EMPIRICAL RESEARCH MIXED METHODS `OPEN ACCESS`

Study on the Current Situation and Influencing Factors of Family Resilience of Patients With Recurrent Cancer and Their Caregivers

Yaoyao Pei[1,2] | Zhangying Xu[3] | Xingjuan Luo[4] | Feng Wu[5] | Mei Yu[1] | Wei Xiao[6] | Tingting Hu[2,3] 🆔

[1]Department of Oral and Maxillofacial Surgery, School and Hospital of Stomatology, Guangdong Engineering Research Center of Oral Restoration and Reconstruction & Guangzhou Key Laboratory of Basic and Applied Research of Oral Regenerative Medicine, Guangzhou Medical University, Guangzhou, China | [2]Hubei Province Key Laboratory of Occupational Hazard Identificaand Control, School of Medicine, Wuhan University of Science and Technology, Wuhan, Hubei, China | [3]Department of Oncology, Xiangyang Central Hospital, Affiliated Hospital of Hubei University of Arts and Science, Xiangyang, Hubei, China | [4]School of Basic Medicine, Hubei University of Arts and Science, Xiangyang, Hubei, China | [5]Office of Academic Research, Xiangyang Central Hospital, Affiliated Hospital of Hubei University of Arts and Science, Xiangyang, Hubei, China | [6]Department of Nursing, School and Hospital of Stomatology, Guangdong Engineering Research Center of Oral Restoration and Reconstruction & Guangzhou Key Laboratory of Basic and Applied Research of Oral Regenerative Medicine, Guangzhou Medical University, Guangzhou, China

Correspondence: Tingting Hu (htt@hbuas.edu.cn; 980574786@qq.com) | Wei Xiao (201269044@gzhmu.edu.cn)

ABSTRACT

Aim: Family resilience plays a crucial role in cancer recurrence patients and their caregivers. However, there are few studies that have studied the family resilience of patients with recurrent cancer and their caregivers at the same time. Guided by the framework of family resilience, this study explored the status, influencing factors and interactions of family resilience between patients with recurrent cancer and their caregivers.

Design: Observational cross-sectional study.

Method: Selecting 204 patients with recurrent tumors and their caregivers from October to November 2023 as the study subjects, and the actor-partner interdependence model of the family resilience of patients with recurrent tumors and their caregivers was established to analyze the current status, influencing factors and interactions of the family resilience of patients and caregivers.

Result: There was a significant correlation between the level of family resilience with the level of perceived social support, the level of Herth's hope, the level of patients' self-perceived burden and the level of burden on the caregiver. The actor-partner interdependence model revealed the direct impact of the patients' and caregivers' social support and hope level on their own family resilience. The indirect effect of the caregivers' social support on the patients' family resilience, in which the caregivers' hope level plays a significant mediating role.

Conclusion: The family resilience of patients with recurrent cancer and their caregivers is affected by the level of social support and hope. In order to help patients and caregivers better cope with the disease, it is recommended that clinical medical staff pay attention to improving the social support and hope level of disease treatment of patients and caregivers, and regard the two as a community, and explore intervention programs focusing on improving family resilience.

Zhangying Xu is the second co-first author.

1 | Background

The recurrence and metastasis of cancer are major problems in modern medicine. According to 2020 data released by the International Agency for Research on Cancer (IARC), the number of new cases of cancer worldwide is about 19.3 million, and the number of deaths is nearly 10 million (Sung et al. 2021; Faccio et al. 2018). Among them, the number of new cancer cases in China is nearly 23.7% (4.57 million cases) (Xia et al. 2022). Cancer recurrence is defined as the reappearance of the same type of tumour as the primary cancer locally, regionally or distantly after the cancer has been in remission for more than 6 months after treatment (Poodt et al. 2018). According to statistics, the 5-year recurrence rate of breast cancer is 7%–13% (Aouad et al. 2022), the 3-year recurrence rate after radical surgery for liver metastasis of colorectal cancer is 33.3%–80.0% (Nordlinger et al. 2013) and the 5-year recurrence rate after radical surgery for small cell lung cancer is 20%–40% (Sebastian et al. 2020). Recurrence of cancer causes patients and caregivers to suffer different degrees of psychological suffering (Lang-Rollin and Berberich 2018), increases the burden of family care, and seriously affects the quality of life of patients and caregivers and their hope for treatment.

Family Resilience, also known as family resilience, refers to the results that occur when individual members and family members work together to help families withstand crises and resolve risks in the face of challenging and dangerous circumstances (Saltzman et al. 2013). However, not all patients and their caregivers succumb to the negative effects of the disease. Some families are considered resilient when they are able to withstand and recover from adversity, becoming stronger and more resourceful. Family resilience has been widely shown to be associated with patient and family adaptation to cancer (Faccio et al. 2018; Liu et al. 2018; Li et al. 2019). Relevant studies have shown that good family resilience can better regulate family stress, mobilise the coping ability of patients and caregivers, promote their physical and mental health, and improve their quality of life (Dionne-Odom et al. 2021; Palacio et al. 2020). The ability of the patient and caregiver as a community to face the fight against cancer recurrence depends on each other's communication, mutual support, understanding and attitudes. Negative coping styles will seriously affect the effectiveness of treatment.

Interpersonal interaction takes the interaction between two individuals as the fundamental unit, and the thoughts and behaviours of two individuals in a couple may influence each other. Collecting information from both parties and analysing the paired data can find out whether an individual is influenced by others and provide a broader idea for the development of health promotion measures. The actor-partner interdependence model (APIM) is an authoritative method of pairwise data analysis proposed by Kenny, which emphasises that the dependent variable of an individual is not only affected by itself but also by the object (Kenny and Ledermann 2010). In stress research, there was an interdependent relationship between the caregiver and the cared-for in the stress coping process, so some scholars refer to it as a dichotomous structure (Regan et al. 2015). The APIM model can answer the question of whether an individual's outcome variables are influenced by their own and others' predictor variables, and it can also analyse the interaction effects between two individuals. The main effect occurs between the predictor variables and the outcome variables of the same individual, while the partner effect occurs between the predictor variables of one individual and the outcome variables of another individual (Setchell et al. 2017). There have been studies that have successfully utilised APIM in intervention studies for heart failure care, mother-infant emotional communication, couple relationships, anxiety and depression, and have achieved favourable results (Dellafiore et al. 2022; Kinkead et al. 2022; Aguilar-Raab et al. 2022; Boeve et al. 2019).

