*	Standardization coefficient β	*t* value	*p* value	95%*CI*
Constant	34.333	4.862		7.061	< 0.001	24.715–43.950
Age	3.944	1.573	0.196	2.507	0.013	0.832–7.055
Whether there is a chronic disease	8.742	2.231	0.310	3.919	< 0.001	4.329–13.154
Whether there is a history of smoking	8.839	2.405	0.289	3.675	< 0.001	4.082–13.596
Erectile function score	-0.202	0.235	-0.082	-0.857	0.393	0.667–0.264
Family resilience score	-0.285	0.124	-0.197	-2.305	0.023	0.529–0.040
Hope level score	-0.555	0.146	-0.350	-3.800	< 0.001	0.844–0.266

4. Discussion

4.1. The anxiety level of patients after benign prostatic hyperplasia surgery is at a moderate level

This study shows that anxiety levels are moderate after transurethral resection of benign prostatic hyperplasia. Chen Hui pointed out that there was widespread anxiety among patients after prostatic hyperplasia surgery due to concerns about the surgical outcome, postoperative complications and recovery process, and most patients had a moderate level of anxiety, which was highly consistent with the results of this study [4]. Another study used SAS to assess the anxiety status of patients after transurethral resection of the prostate and found that although the postoperative anxiety score was significantly lower than that before the operation, it was still at a moderate level, which was consistent with the overall manifestation of postoperative anxiety in patients in this study, suggesting that although surgical treatment can relieve the physical symptoms of patients, it does not completely eliminate their psychological anxiety distress [5]. The reasons for this are mainly related to the fact that most patients after benign prostatic hyperplasia surgery are elderly, have a relatively weak psychological endurance, and have a temporary lack of awareness of postoperative complications such as abnormal urination and urinary incontinence, which can easily lead to "catastrophic thinking" and thereby cause moderate anxiety; At the same time, physical discomfort such as postoperative pain and indwelling catheters can further increase patients' anxiety, which is consistent with the emotional characteristics of postoperative patients observed in urology clinical nursing, that is, physical discomfort and psychological anxiety interact and jointly cause patients' anxiety levels to remain in a moderate state [6].

4.2. The older the patient, the higher the anxiety level after prostatic hyperplasia surgery

The study showed that older patients had higher levels of anxiety after prostatic hyperplasia surgery ($p < 0.05$). The relationship between age and anxiety levels reveals vulnerability to mental health in older patients. Studies showed that patients aged 70 and above had significantly higher anxiety scores than younger patients, which may be associated with a higher burden of chronic diseases and concerns about surgical complications in the older population [7]. Older patients often face multiple comorbidities such as cardiovascular disease and diabetes, which interact to form complex psychological and physiological burdens [8]. It is also noted in the literature that elderly patients tend to have a more negative perception of rehabilitation ability when facing surgery, and this cognitive bias may exacerbate their anxiety [9]. There are also studies suggesting that age ≥ 60 years may also lead to a lack of confidence in postoperative recovery in patients, thereby increasing anxiety levels, which is consistent with the analysis of risk factors affecting the mood of patients after prostatic hyperplasia surgery in related studies [10]. Therefore, psychological intervention measures for elderly patients need to pay particular attention to their psychological resilience and social support in order to reduce anxiety and improve the overall therapeutic effect.

4.3. Patients with chronic diseases and those who smoke have higher levels of anxiety

The study showed that patients with chronic diseases and smoking had higher levels of anxiety after prostatic hyperplasia surgery ($p < 0.05$). Patients with chronic diseases often face a higher burden of symptoms and more complex treatment options, which not only increase concerns about their health status but may also lead to a decline in their self-efficacy, thereby exacerbating anxiety [11,12]. Relevant studies suggest that anxiety in patients with chronic diseases is often associated with a reduced sense of control over treatment outcomes, and patients may feel helpless and desperate when facing multiple health problems, an emotional state that directly affects their

mental health [3]. In addition, the depletion of mental resources in patients with chronic diseases (such as lower levels of hope and increased fatigue) is also considered an important factor contributing to anxiety [13]. Therefore, comprehensive intervention programs should focus on the overall health status of patients with chronic diseases and design personalized psychological support strategies.

The association between smoking behavior and postoperative anxiety reveals the complexity of the physiological-psychological interaction. Studies have shown that smoking is not only closely related to physical health but also has a significant impact on mental health, with smokers being more prone to anxiety and depression symptoms [14]. Physiologically, nicotine dependence may exacerbate anxiety and stress responses by affecting the brain's reward system [15]. In addition, smoking as a poor coping strategy may reflect smokers' inefficient management of stress, which further exacerbates anxiety. In this context, smoking withdrawal interventions can not only improve physical health, but may also promote psychological adaptation in patients by reducing anxiety levels. Therefore, in perioperative care, it is particularly important to strengthen the combination of smoking cessation support and psychological intervention.

