

INVESTIGATION AND CORRELATION ANALYSIS OF FEAR OF CANCER RECURRENCE AND SOCIAL SUPPORT AFTER THYROID CANCER SURGERY

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ABSTRACT – Objective: This study investigated the association between fear of cancer recurrence and the level of social support among individuals who have undergone thyroid cancer surgery.

Patients and Methods: The study was conducted at our hospital from May 2021 to June 2022 and involved the distribution of 520 questionnaires to postoperative thyroid cancer patients using stratified random sampling. A high response rate of 97.11% was achieved, with 505 completed questionnaires returned. The survey employed a specially designed three-dimensional scale, encompassing aspects of social support (A1-A7), fear of relapse (B1-B7), and disease awareness (C1-C6). This, coupled with patients' medical records and pathological data, formed a comprehensive basis for analysis.

Results: Key findings revealed significant variations in social support, disease awareness, and fear of recurrence across different clinical stages of the patients ($p < 0.05$). The analysis demonstrated that social support exhibited a moderate positive correlation with disease cognition ($r = 0.602$, $p < 0.001$). Conversely, fear of recurrence displayed a mild negative correlation with both social support ($r = -0.413$, $p < 0.001$) and disease cognition ($r = -0.396$, $p < 0.001$). Logistic regression identified several independent factors influencing the fear of recurrence, including distant metastasis, clinical stage, risk level, social support, and disease cognition ($p < 0.005$).

Conclusions: The fear of cancer recurrence in patients' post-thyroid cancer surgery is inversely related to the degree of social support they receive, thus highlighting the importance of social support as a significant determinant in managing the fear of cancer recurrence.

KEYWORDS: Correlation, Fear of postoperative cancer recurrence, Social support, Thyroid cancer.

INTRODUCTION

Thyroid cancer represents a prevalent endocrine malignancy. Although it generally carries a favorable clinical prognosis, approximately 15-20% of patients with differentiated thyroid cancer (DTC) and the majority of those with anaplastic thyroid carcinoma (ATC) will eventually develop resistance to their treatments, such as radioactive iodine (RAI) therapy^{1,2}. Enhanced drug resistance in individuals with thyroid cancer will heighten the likelihood of recurrence, leading to a detrimental effect on the physical and mental well-being of patients, as determined in pertinent research^{3,4}. The conventional treatment



for thyroid malignancies involves the surgical resection of the thyroid gland, along with adjuvant RAI therapy, contingent upon RAI uptake by any residual thyroid tissue and tumor lesions. Unfortunately, recurrence is common in such patients, with a relatively high likelihood of distant metastases. These factors significantly impact the quality of life of the patients. Studies have shown that 65.8% of thyroid cancer survivors reported experiencing a fear of recurrence, while 59.6% of their spouses similarly dealt with this fear⁵. Among 2,215 thyroid cancer survivors, researchers observed that 41.0% harbored a fear of death, 43.5% feared treatment-related harm, 54.7% were concerned about the impairment of their quality of life, 58.0% feared for the well-being of their family members, and 63.2% had apprehensions regarding recurrence⁶.

An intense fear of recurrence diminishes family tolerance and social support, as thyroid cancer treatment and care are intricately linked with familial and social backing. In the event of thyroid cancer recurrence, patients and their families undergo both physical and mental distress. Social support stands as the intrinsic spiritual impetus for the therapy and recovery of thyroid cancer patients. The robustness of social support corresponds closely with the disease awareness of patients and their families. While relevant studies⁷⁻⁹, both domestically and internationally, have explored the connection between thyroid cancer and social support, fewer have delved into the link between postoperative recurrence, social support, and disease cognition. Hence, this research may provide novel insights into analyzing the association between fear of recurrence following thyroid cancer surgery, social support, and clinical manifestations.

PATIENTS AND METHODS

Respondents

Patients admitted to our hospital from May 2021 to June 2022 and who underwent thyroidectomy were included as respondents. Utilizing stratified cluster random sampling, 520 questionnaires were distributed, with 505 successfully retrieved (505/520, 97.11% response rate).