Current domestic and international research on family resilience in patients with recurrent tumours is limited to single-individual studies, and little attention has been paid to the level and interactive effects of family resilience between patients with recurrent tumours and caregivers. Besides, Part of the literature suggests that the level of resilience of family caregivers and patients is strongly related to sociodemographic factors, factors related to the patient's illness, factors related to the caregiving situation, self-efficacy, coping styles, and social support (Palacio et al. 2018; Ruisoto et al. 2020). Therefore, it is necessary to explore the role of the family resilience level in social support, hope level, feeling burden and quality of life for both at the dichotomous level. Therefore, this study intends to explore the interaction effect of family resilience between patients with recurrent tumours and their caregivers through an investigation to provide a basis for the clinical development of interventions.

2 | Methods

2.1 | Design and Participants

This cross-sectional study was part of a larger mixed methods project. This project quantitatively studies the relationship between patients and caregivers on family resilience and explores their interactions. A total of 204 inpatients and caregivers with recurrent tumours in the Department of Oncology of our hospital from October to November 2023 were selected as the study subjects, and convenience sampling was used to recruit participants who met the following criteria: ① inclusion age ≥ 18 years; ② after anti-tumour therapy, the remission was > 6 months, and the cancer recurrence was clinically confirmed; ③ have normal reading, comprehension, and language skills; ④ know your own condition and have an expected survival time of not less than 3 months; and ⑤ the KPS score ≥ 60 points.

Caregiver inclusion criteria: ① age ≥ 18 years old; ② identified by the patient as the primary unpaid caregiver, providing ongoing care and support to the patient at home and during the hospital stay, and participating in the patient's medical decision-making. The exclusion criteria for this study are patients and their caregivers with mental illness, cognitive impairment, or other serious medical conditions. This study was approved by the Medical Ethics Committee of the hospital. Prior to participating in the survey, all participants were informed of the purpose and content of the study; they volunteered to participate and could withdraw from the study at any time.

According to the method of distinguishing binary data types in the subject-object interdependence model, the subject and object

effects of patients and caregivers were 0.2, $\alpha = 0.05$, 1-$\beta = 0.08$, and the sample size required was 187 pairs. Whereas the structural equation model requires a sample size greater than 200 (Rappaport et al. 2020). Considering 10% of invalid questionnaires that 204 pairs of patients and caregivers with recurrent tumours were included in this study, which met the requirements of sample size.

2.2 | Data Analysis

The General Information Questionnaire includes sociodemographic characteristics related to family resilience and was developed through a literature review and discussion by our research group. Including the general information of the patient (including age, gender, disease location, diagnosis time, treatment method, disease stage, whether it has recurrence, etc.), the general information of the caregiver (including age, gender, education level, whether there are other people to take care of him, understanding of the patient's condition, his own physical health, etc.);

The shortened Chinese version of the family resilience assessment scale (C-FRAS); it was compiled by the American scholar Sixbey in 2005 and was revised by the Chinese scholar Li and others. The C-FRAS scale includes 32 items across three domains: family communication and problem-solving (FCPS), utilising social resources (USR) and maintaining a positive outlook (MPO). The scale adopts the Likert 4-level scoring method, from strongly disagree to strongly agree; 1–4 points are recorded respectively, and the total score of the scale is between 32 and 128, and the higher the score, the better the level of family resilience (Leung et al. 2023; Chung et al. 2020). In our study, the Cronbach's α coefficient of the C-FRAS scale was 0.944, and the Cronbach's α coefficient of the C-FRAS scale for the caregivers was 0.947, both of which had good reliability and validity.

Perceived Social Support Scale (PSSS) is a survey of perceived social support for patients with tumour recurrence and family caregivers. The scale contains 12 items, which mainly evaluate the social support perceived and obtained by the study subjects from three dimensions: family support, friend support and other support. The scale adopts the Likert 7-level scoring method, and the score of each item is calculated from 1 to 7 points as 'strongly disagree' to 'strongly agree' and the total score range is 12–84, and the higher the score, the more social support is perceived. The Cronbach's α coefficient of the PSSS scale was 0.918 for the patients in our study, while Cronbach's α coefficient of the PSSS scale for the caregivers was 0.876, and the application had better reliability and validity.

The European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire-core 30 version 3.0 (EORTC QLQ-C30(V3)) was published in 1993 by the European Agency for Research and Treatment of Cancer and has been used by a large number of research groups in a wide range of clinical trials as well as in a variety of other non-experimental studies (Aaronson et al. 1993). This study uses the EORTC QLQ-C30 version 3.0 version which is the current standard version, has been tested in the EORTC field study, and can be applied to all new research on the quality of life of cancer patients. The

dimensions of this version of the scale include 5 functional dimensions: somatic (1–5), role (6, 7), emotional (21–24), cognitive (20, 25), social (26, 27) and 3 symptom dimensions: fatigue (10, 12, 18), malignancy and vomiting (14, 15), pain (9, 19); 6 symptom items: dyspnoea (8), insomnia (11), loss of appetite (13), diarrhoea (17), financial difficulties (28); 1 overall quality of life dimension (29, 30) (Kaasa et al. 1995). The 1–28 items of the scale use a 1–4-point scale, which are none, somewhat, quite, and very, and the 29,30 items of the scale use a 1–7-point scale, representing the quality of life from very poor to very good. The scores of each dimension of the scale ranged from 0 to 100; the high score of the functional dimension represented a high level of functioning, the high score of general health represented a high quality of life, but the high score of the symptom dimension/single item represented a high level of symptoms/problems. The scale shows better internal consistency (Cronbach's α coefficient = 0.870).