4.4. The better the family resilience, the lower the anxiety level after prostatic hyperplasia surgery

The study found that the better the family resilience, the lower the anxiety level in patients after prostatic hyperplasia surgery, and the two were significantly negatively correlated. This conclusion corroborates the existing research results and highlights the important role of family resilience in alleviating postoperative anxiety in patients. Mccubbin et al. proposed the concept of "Family Resilience" in 1988 [16]. Family resilience, also known as family resistance or family recovery, is a protective factor, adaptation method, or the result of family reconfiguration in the face of adversity. Family resilience focuses on the entire family and emphasizes during times of crisis. How a family, as a collaborative team, uses its own strengths and resources to build its own support system to deal with possible difficulties or challenges in the future is the response and adaptation of the family as a functional unit as a whole [17]. The family is the direct environment in which the patient lives. When the patient themselves face illness or setbacks, good family resilience can help the patient and their family better cope with and get out of the crisis, transform the stress caused by illness into the driving force for family growth and progress, and better promote the patient's recovery from illness [18,19]. When patients face crises and setbacks such as illness and adversity, family resilience can help families get out of the crisis, turn stress into the driving force for family progress and growth, and promote the recovery of family functions [20]. Studies show that well-adapted families are characterized by stronger problem-solving skills, a warm family atmosphere, more composure in the face of difficulties, the ability to quickly identify the root cause of problems and solve them effectively, more happiness and less anxiety and depression among family members, and greater unity and higher family cohesion in the process [21]. It has also been found that the psychological state and quality of companionship of family members are closely related to the anxiety of patients after prostatic hyperplasia surgery. The empathy and support of family members can help patients relieve psychological burden and reduce anxiety episodes, which is a core manifestation of the emotional support dimension in family resilience, echoing the conclusion in this study that the better the family resilience, the lower the anxiety level of patients. This indicates that family resilience helps patients cope with postoperative rehabilitation stress by enhancing family support, thereby reducing anxiety levels. This mechanism also provides a theoretical basis and practical support for the intervention of patients' anxiety through enhancing family resilience in clinical nursing [22].

4.5. The higher the level of hope, the lower the level of anxiety after prostatic hyperplasia surgery

The results of this study show that the higher the level of hope, the lower the level of anxiety in patients after prostatic hyperplasia surgery, which is consistent with the conclusions of many studies at home and abroad on the psychological state of patients after prostatic hyperplasia surgery, clarifying the key role of the level of hope in alleviating postoperative anxiety in patients. The level of hope is the patient's positive expectation of future recovery and confidence in achieving rehabilitation goals, which can help patients deal with difficulties and stress during the postoperative rehabilitation process with a positive attitude, thereby reducing anxiety [23]. The effect of psychological intervention on the quality of life of patients after transurethral resection of the prostate (TURP) research shows that enhancing patients' confidence in rehabilitation through psychological intervention can significantly reduce their anxiety scores and improve their psychological state, which is essentially achieved by increasing patients' level of hope, consistent with the conclusion of this study [24]. Synergistic intervention based on caring behavior also found that improving the mood state of patients after prostatic hyperplasia surgery through intervention could reduce their anxiety score, and the improvement in the level of hope is an important manifestation of the improvement in mood state, further confirming the negative correlation between the level of hope and the level of anxiety [5]. Analyzing the mechanism of action, patients with high levels of hope after prostatic hyperplasia surgery can have a clearer understanding of the process and pattern of postoperative rehabilitation, have a more objective cognition of possible discomforts such as abnormal urination and pain after surgery, and are less likely to have excessive worry and fear, thereby reducing the generation of anxiety; At the same time, high levels of hope can stimulate patients' self-management ability, making them more actively cooperate with postoperative rehabilitation training and nursing measures to promote physical recovery, and the relief of physical symptoms can further enhance patients' confidence in recovery, forming a virtuous cycle of "increased level of hope–active cooperation in rehabilitation–relief of physical symptoms–reduced level of anxiety" [24]. This is in line with the conclusion in related studies that "psychological care combined with urination function training can relieve negative emotions by enhancing patients' confidence in rehabilitation", indicating that the level of hope, as an important positive indicator of patients' psychological state, can effectively buffer the impact of postoperative stress on anxiety, providing an important entry point for clinical psychological nursing intervention [23].

There are several limitations in this study. First, the use of convenience sampling and the fact that the samples originated from only one medical institution may lead to sample selection bias, limiting the universality of the study results. The family resilience, levels of hope, and anxiety experiences of patients from specific regions and medical backgrounds may not fully represent the broader post-prostatic hyperplasia population. Secondly, the study was designed as a cross-sectional survey that could only reveal correlations among variables, but could not infer the direction of the causal effects of family resilience and hope levels on anxiety. For example, it is not clear whether higher levels of hope reduce anxiety or lower anxiety promotes an increase in the sense of hope. This needs to be further verified through prospective longitudinal studies or intervention trials.

5. Conclusion

To sum up, this study identified age, comorbidity, smoking history, family resilience, and level of hope as key factors influencing anxiety in patients after surgery for benign prostatic hyperplasia. The innovation lies in

integrating and quantifying the independent predictive effects of family system resources (family resilience) and individual psychological capital (hope level) on anxiety for the first time in this specific patient group, going beyond the conventional perspective that focuses only on individual or disease factors. This finding has clear practical implications, suggesting that clinical interventions need to shift from traditional symptom management to an integrated model that combines psychosocial support and family system interventions. Future research should focus on developing and evaluating structured psychosocial intervention programs centered on enhancing family resilience and hope levels, and testing their efficacy in reducing postoperative anxiety and improving long-term quality of life through randomized controlled trials.

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Disclosure statement

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