Methods

The questionnaire survey was conducted online and offline (including face-to-face interviews, electronic questionnaires, and commissioned surveys). Experts, professors, and clinicians were also engaged to ensure the professional quality of the questionnaire content.

EXPLANATION OF STRATIFIED CLUSTER RANDOM SAMPLING

Stratification

The stratification in this study was based on the clinical and demographic features of the thyroid cancer patients who underwent surgery. These characteristics likely included factors such as the cancer stage (differentiated thyroid cancer (DTC) vs. anaplastic thyroid carcinoma (ATC)), various age groups, and potentially the risk level (mild, moderate, severe) as indicated by the categorization of patients into groups with and without metastasis, alongside the clinical staging outlined in the manuscript. Stratification played a vital role in ensuring that the sample accurately represented the broader population of thyroid cancer patients, accommodating the diversity in cancer prognosis, treatment response, and potential for recurrence.

Cluster Randomization

In terms of the cluster randomization component of our sampling approach, we employed a two-stage process designed to align with the specific needs and structure of the patient population and the operational framework of the hospital.

Stage 1: Defining Clusters

Initially, we delineated our clusters based on the hospital's organizational structure and the geographical distribution of patients. Clusters were designated as distinct treatment centers or units within the hospital that focus on thyroid cancer care. This encompassed various hospital departments involved in the postoperative management of thyroid cancer, such as the endocrinology unit, the oncology department, and the surgical units specializing in thyroid procedures. By aligning our clusters with existing treatment pathways, we ensured each cluster represented a unique patient population segment, capturing diverse treatment experiences and outcomes.

Stage 2: Random Selection of Clusters

Once clusters were defined, we employed a computer-generated random selection method to choose clusters for inclusion in the study. This step was performed separately within each stratum to ensure that the selected clusters represented the broader demographic and clinical characteristics identified during stratification. For example, if the stratification resulted in groups based on the severity of the disease (e.g., stages I-II vs. stages III-IV of thyroid cancer), clusters within each group were randomly selected to participate in the study. The random selection process was designed to ensure that each cluster had an equal chance of being chosen, thereby minimizing selection bias and enhancing the sample's representativeness.

Denominator

The denominator for this study was the total number of patients who underwent thyroid cancer surgery at the hospital from May 2021 to June 2022 and met the inclusion criteria. Out of 520 questionnaires distributed, 505 were completed and returned, yielding a response rate of 97.11%. In the context of stratified cluster sampling, the denominator refers to the total population from which the sample is drawn, which, in this case, would be these 520 patients.

Selection Bias

The methodology applied aimed to minimize selection bias through its stratified cluster random sampling design. By stratifying the population by relevant clinical and demographic factors and then randomly selecting clusters within these strata, the study attempted to ensure that the sample was representative of the broader population of thyroid cancer patients. This approach helps control variables that could influence the measured outcomes, such as fear of recurrence and social support. However, the potential for selection bias cannot be eliminated, especially if certain subgroups of patients were underrepresented in the final sample. Given the nature of survey-based research, it is also important to consider the possibility of non-response bias. However, the high response rate reported mitigates this concern to some extent.

The stratified cluster random sampling method was chosen to ensure a representative, manageable, and efficient sample selection process, minimizing selection bias and accommodating the study's logistical constraints.

Inclusion criteria: (1) patients that meet the diagnostic criteria in the Chinese Management Guidelines for Patients with Thyroid Nodules and Differentiated Thyroid Cancer¹⁰ and have received thyroid surgery; (2) patients with good writing and expression skills; (3) patients with complete data.

Exclusion criteria: (1) patients with other malignant tumors; (2) those complicated by severe intestinal, liver and kidney, and cardiopulmonary diseases; (3) those complicated by severe cardiovascular diseases or coagulation disorders; (4) those with other severe chronic diseases; (5) those with severe cognitive impairment and mental disorders.