Zarit Caregiver Burden Interview (ZBI) was compiled by Zarit et al. in the 80s of the 20th century and is widely used to measure the burden of primary caregivers (Zarit et al. 1986; Alves et al. 2022; Pinyopornpanish et al. 2020). This study used the Chinese Version of the Zarit Caregiver Burden Interview (CIZB). This scale is used to measure the degree of burden for the primary caregiver. CZBI includes two dimensions: personal burden is composed of items 1, 4, 5, 8, 9, 14 and 16–21, and responsibility burden is composed of items 2, 3, 6, 11, 12, and 13. The scale adopts a 5-level score, from 'none' to 'often'; 0–4 points are recorded, and the sum of the scores of each item is the total score of the scale, and the higher the score, the heavier the burden. According to the score, the burden is divided into four levels: (Sung et al. 2021) < 20 points indicate no burden, (Faccio et al. 2018) 20–39 points indicate mild burden, (Xia et al. 2022) 40–59 points indicate moderate burden and (Poodt et al. 2018) 60–88 points indicate severe burden. The scale has a Cronbach's α coefficient of 0.87.

Self-Perceived Burden Scale (SPBS) was initially proposed by Cousineau et al. in 2003 in a study of haemodialysis patients, and it was mainly used to understand the patients' internal sense of self-burden, which consisted of a total of 10 items with a Cronbach's alpha coefficient of 0.85 (Cousineau et al. 2003). Totally, SPBS was categorised into 3 dimensions: physical factor dimension, emotional factor dimension, and economic factor dimension (Simmons 2007). The scale is based on a 5-point Likert scale, with 1 point for 'never', 2 points for 'sometimes', 3 points for 'sometimes', 5 points for 'always', and a total score of 50 points. The total score is 50 points, and the total SPB score is obtained by summing up the entries; the higher the score, the higher the self-perceived burden. The higher the score, the higher the self-perceived burden. The critical value of the score was 20 points, in which patients with less than 20 points had no obvious self-perceived burden, 20–30 points were considered mild self-perceived burden, 30–40 points were considered moderate self-perceived burden and more than 40 points were considered severe self-perceived burden (Liu et al. 2023).

Herth Hope Index (HHI) was compiled by Herth (Herth 1992) and is mainly applied to the expression of individuals' attitudes and beliefs about life. It includes a total of 12 questions, 3 aspects (attitude towards life, taking positive actions 17 actions,

maintaining intimate relationships with others), and the scoring method is 4 levels for each question item, 1 = strongly disagree~4 = strongly agree, and the score range is 12~48 points, the higher the score, the higher the score, the individual has a positive attitude and firm confidence in life, of which items 3 and 6 are reverse items. The Cronbach's α coefficient of the scale is 0.870, which has good reliability.

Quality of Life in Life-threatening Illness-Family Carer Questionaire (QOLLTI-F) was developed by Cohen based on qualitative research results to assess the quality of life of primary family caregivers at home or in hospital (Cohen et al. 2006). After obtaining Cohen's consent, the researcher passed the scale through translation-back translation-testing and other procedures to form the Chinese version of the QOLLTI-F scale. The scale contains 16 items, involving 7 dimensions, including caregiver status, patient condition, quality of care, caregiver values, environment, economy, and relationship. The Chinese version of the scale is scored on a scale of 0–4, and the higher the score, the better the quality of life. The results of the study showed that the test–retest reliability of the QOLLTI-F total score was 0.77–0.80, and the reliability of the seven domain scores ranged from 0.50 to 0.79, which was a good reliability (Cohen et al. 2006).

2.3 | Survey Methods

Data collection was carried out by graduate students in nursing who had undergone standardised training. Before the investigation, the research purpose, research significance, and confidentiality principle of the research process were explained to the patients and caregivers of recurrent tumours, the questionnaire was distributed after obtaining informed consent, and they were guided to fill in the standardised form according to the facts in accordance with the requirements of the research. To prevent the mixing of data caused by mutual interference between patients and caregivers, a one-to-one survey method is adopted, and a uniform, objective, and accurate interpretation of the questionnaire was given if there were questions and in comprehensions. After the questionnaire was completed, the researcher would check whether the questionnaire was complete, and if there were any errors or omissions, modifications would be made and verified with the research subjects on the spot.

2.4 | Statistical Analyses

IBM SPSS software version 26.0 was used to analyse the data. Descriptive statistical analysis, independent t-test, one-way analysis of variance, and Kruskal-Wallis H test were used to describe and compare the family resilience of patients and caregivers with recurrent cancer according to general demographic characteristics. If the results of the data analysis show that certain sociodemographic characteristic variables are significantly different in the distribution of our study sample ($p < 0.05$), these variables will be included as covariates in subsequent multiple linear regression analysis to mitigate the confounding effect on the study results. Before dyadic analyses were conducted, Pearson correlations were computed for all variables of patients

and caregivers to determine the nonindependence of the dyad. Pearson correlation analysis was used to evaluate the relationship between family resilience, social support, psychological hope, self-perceived burden and quality of life. In this study, we selected patient and caregiver social support including family support, friend support and other support (detected by the PSSS), and patient and caregiver hope levels including attitudes and beliefs about life (detected by the HHI scale) as predictor variables. Family resilience is the outcome variable. APIM and actor-partner interdependence model extended to mediation (APIMeM) was established by using AMOS 23.0 and paired mode test.

3 | Results

3.1 | Preliminary Analysis

3.1.1 | Demographic Characteristics

In this study, 209 questionnaires were distributed and 204 were validly returned, with a valid return rate of 97.6%. The general information of the patients was as follows: 121 males, 83 females, marital status: 182 were married, 22 were unmarried, divorced and widowed; education level: 142 cases were junior high school or below, 62 cases igh school/technical secondary school or above; monthly income: 177 cases of < 5000 yuan, 27 cases of ≥ 5000 yuan; tumour types: 59 cases of lung cancer, 28 cases of intestinal cancer, 32 cases of breast cancer, 85 cases of other tumours; number of metastases and recurrence: 187 cases of < 3 times, 17 cases of ≥ 3 times; course of disease: 110 cases in < 3 years, 94 cases in ≥ 3 years. In this study, there were 85 males and 119 females; 46 were children, 142 were spouses, 4 were parents, 12 were others; 120 were educated: junior high school or below, 84 were high school/technical secondary school or above; 115 were ≤ 3000 yuan, 89 were > 3000 yuan; 108 were unemployed, 47 were retired, 49 were employed, 72 were taken care of by others and 132 were no. Further characteristics of the participants can be found in Table 1. The results of this study showed that the difference in the factor of the degree of family harmony was statistically significant in the process of comparing the general information of the patients included in the study ($p = 0.031$), which indicates that the harmonious atmosphere of the family can effectively improve the ability of family members to face the difficulties among themselves and can help each other to overcome the difficulties together. Therefore, in clinical work, improving the degree of family harmony can better enhance the level of family resilience, such as providing family members with face-to-face heart-to-heart conversations and providing help for some of the difficulties faced by the family. Meanwhile, in the process of comparing the general information of the study participants, the results showed that there was a statistically significant difference in the family resilience of the caregivers due to the factor of religiosity ($p = 0.009$). This suggests that some of the caregivers may have gained a certain level of spiritual sustenance due to patients' religious beliefs, thus enhancing family resilience to a certain extent. Thus, the level of family resilience was increased to some extent. Therefore, patients' and caregivers' religious beliefs should be honoured in the clinical setting. At the same time, for caregivers and

TABLE 1 | Differences in family resilience by general characteristic.

Characteristics	Patient's family resilience score ($\bar{x} \pm s$)	t/F	p	Caregiver family resilience score ($\bar{x} \pm s$)	t/F	p
Gender						0.462
Male	3.04±0.28	1.918	0.057	3.06±0.29	0.737	
Female	2.97±0.29			3.03±0.3		
Age						0.21
20–40	2.92±0.43	0.432	0.65	2.91±0.35	1.573	
41–60	3.01±0.26			3.03±0.27		
61–80	3.02±0.30			3.08±0.30		
Religious beliefs						0.009
Yes	2.86±0.58	−0.64	0.550	2.74±0.37	−2.629	
No	3.02±0.27			3.06±0.29		
Marital status						0.052
Spinsterhood	2.95±0.75	1.346	0.261	2.60±0.12	2.627	
Married	3.02±0.28			3.06±0.29		
Divorce	3.04±0.14			2.97±0.21		
Bereft of one's spouse	2.87±0.22			3.09±0.27		
Education						
Primary and below	2.97±0.25	1.3113	0.27	3.02±0.27	0.309	0.819
Junior high school	3.00±0.29			3.05±0.31		
High school/Technical secondary school	3.07±0.26			3.06±0.27		
College degree or above	3.07±0.38			3.09±0.33		
Monthly income per capita						0.088
≤3000	2.99±0.24	2.241	0.067	3.01±0.25	2.208	
3001–5000	3.01±0.35			3.12±0.36		
5001–8000	3.12±0.26			3.12±0.31		
≥8000	3.20±0.39			3.11±0.33		
Family harmony						0.156
Good	3.04±0.27	3.518	0.031	3.07±0.30	1.875	
Middle	2.90±0.30			2.96±0.27		
Bad	2.90±0.50			3.07±0.26		
Modalities of treatment						0.815
Surgery	3.11±0.21	0.381	0.862	3.15±0.28	0.447	
Radiotherapy	3.07±0.37			3.05±0.33		
Chemotherapy	3.05±0.35			3.07±0.34		
Targeted therapy	3.04±0.31			2.98±0.33		
Mixed treatments	3.00±0.28			3.04±0.28		
Others	3.05±0.05			3.22±0.49		

(Continues)

TABLE 1 | (Continued)

Characteristics	Patient's family resilience score ($\bar{x} \pm s$)	t/F	p	Caregiver family resilience score ($\bar{x} \pm s$)	t/F	p
Comorbid medical conditions						0.168
No	3.02 ± 0.29	1.722	0.131	3.05 ± 0.30	1.576	
Hypertension	3.02 ± 0.29			3.01 ± 0.26		
Diabetes	3.03 ± 0.27			3.03 ± 0.27		
Heart disease	2.93 ± 0.03			3.11 ± 0.32		
Others	3.69			3.81		
Comorbid multiple medical conditions	2.89 ± 0.14			3.04 ± 0.14		
Type of tumour						0.235
Lung cancer	2.96 ± 0.24	1.868	0.136	3.03 ± 0.29	1.432	
Bowel cancer	3.02 ± 0.26			3.07 ± 0.28		
Breast cancer	2.96 ± 0.38			2.97 ± 0.34		
Others	3.06 ± 0.28			3.09 ± 0.28		
Number of metastatic recurrences						0.911
1 time	3.01 ± 0.26	0.625	0.536	3.05 ± 0.28	0.093	
2 time	2.98 ± 0.40			3.03 ± 0.35		
≥ 3 time	3.07 ± 0.27			3.04 ± 0.33		
Course						0.41
< 1 year	2.96 ± 0.30	0.447	0.72	3.02 ± 0.26	0.996	
1–3 year	3.01 ± 0.24			3.07 ± 0.30		
3–5 year	3.02 ± 0.29			3.00 ± 0.26		
> 5 year	3.04 ± 0.35			3.08 ± 0.32		
Time to recurrence						0.806
< 1 month	3.06 ± 0.27	0.836	0.476	3.08 ± 0.32	0.327	
1–6 month	2.98 ± 0.26			3.02 ± 0.23		
6–12 month	3.00 ± 0.19			3.05 ± 0.22		
> 12 month	3.04 ± 0.35			3.06 ± 0.36		

patients who do not have religious beliefs, medical professionals should provide appropriate psychological care to help caregivers improve their level of family resilience.