Questionnaire settings

The content of the questionnaire is based on the clinical practice of patients after thyroid cancer surgery, the existing mature scale is used for reference, and the practical nature of the survey is taken into consideration. The social support scale is based on the Chinese version of the Questionnaire on Social

Support Behavior by Zhang and Xing¹¹. The fear of relapse was addressed in the Simplified Chinese version of the Fear of Disease Progression Scale for Cancer Patients, developed by Wu et al¹². The disease cognition was referred to the Chinese version of the Disease Cognition Questionnaire by Han et al¹³. With these three, a three-dimensional comprehensive scale was developed, covering social support (A1-A7), fear of recurrence (B1-B7), and disease cognition (C1-C6). Each question was presented with five response options on a 5-point scale: “totally disagree,” “basically disagree,” “sometimes agree,” “basically agree,” and “totally agree,” assigned 1, 2, 3, 4, and 5 points, respectively. The total points allocated to each dimension were 100, 35, 35, and 30, respectively.

The scale content includes the following dimensions: A) Social support, which concentrates on the emotional and supportive interactions with relatives, friends, colleagues, and others; B) Fear of recurrence, addressing the emotional impact, concerns about future generations, and life implications; C) Disease cognition, focusing on the duration, behavioral impacts, burden, origins of the disease, and associated mood changes. For detailed information, refer to **Table 1**.

Table 1. Distribution of the content of the self-made scale.

Dimension	Main content	Dimension	Main content
Social support	A1 I get help from friends, family, and colleagues when in trouble A2 I share my sorrows and joys with them A3 My family offered me actual help A4 Friends, family, and colleagues are the main soothing voices to my emotional and mental wounds. A5 My friends and family take the initiative to talk to me about their joys and sorrows. A6 My family supports me in all my decisions A7 I can open up to my friends, family, and colleagues about my issues	Fear of recurrence	B1 I feel anxious about and afraid of disease recurrence B2 Regular checkups make me feel nervous and uncomfortable B3 The pains stop me from working normally B4 I am worried that the disease will be passed on to my children B5 I am concerned that receiving the surgery or medication may harm my body B6 I am worried that this disease will make me a burden to the family B7 I am worried that I will have to depend on others because of my illness
Disease cognition	C1 My illness will last for a long time C2 My illness has placed a huge burden on my family and friends C3 My behavior is affected by the disease C4 I believe the current treatment can help control my disease C5 I understand the source of my disease and its nursing care C6 I can well control my emotions to avoid secondary damage to my family		

Questionnaire reliability and validity

Cronbach’s alpha for the total scale and the three dimensions – social support, fear of recurrence, and disease cognition – were 0.892, 0.774, 0.735, and 0.701, respectively, all exceeding the threshold of 0.7. This indicates that the questionnaire is highly reliable and conforms to statistical requirements, eliminating the need for redesign. Validity was also confirmed: the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy yielded values of 0.845, 0.839, 0.808, and 0.717, respectively, with a significance level of $p=0.000$. Thus, the questionnaire was deemed valid.

Observations

Total points in each dimension were calculated to analyze the questionnaire findings under different baseline conditions. Meanwhile, the patients’ clinical medical records and pathological features were included for analysis.

Statistical analysis

Statistical analyses were performed using SPSS 25.0 (SPSS Inc., IBM, Armonk, NY, USA). Quantitative data were reported as mean \pm standard deviation ($\bar{x} \pm s$). Comparisons between two groups were conducted using independent sample *t*-tests, while within-group comparisons of quantitative data utilized paired-sample *t*-tests. Enumeration data were presented as n (%) and analyzed using cross-tabulation and the chi-square (χ^2) test. Pearson correlation analysis was used to evaluate relationships, with the following correlation standards: $|r| > 0.95$ indicated a very strong correlation; $|r| \geq 0.8$ a strong correlation; $0.5 \leq |r| < 0.8$ a moderate correlation; $0.3 \leq |r| < 0.5$ a weak correlation; and $|r| < 0.3$ a negligible correlation. Factors influencing fear of recurrence were analyzed using a linear regression model. Statistical significance was indicated by $p < 0.05$ and $p < 0.001$.