3.1.2 | Family Resilience Levels and Measurement of the Included Studies

In this study, the mean total score of family resilience in patients with tumour recurrence was (3.01 ± 0.29). Among them, the scores were (3.03 ± 0.28) in the dimension of family communication and problem-solving, (2.80 ± 0.44) in the dimension of USR, and (3.05 ± 0.36) points in the dimension of MPO. In addition, the average total score of family resilience of caregivers was (3.05 ± 0.29). The scores were (3.07 ± 0.29) in the dimensions of family communication and problem-solving, (2.84 ± 0.41) in the dimensions of USR, and (3.06 ± 0.35) in the dimensions of MPO. Among the family resilience scores of patients with recurrent tumours, the MPO score was the highest, while the USR score was the lowest. This indicates that patients have high hopes and positive views on treatment and future rehabilitation, while the social support given to patients at this stage is limited, which is the low score. For caregivers, the results of this study showed that the family communication and problem-solving scores were higher in the caregivers' family resilience score ($p = 0.027$), while the social support scores were lower. These results indicate that caregivers can properly communicate with patients and deal with problems encountered during treatment, and can assist patients in active treatment, but there is still a lack of social

TABLE 2 | Comparison of family resilience scores between patients with recurrent tumours and caregivers.

Variables	Patient $(\overline{x} \pm s)$	Caregivers $(\overline{x} \pm s)$	t	p
Family resilience score	3.01 ± 0.29	3.05 ± 0.29	-1.95	0.053
Family communication and problem-solving	3.03 ± 0.28	3.07 ± 0.29	-2.223	0.027
Utilising social resources	2.80 ± 0.44	2.84 ± 0.41	-1.18	0.239
Maintaining a positive outlook	3.05 ± 0.36	3.06 ± 0.35	-0.725	0.469

TABLE 3 | Analysis of differences between PSSS, HHI, SPBS/CIZB, QLQ-C30/QOLLTI-F between patients with recurrent cancer and primary caregivers.

Variables	Patient $(\overline{x} \pm s)$	Caregivers $(\overline{x} \pm s)$	t	p
PSSS	4.97 ± 0.87	4.98 ± 0.79	-0.263	0.793
HHI	2.93 ± 0.30	2.95 ± 0.26	-0.579	0.563
SPBS/CIZB	2.83 ± 0.91	2.17 ± 0.63	9.996	0.000
EORTC QLQ-C30/ QOLLTI—F	2.05 ± 0.47	2.69 ± 0.28	-16.961	0.000

support, which leads to a low family resilience score for caregivers. The results of the difference in family resilience between patients with tumour recurrence and their caregivers are shown in Table 2. In this study, there was no significant difference in the comparison between the total mean score of family resilience and the mean score of each other dimension between patients with recurrent cancer and family caregivers ($p > 0.05$).

3.1.3 | Other Scale Levels and Measurement of the Included Studies

The results of this study showed that there was no statistically significant difference between the PSSS (4.97 ± 0.87) and HHI (2.93 ± 0.30) of patients and the PSSS (4.98 ± 0.79) and HHI (2.95 ± 0.26) of caregivers. Conversely, there was a statistically significant difference between the patients' SPBS (2.83 ± 0.91), EORTC QLQ-C30 (2.05 ± 0.47) and the caregiver's CIZB (2.17 ± 0.63), QOLLIMI –F (2.69 ± 0.28). A detailed analysis of the results of the study is presented in Table 3.

3.2 | Correlation Analyses

The results of the Pearson correlation analysis showed that there was a significant positive correlation between the patient's family resilience and the patient's perceived social support ($r = 0.578$, $p < 0.001$), the patient's hope level ($r = 0.589$, $p < 0.001$), the caregiver's social support ($r = 0.359$, $p < 0.001$) and the caregiving hope level ($r = 0.367$, $p < 0.001$). However, it was negatively correlated with the patient's self-perceived

burden ($r = -0.143$, $p < 0.05$) and caregiver burden ($r = -0.203$, $p < 0.001$), but was not correlated with the quality of life between patients and caregivers. This means that the higher the level of social support and hope of the patient and the caregiver, the higher the patient's family resilience, and the greater the self-perceived burden of the patient, which can reduce the patient's family resilience. Moreover, the family resilience of caregivers ($r = 0.544$, $p < 0.001$) could also significantly and positively affect the level of family resilience of patients. In addition, the family resilience of caregivers was significantly positively correlated with patients' perceived social support ($r = 0.295$, $p < 0.001$) and patients' hope level ($r = 0.278$, $p < 0.001$), but negatively correlated with patients' self-perceived burden ($r = -0.148$, $p < 0.05$), but not with patients' quality of life (Table 4).

3.3 | Model Test

The family resilience level of patients and caregivers was used as outcome variables, and the social support scale and hope level scale of patients and caregivers were used as predictor variables to construct APIM (Steiger 1990; Guyon-Harris et al. 2023). The goodness-of-fit indices were as follows: RMSE = 0.000, NFI = 0.994, TLI = 1.003, CFI = 1.000, IFI = 1.001, CMIN/DF = 0.902, AIC = 50.706 (Table 5). These indices indicated that the model fit was satisfactory. Based on the correlation results, in order to further explore the pathways and magnitude of the roles between HHI, PSSS, SPBS, quality of life, and family resilience, AMOS 23.0 was applied to construct an initial structural model of the relationship between patients with tumour recurrence and caregivers. The results showed that the social support and Herth hope level of patients with recurrent tumours positively predicted the level of family resilience ($p < 0.001$), the level of social support and Herth hope of the primary caregiver positively predicted the level of family resilience of the primary caregiver ($p < 0.001$), and the Herth hope level of the primary caregiver positively predicted the family resilience level of the patients ($p < 0.003$) (Figure 1, and Table S1).

Considering that hope level was significantly correlated with both social support and family resilience, this study further used APIMeM to explore the mediating role of hope level between family resilience and social support. The results are presented in Figure 1 and Tables S1 and S2. The hope level significantly mediated the actor effect between their own perceived family resilience and social support (for patient, $\beta = 0.173$, 95% CI = 0.097, 0.276; for caregiver, $\beta = 0.201$, 95% CI = 0.115, 0.311; $p = 0.001$). In the relationship between patients' perceived family resilience

TABLE 4 | Correlation between PSSS, HHI, SPBS/CIZB, and QLQ-C30/QOLLTI –F family resilience between patients with recurrent cancer and caregivers.