RESULTS

Statistical analysis under Tumour, Node, Metastasis (TNM) classification

According to the TNM classification, patients were divided into two groups: those with lymph node or distant metastasis were categorized as the metastatic group, and those without metastasis were placed in the non-metastatic group. The survey results indicated statistically significant differences between these two groups in several variables, including the size of the primary tumor, lymph node metastasis, distant metastasis, clinical stage, risk level, frequency of operations, iodine therapy, social support, disease cognition, and fear of recurrence. Age also showed significant variation. The only exception was gender, which did not show a significant difference. These findings are detailed in **Table 2** ($p < 0.05$).

The correlation of social support, disease cognition, and fear of recurrence

Social support was moderately positively correlated with disease cognition (coefficient $r = 0.602$, $p < 0.001$). Social support was slightly negatively correlated with fear of recurrence (coefficient $r = -0.413$, $p < 0.001$). In addition, disease cognition was somewhat negatively associated with fear of recurrence (coefficient $r = -0.396$, $p < 0.001$). The scatter charts are reported in **Figure 1**.

Influencing Factors of Fear of Recurrence

A linear regression analysis was conducted with fear of recurrence as the dependent variable, and gender, age, size of the primary tumor, presence of lymph node metastasis, distant metastasis, clinical stage, risk level, operation frequency, iodine therapy, social support, and disease cognition as independent variables. According to the results, factors influencing fear of recurrence included distant metastasis, clinical stage, risk level, social support, and disease cognition. The results are shown in **Table 3**.

DISCUSSION

The histological subtypes of thyroid cancer are classified as papillary, follicular, medullary, and undifferentiated carcinomas. According to the International Classification of Diseases for Oncology, patients diagnosed with thyroid cancer are categorized into five age groups: under 20, 20-44, 45-54, 55-64, and over 65. The incidence of thyroid cancer tends to increase with age^{14,15}. According to relevant research^{16,17}, in most cases, thyroid cancer originates from thyroid follicular cells (93%) and is well differentiated; fatal undifferentiated thyroid cancer is rarely seen. Undifferentiated cancers are challenging to cure and often involve surrounding tissue and organs. The 5-year survival in advanced stages is less than 50%; in iodine-sensitive patients with well-differentiated cancer, however, the 5-year survival is about 98%. Patients included in this research had well-differentiated cancer. This guaranteed 5-year survival provides a realistic basis for the follow-up visits herein and a foundation for future studies on long-term survival. RAI is widely used to treat follicular cell-derived thyroid cancer. However, down-regulation of SLC5A5 in sodium-iodine symporter will lead to drug resistance or RAI-R (Radioiodine-refractory) disease. Comorbidities and the recurrence of disease will have a huge negative impact on the body and mind of a patient. The fear of

Table 2. Statistics of the survey under TNM classification.

Indicators	Classification	No metastasis (n=408)	Metastasis (n=97)	χ^2	<i>p</i>
Gender	Female	276 (67.65)	60 (61.86)	1.18	0.277
	Male	132 (32.35)	37 (38.14)		
Education/Income	N/A				
Deprivation	N/A				
Support Carers	N/A				
How Diagnosed	Imaging combined with the level of thyroglobulin antibodies				
Surgery Type	Total thyroidectomy + neck lymph node dissection				
Time Since Diagnosis	N/A				
Size of the primary tumor	<2 cm	190 (46.57)	23(23.71)	19.106	0.001
	2-4 cm	49 (12.01)	14(14.43)		
	>4 cm	53 (12.99)	14(14.43)		
	Extra-glandular invasion under the naked eye	107 (26.23)	43(44.33)		
	Unclear	9 (2.21)	3 (3.09)		
Lymph node metastasis	No	20 (4.91)	7 (7.22)	15.704	<0.001
	Yes	380 (93.37)	81 (83.51)		
	Unclear	7 (1.72)	9 (9.28)		
Distant metastasis	No	404 (99.02)	53 (54.64)	182.214	<0.001
	Yes	2 (0.49)	40 (41.24)		
	Unclear	2 (0.49)	4 (4.12)		
Clinical staging	Stage I	345 (84.56)	47 (48.45)	79.317	<0.001
	Stage II	38 (9.31)	25 (25.77)		
	Stage III	19 (4.66)	7 (7.22)		
	Stage IV	6 (1.47)	18 (18.56)		
Risk level	Mild	6 (1.47)	0 (0.00)	41.856	<0.001
	Moderate	235 (57.60)	22 (22.68)		
	Severe	167 (40.93)	75 (77.32)		
Operation frequency (times)	0 time	1 (0.25)	5 (5.15)	43.972	<0.001
	1 time	360 (88.24)	70 (72.16)		
	2 times	45 (11.03)	14 (14.43)		
	3 times	2 (0.49)	5 (5.15)		
	4 times	0 (0.00)	1 (1.03)		
	5 times	0 (0.00)	2 (2.06)		
Iodine therapy (times)	0 time	1 (0.25)	5 (5.15)	83.749	<0.001
	1 time	202 (49.51)	30 (30.93)		
	2 times	189 (46.32)	36 (37.11)		
	3 times	8 (1.96)	10 (10.31)		
	4 times	7 (1.72)	8 (8.25)		
	5 times	0 (0.00)	1 (1.03)		
	6 times	0 (0.00)	3 (3.09)		
	8 times	0 (0.00)	1 (1.03)		
	9 times	0 (0.00)	2 (2.06)		
	10 times	0 (0.00)	1 (1.03)		
	11 times	1 (0.25)	0 (0.00)		
Social support (points)		26.99±4.35	15.71±4.13	23.187	<0.001
Disease cognition (points)		22.52±3.46	13.99±4.71	16.794	<0.001
Fear of recurrence (points)		17.85±5.10	26.22±2.91	-21.547	<0.001
Age		42.06±11.92	46.71±16.25	-2.653	0.009