Variables	Patients					Caregivers				
	1	2	3	4	5	1	2	3	4	5
Patients										
Family resilience score	1									
PSSS	0.578**	1								
HHI	0.589**	0.503**	1							
SPBS	−0.143*	0.014	−0.066	1						
QLQ-C30	−0.022	0.066	−0.046	0.488**	1					
Caregivers										
Family resilience score	0.544**	0.295**	0.278**	−0.148*	0.093	1				
PSSS	0.359**	0.457**	0.250**	−0.108	0.124	0.504**	1			
HHI	0.367**	0.308**	0.296**	−0.069	0.105	0.609**	0.495**	1		
CIZB	−0.203**	−0.063	−0.07	0.287**	0.188**	−0.123	0.022	−0.008	1	
QOLLTI—F	0.1	0.143*	0.1	0.032	0.042	0.274**	0.349**	0.327**	0.11	1

*At the 0.05 scale (two-tailed), the correlation is significant.
**At the 0.01 scale (two-tailed), the correlation is significant.

TABLE 5 | APIM model fit test.

Indicate	Suggested criteria	Measured results
NFI	≥ 0.9	0.994
IFI	≥ 0.9	1.001
TLI	≥ 0.9	1.003
CFI	≥ 0.9	1.000
RMSE	< 0.08	0.000

and caregivers' social support, caregivers' hope level played a significant mediating role ($\beta = 0.065$, 95% CI = 0.001, 0.143, $p < 0.05$).

4 | Discussion

4.1 | Levels of Patient and Caregiver Family Resilience

A total of 204 patients and caregivers with tumours were included in this study, of which the findings showed that the average score of 204 patients with recurrent cancer was 3.01 ± 0.29, while the average family resilience of caregivers was 3.05 ± 0.29 (out of a total of 4). This suggests that the family resilience scores among the patients and caregivers included in this study are at an upper moderate level. Among them, the USR dimension scores of patients with recurrent tumours and their caregivers were the lowest, which were (2.80 ± 0.29) and (2.84 ± 0.41), respectively, suggesting that patients with recurrent tumours and their caregivers may have insufficient social resources or cannot make full and reasonable use of social resources. The overall level of family resilience needs to be improved. Analysis of the reasons for the results of this study: (1) Most of the patients included in this study are middle-aged male patients, who play a mainstay role in the family and bear greater family pressure. When faced with long-term treatment and recurrent attacks of tumour diseases, they bear greater psychological and physical pressure, which can lead to a decrease in the family's ability to resist pressure. (2) 60.8% of the patients included in this study had a monthly family income of < 3000 yuan, and among the family caregivers, unemployed caregivers accounted for 52.9%, and the lack of income greatly increased the cost of tumour recurrence treatment The financial burden of the patients' families was greatly increased, coupled with the decline in the quality of life, resulting in a decrease in the resilience of the patients and their caregivers' families. (3) The results of this study showed that most of the caregivers were taking care of patients alone, and they could not obtain financial resources; coupled with the mental and physical pressure of caring for patients, the family resilience of the caregivers in the study was at a low level. Therefore, in clinical work, we should pay attention to the mental health of patients with recurrent tumours and their caregivers, and provide more social support such as psychological and medical insurance for patients with recurrent tumours, fully educate patients and caregivers, provide social support channels, and further improve the family resilience of patients
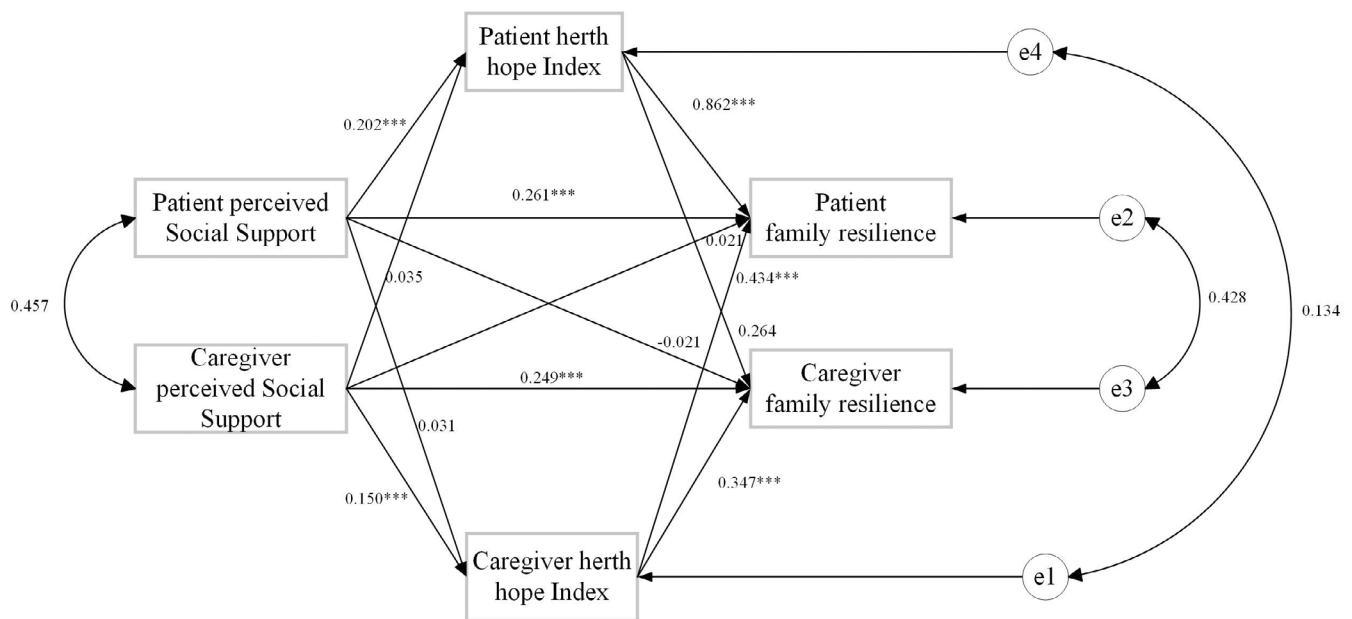
FIGURE 1 | An actor-partner interdependence model of the impact of family resilience in cancer patients and caregivers. The values on the arrows are the normalised coefficients for the model. Standardised actor and partner associations between perceived family resilience and social support through hope levels. **$p < 0.01$, ***$p < 0.001$.

and caregivers, so as to improve the quality of family life of patients and caregivers.