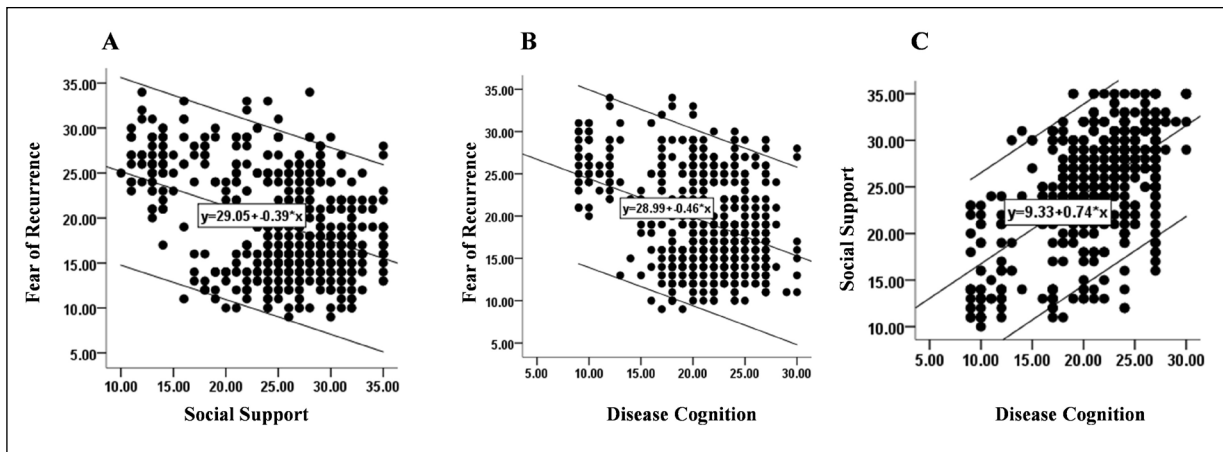


Figure 1. Scatter charts of correlation. A, Negative correlation between fear of recurrence and social support. B, Negative correlation between fear of recurrence and disease cognition. C, Positive correlation between fear of recurrence and disease cognition.