4.2 | Influences Related to Family Resilience

The results of this study showed that: (1) There is a trend of positive correlation between the level of family resilience and the level of social support perceived by patients and caregivers. The results suggest that strong social support is a protective factor for patients' family resilience and plays a key role in the health of patients and families and their resilience levels. This is consistent with the findings of other scholars (Lin et al. 2024). Family systems theory holds that the family is a systematic whole, and social support from family, friends, neighbours and other social groups is an important factor affecting family life satisfaction (Enkvist et al. 2012). A high level of social support for cancer patients means they can get more help from family, friends and others, which in turn increases family well-being and life satisfaction. Higher social support also improves cognition, ability to perform daily activities, and social participation (Northcott et al. 2016). At the same time, medical staff should clarify the advantages and risk factors of the families of patients with recurrent tumours, and help patients establish effective coping strategies and strengthen their family coping ability. (2) There was a significant trend of positive correlation between the level of family resilience and the level of Herth's hope. The higher the level of hope of patients and caregivers, the higher the level of family resilience. Herth Hope is a positive emotion, and as a positive internal support force, it can objectively evaluate the patient's positive and active coping state, and help cancer patients build up confidence in cooperating with the treatment to overcome the disease (Feldman and Corn 2023). Patients facing second recurrence of cancer, long-term medication, review, and side effects of treatment make them physically and

psychologically tortured. Patients are physically and psychologically tortured and are prone to give in and lower their expectations; at the same time, caregivers not only need to meet patients' basic care needs but also need to provide emotional and financial support, which tends to make caregivers physically and psychologically burdened due to the huge task of caregiving, and thus lowers their level of hope (O'Rourke et al. 2021; Leske et al. 2018). Therefore, in addition to paying attention to the physical and mental health of patients and family caregivers, medical staff should also popularise treatment-related knowledge and nursing points through active health education so as to improve the confidence and hope of patients and caregivers in disease treatment, thereby improving their psychological resilience and family resilience. (3) There was a significant trend of negative correlation between the level of family resilience of patients and caregivers and the level of patients' self-perceived burden and caregivers' burden. This suggests that the greatly less the self-perceived burden between patients and caregivers, the higher the level of family resilience. In the face of family frustration, patients and caregivers feel that they are burdening with greater burdens and actively seek solutions to cope with family adversity. (4) The absence of changes in family resilience induced by quality of life as the dependent variable may be explained by several reasons. Sample bias: Although we conducted a post hoc power analysis (Table S3), based on the sample size, we used a power value greater than 0.8, which has reliability; it still has sample bias. The sampling method of convenience sampling and single-center study designresulted in an under-representative sample for inclusion and was susceptible to extremes or chance, making it probably reflect the incomplete correlation between family resilience and quality of life. The context of the research investigation also affects the analysis of the results to a certain extent: in the context of social policies, a sound welfare policy can reduce the burden of families and enhance the quality of life, and vice versa; it will

weaken the correlation between family resilience and quality of life. The reason for this discrepant result could be the limitations of the small sample size included in this study. Therefore, in future studies, the sample size should be expanded and a multicenter study should be conducted to verify the correlation between the family resilience of patients with recurrent cancer and their caregivers' quality of life. Meanwhile, it is interesting to note that in past studies, the lack of family resilience was instead highly likely to lead to poor quality of life (Xing et al. 2025; Salman Aminwala et al. 2024; Zulkifli et al. 2024). We hope to continue to explore in depth the potential link between family resilience and quality of life in patients with recurrent cancer in future studies.

The results of this study showed that there was an interaction between the family resilience of patients with recurrent cancer and their caregivers, the level of social support, and the level of Herth's hope, the main that the level of social support and Herth hope of patients with recurrent cancer and their caregivers had a trend of positive effect on their family resilience, and the higher the level of social support and hope received by the individual, the higher the level of family resilience of the patients (or caregivers). The objective effect is that the level of hope of the caregiver plays a significant mediating role which can positively affect the patient's family resilience. The study believes that caregivers' confidence and hope in disease treatment can better help patients by learning related disease and care knowledge, and can also drive patients' confidence and hope in long-term treatment, thereby improving the patient's family resilience. Therefore, in clinical work, it is necessary to observe the relationship between family resilience and social support and the level of hope among patients and caregivers, so as to further improve the level of family resilience among patients with recurrent cancer and their caregivers.

5 | Limitations

First, this study was a cross-sectional study, limiting our ability to determine causal relationships between variables. In addition, the study design limited our ability to investigate changes in family resilience over time. To overcome this limitation, longitudinal studies should be considered in future research. Second, our study was conducted in a region of China, and there are limitations about geographical features in the representativeness of the sample. Therefore, in future studies, we will expand the sample size and conduct data collection in different regions and hospitals to make the study more representative and informative. Third, the data collection for this study utilised the convenience sampling method. Although confounding variables were included in the data analysis to mitigate the effect of convenience sampling on the results of the study, this effect could not be completely eliminated. Future research could use a more rigorous random sampling method to improve the reliability of the results. Finally, this study only investigated the current status of family resilience among patients and caregivers with recurrent tumours. However, family resilience also changes dynamically during disease progression; therefore, in future studies, we will focus on observing changes in the family resilience of patients and caregivers during the disease progression of recurrent tumours.

6 | Conclusion

In summary, APIM was used to explore the subject-object effects of family resilience and perceived social support, Herth's hope level, burden level and quality of life level of patients with recurrent cancer and their caregivers from the binary level. This study makes up for the shortcomings of the traditional method of using the individual as the unit of analysis, which may ignore the non-independence of paired data. According to the theory of dualistic disease management, dualistic individuals with mutual influence should work together to maintain the status quo of the disease and manage the disease according to the needs of patients and caregivers. Therefore, clinical medical staff should intervene from the perspective of the family resilience level of patients with recurrent tumours and their caregivers, and actively explore innovative health education programmes for multidisciplinary medical and nursing collaboration, so as to promote patients and caregivers to participate in the maintenance and management of the disease together and actively improve family resilience.