postoperative recurrence is a major clinical characteristic of patients with thyroid cancer. A research¹⁸ has proposed to pharmacologically induce re-expression of SLC5A5 in sodium-iodine symporter, i.e., cell “re-differentiation,” so it could be treated with RAI. For instance, vitamin A-derived retinoic acid-retinoids can induce 5'-deiodinase, promote NIS mRNA expression, and increase thyroglobulin levels, thus, to a certain extent, enabling re-uptake of RAI in patients with thyroid tumors. However, the actual effect on patients with thyroid cancer hasn't been widely proven in clinical practice. In this research, iodine therapy was effective in both the metastatic and non-metastatic groups. Still, there were differences in the frequency of the therapy – the metastatic group received significantly more treatment times than the non-metastatic group. This, in turn, indicates that iodine therapy is effective. Iodine therapy is radioactive; although it can be absorbed and destroyed by thyroid carcinoma cells, the residual radioactivity may still cause thyroid cancer to recur after surgery. In the non-metastatic group, the frequency of iodine treatment was mainly concentrated in 1 treatment and 2 treatments, accounting for 49.51% and 46.32%, respectively. In the metastatic group, the frequency of iodine treatment was mainly concentrated in 1, 2, 3, and 4 treatments, accounting for 30.93%, 37.11%, 10.31%, and 8.25%, respectively (**Table 1**). Therefore, iodine therapy does not completely inhibit the reproduction of thyroid carcinoma cells. Existing research^{6,19} points out that patients' quality of life depends on their health-promoting behaviors, which are associated with concerns over recurrence, social support, self-efficacy, and improvement in their symptoms. A group of researchers reviewed 314 articles related to thyroid cancer and observed a significant trend towards improved prognosis and increased survival rates. However, they noted that the fear of recurrence was closely associated with clinical symptoms⁹. The research findings indicate that clinical features significantly influence patients' fear of recurrence, social support, and disease cognition.

Different studies^{19,20} have segmented the survival period of patients with thyroid cancer into three stages: the acute stage (<2 years post-diagnosis), the expansion stage (2-5 years post-diagnosis), and the permanent stage (≥ 5 years post-diagnosis). A significant number of patients in the permanent stage undergo multiple rounds of RAI (Radioactive Iodine) therapy and may still experience recurrence. Post-operative RAI therapy is administered as needed, with subsequent treatments scheduled between 6 to 12 months later. Despite these interventions, some patients experience recurrence even after 5 years and several rounds of RAI therapy.

Additionally, patients in the long-term stages often receive lower levels of social support, potentially due to increased mobility challenges and shrinking social networks as the disease progresses. The reduced support, particularly in meaningful interactions, for long-term survivors may also stem from societal desensitization to their ongoing condition, leading to less engagement from friends and colleagues^{21,22}. Fear of recurrence is a common psychological issue in patients with thyroid cancer²³. According to extensive research^{24,25}, patients with thyroid cancer show a high level of fear of recurrence, especially fear of reoperation. Therefore, appropriate social support for patients seems particularly important. Relevant research²⁶ has found that health-promoting behaviors of patients with thyroid cancer varied depending on the duration of survival. Fear of recurrence is present in the postoperative expansion stage. Social support is important in promoting self-efficacy and encouraging healthy behaviors, which patients of all stages expect to receive.

Table 3. Influencing factors of fear of recurrence.

Factors	Non-standard coefficient	Standard coefficient	t	p	B 95.0% CI		Collinearity statistics		
	B	Standard error			B	Lower limit	Upper limit	Tolerance	VIF
(constant)	31.048	1.731	17.931	<0.001	27.646	34.45			
Gender	-0.51	0.485	-0.042	-1.052	0.293	-1.464	0.443	0.986	1.015
Age	-0.01	0.022	-0.022	-0.454	0.65	-0.052	0.033	0.666	1.502
Size of the primary tumor	0.271	0.217	0.063	1.247	0.213	-0.156	0.697	0.606	1.65
Presence of lymph node metastasis	-0.009	0.321	-0.001	-0.028	0.978	-0.64	0.623	0.901	1.11
Distant metastasis	0.87	0.411	0.09	2.117	0.035	0.063	1.677	0.851	1.176
Clinical stage	0.712	0.38	0.097	1.872	0.062	-0.035	1.459	0.576	1.738
Risk level	-1.67	0.594	-0.142	-2.812	0.005	-2.837	-0.503	0.61	1.639
Operation frequency	0.094	0.512	0.008	0.184	0.854	-0.911	1.1	0.822	1.217
Iodine therapy	0.161	0.229	0.031	0.701	0.483	-0.29	0.612	0.789	1.268
Social support	-0.18	0.049	-0.192	-3.671	<0.001	-0.276	-0.084	0.565	1.771
Disease cognition	-0.229	0.059	-0.199	-3.897	<0.001	-0.345	-0.114	0.595	1.681

In this research, social support is negatively correlated with fear of recurrence ($p < 0.05$), which means that patients' fear of recurrence mitigates as social support increases. This is because patients with thyroid cancer, as members of the social community, are related to the community both physically and mentally – down to friends and relatives around them and up to social care, social security, government relief, etc.^{27,28}. In other words, the fear of recurrence in patients with thyroid cancer arises not only from the anxiety over the disease – isolation from family, friends, and colleagues may also increase the risk of recurrence. Under such circumstances, appropriate social support for these patients will encourage them both physically and mentally so that they will be strong enough to continue fighting the disease^{29,30}. Of course, it is believed here that fear of recurrence requires social support and, more importantly, patients' disease cognition and healthy behaviors. Disease cognition is also negatively correlated with fear of recurrence ($p < 0.05$); the better the disease cognition, the slighter the fear of recurrence. This is because disease cognition is multi-faceted, involving etiology, targeted treatment, and nursing measures closely related to treatment and recovery^{31,32}. The higher the level of disease cognition is, the better the patient's understanding of their disease progression will be, thus reducing the fear of recurrence. In the multivariate regression analysis, social support and disease cognition are also two major contributing factors to fear of recurrence; other influencing factors are distant metastasis, level of risk, and clinical stage ($p < 0.05$). Distant metastasis and lymph node metastasis are different in pathology. Lymph node metastasis mainly refers to enlarged lymph nodes caused by the multiplication of cancer cells in the involved lymph nodes through lymphatic vessels; distant metastasis, on the other hand, refers to the spread of cancer cells to body parts with lymph nodes such as heart, liver, spleen, lung, and kidney, which seriously endangers patients' lives. According to comparison, patients with distant lymph node metastases showed significantly stronger fear of recurrence than those without distant metastases ($p < 0.05$), while disease cognition and social support were on the decline ($p < 0.05$). Therefore, as thyroid cancer advances, patient cognition and social support both decline, which could be associated with shortened life expectancy and increased difficulty in eradicating the disease. Risk level and clinical stage are both indicators of the severity of a patient; the more advanced the stage, the more critical the illness, and the greater the patient's fear of recurrence.

Relevant research also points out that aging and aggravation of the disease will also increase the fear of recurrence, which should receive more attention in clinical practice³².

In addition, the mini-AFTER intervention and tools like the Holistic Needs Assessment (HNA) and the Patient Concerns Inventory (PCI) serve significant roles in managing the fear of cancer recurrence (FCR) and addressing the comprehensive needs of cancer survivors.

The HNA is recognized as a critical tool for identifying and addressing the needs and concerns of people living with cancer, thereby aiding in the development of a Personalized Care and Support Plan. The questionnaire is designed to be a straightforward tool that can be used at any point along the cancer care pathway. Its purpose is to help identify patient concerns, initiate discussions about their needs, and facilitate the provision of targeted support. The process typically involves the patient filling out the questionnaire, which is then followed by a discussion to explore the patient's needs more deeply. This leads to the development of a personalized care plan aimed at addressing these specific concerns. The electronic Holistic Needs Assessment (eHNA) offers a web-based platform for conducting these assessments, providing a secure and user-friendly environment for both patients and clinicians. This innovation supports remote working practices and allows care plans to be seamlessly integrated into patient medical records, thereby enhancing the continuity of care³³.

A study highlighted the objectives of evaluating the HNA's impact on consultation style, shared decision-making, and patient-reported self-efficacy in outpatient cancer care. The study design involved a randomized controlled trial to test hypotheses related to the benefits of HNA in clinical consultations, including facilitating patient participation and shared decision-making. Clinicians participating in the study receive training on the use of HNA to standardize the intervention and ensure that they are equipped to respond to patient needs identified through the assessment³⁴.

These interventions and tools are crucial for integrating into routine care to enhance the identification and management of FCR. Their incorporation empowers Clinical Nurse Specialists (CNSs) to provide targeted support tailored to individual patient needs. Thus, they play a substantial role in alleviating FCR among thyroid cancer survivors and advocating for their integration into standard postoperative care protocols.

Limitations

This research is limited by the small sample size, the single-center study approach, and other factors such as inadequate data on certain age groups, operation frequency, and iodine therapy frequency, which may lead to biased results. It is to be further supported with a large sample and multi-center studies.

Moreover, another limitation of our study is the development and utilization of a bespoke, unvalidated questionnaire. While the decision to create a tailored instrument was driven by a specific need to capture nuanced aspects of fear of cancer recurrence (FCR), social support, and disease cognition within our unique patient population, this approach has inherent drawbacks. The lack of prior validation means that, although the questionnaire was carefully designed with input from clinical experts and a review of existing literature, its reliability and validity in measuring the constructs of interest have not been established through empirical research. This limitation may impact the generalizability of our findings and their comparability with studies utilizing established, validated tools.

The rationale for not employing established questionnaires was twofold. First, we aimed to address specific research questions that were not adequately covered by existing instruments. Second, we sought to minimize participant burden by creating a more concise survey that directly aligned with our study objectives. However, we acknowledge that this choice necessitates a cautious interpretation of the data, especially when drawing comparisons with other studies.

We used a self-made scale that incorporates elements from the Chinese version of the Questionnaire on Social Support Behavior by Zhang¹¹ and the Simplified Chinese version of the Fear of Disease Progression Scale for Cancer Patients by Wu et al¹².

The decision to adapt and combine elements from these validated tools rather than using the full versions was driven by several considerations:

i. Specificity and relevance: we sought to ensure that each question directly pertained to the experiences and concerns of thyroid cancer survivors, thereby increasing the relevance and potential for insightful data on the specific relationships being studied.

ii. Brevity and response rate: by creating a more concise questionnaire, we aimed to reduce the burden on respondents, potentially increasing completion rates and the quality of data collected. This consideration was particularly important given the sensitive nature of the topics addressed and the potential for survey fatigue.

iii. Cultural and contextual appropriateness: the adaptations were also informed by a desire to ensure cultural and contextual appropriateness for our study population, which might not have been fully met by the original scales in their entirety.

iv. Integrated Analysis: Integrating aspects from different scales allowed us to explore the interplay between social support, fear of recurrence, and disease cognition in a more holistic manner than possible using separate instruments.

Another limitation is our study's cross-sectional design, which captures a single snapshot in time. This design choice limits our ability to explore changes in FCR, social support, and disease cognition over time. Importantly, it restricts our understanding of how FCR evolves as a dynamic process influenced by various trigger factors and the temporal relationship between these constructs. Longitudinal studies are better suited to capturing these temporal dynamics. They could provide deeper insights into the natural history of FCR, the effectiveness of interventions over time, and the identification of critical trigger points for heightened FCR in thyroid cancer survivors.

CONCLUSIONS

To sum up, the fear of postoperative recurrence in patients who have received thyroidectomy is negatively correlated with social support – the less social support, the greater the fear of recurrence. In clinical practice, we should encourage a patient's family, friends, and colleagues to provide them with stronger psychological support to mitigate the patient's fear of recurrence.

While our study provides valuable insights into the relationship between FCR, social support, and disease cognition among thyroid cancer survivors, the limitations associated with our bespoke questionnaire and cross-sectional design underscore the need for cautious interpretation of these findings. Future research would benefit from employing validated instruments and adopting longitudinal designs to build on our work and further elucidate the complexities of FCR in cancer survivorship.

AUTHOR CONTRIBUTIONS:

Q.B. and X.Y. wrote the main manuscript text; L.X. prepared Tables 1–3 and Figures 1. All authors reviewed the manuscript and approved it for publication.

CONFLICT OF INTEREST:

The authors declare that they have no conflicts of interest to declare regarding the present study.

DATA AVAILABILITY STATEMENT:

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

ETHICAL APPROVAL:

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Informed consent was obtained from all individuals included in this study.

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