Author Contributions

Yaoyao Pei and Tingting Hu wrote the manuscript, Wei Xiao and Feng Wu supervised the study. Yaoyao Pei and Zhangying Xu collect the questionnaires. All authors proofread the final version of the paper.

Ethics Statement

The research of human and the experimental protocols (REDACTED) used in this study were approved. The clinial trial was approved by the Medical Ethics Committee of Xiangyang Central Hospital (No. 2022–056-05).

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data is not publicly available due to privacy or ethical restrictions.

References

Aaronson, N. K., S. Ahmedzai, B. Bergman, et al. 1993. "The European Organization for Research and Treatment of Cancer QLQ-C30: A Quality-Of-Life Instrument for Use in International Clinical Trials in Oncology." *Journal of the National Cancer Institute* 85: 365–376. https://doi.org/10.1093/jnci/85.5.365.

Aguilar-Raab, C., F. Winter, M. N. Jarczok, B. Ditzen, and M. Warth. 2022. "Feeling Low and Unhappy Together? An Actor-Partner-Interdependence Model Uncovering the Linkage Between Different Operationalizations of Relationship Quality and Depression in Different-Sex Couples." *PLoS One* 17: e0274756. https://doi.org/10.1371/journal.pone.0274756.

Alves, S., R. O'Caoimh, O. Ribeiro, L. Teixeira, D. W. Molloy, and C. Paúl. 2022. "Screening for Caregiver Burden in the Community:

Validation of the European Portuguese Screening Version of the Zarit Burden Interview (ZBI-4)." *Clinical Gerontologist* 45: 525–537. https://doi.org/10.1080/07317115.2020.1728807.

Aouad, P., Y. Zhang, F. de Martino, et al. 2022. "Epithelial-Mesenchymal Plasticity Determines Estrogen Receptor Positive Breast Cancer Dormancy and Epithelial Reconversion Drives Recurrence." *Nature Communications* 13: 4975. https://doi.org/10.1038/s41467-022-32523-6.

Boeve, J. L., M. Beeghly, A. M. Stacks, J. H. Manning, and M. E. Thomason. 2019. "Using the Actor-Partner Interdependence Model to Assess Maternal and Infant Contributions to Mother-Infant Affective Exchanges During the Still-Face Paradigm." *Infant Behavior & Development* 57: 101351. https://doi.org/10.1016/j.infbeh.2019.101351.

Chung, J. O. K., K. K. W. Lam, K. Y. Ho, et al. 2020. "Psychometric Evaluation of the Traditional Chinese Version of the Resilience Scale-14 and Assessment of Resilience in Hong Kong Adolescents." *Health and Quality of Life Outcomes* 18: 33. https://doi.org/10.1186/s12955-020-01285-4.

Cohen, R., A. M. Leis, D. Kuhl, C. Charbonneau, P. Ritvo, and F. D. Ashbury. 2006. "QOLLTI-F: Measuring Family Carer Quality of Life." *Palliative Medicine* 20: 755–767. https://doi.org/10.1177/0269216306072764.

Cousineau, N., I. McDowell, S. Hotz, and P. Hébert. 2003. "Measuring Chronic Patients' Feelings of Being a Burden to Their Caregivers: Development and Preliminary Validation of a Scale." *Medical Care* 41: 110–118. https://doi.org/10.1097/00005650-200301000-00013.

Dellafiore, F., M. L. Chung, R. Alvaro, V. Zeffiro, V. Ercole, and G. Pucciarelli. 2022. "Influence of Mutuality on Quality of Life in Heart Failure Patient With Inadequate Self-Care and Caregiver Dyads: An Actor-Partner Interdependence Model Analysis." *European Journal of Cardiovascular Nursing* 21: 366–373. https://doi.org/10.1093/eurjcn/zvab089.

Dionne-Odom, J. N., A. Azuero, R. A. Taylor, et al. 2021. "Resilience, Preparedness, and Distress Among Family Caregivers of Patients With Advanced Cancer." *Supportive Care in Cancer* 29: 6913–6920. https://doi.org/10.1007/s00520-021-06265-y.

Enkvist, A., H. Ekström, and S. Elmståhl. 2012. "What Factors Affect Life Satisfaction (LS) Among the Oldest-Old?" *Archives of Gerontology and Geriatrics* 54: 140–145. https://doi.org/10.1016/j.archger.2011.03.013.

Faccio, F., C. Renzi, A. V. Giudice, and G. Pravettoni. 2018. "Family Resilience in the Oncology Setting: Development of an Integrative Framework." *Frontiers in Psychology* 9: 666. https://doi.org/10.3389/fpsyg.2018.00666.

Feldman, D. B., and B. W. Corn. 2023. "Hope and Cancer." *Current Opinion in Psychology* 49: 101506. https://doi.org/10.1016/j.copsyc.2022.101506.

Guyon-Harris, K. L., J. Rosas, L. Dolcini-Catania, et al. 2023. "Validation of Parenting Your Baby and Parenting Your Toddler and Associations With Engagement in Parenting Intervention." *Journal of Child and Family Studies* 32: 1789–1804. https://doi.org/10.1007/s10826-022-02484-x.

Herth, K. 1992. "Abbreviated Instrument to Measure Hope: Development and Psychometric Evaluation." *Journal of Advanced Nursing* 17: 1251–1259. https://doi.org/10.1111/j.1365-2648.1992.tb01843.x.

Kaasa, S., K. Bjordal, N. Aaronson, et al. 1995. "The EORTC Core Quality of Life Questionnaire (QLQ-C30): Validity and Reliability When Analysed With Patients Treated With Palliative Radiotherapy." *European Journal of Cancer* 31, no. 13-14: 2260–2263. https://doi.org/10.1016/0959-8049(95)00296-0.

Kenny, D. A., and T. Ledermann. 2010. "Detecting, Measuring, and Testing Dyadic Patterns in the Actor-Partner Interdependence Model." *Journal of Family Psychology* 24: 359–366. https://doi.org/10.1037/a0019651.

Kinkead, A., C. Salas, and C. P. Ewert. 2022. "Couples' Extrinsic Emotion Regulation and Dyadic Adjustment: An Actor-Partner Interdependence Model Analysis." *Current Psychology* 42, no. 35: 1–15. https://doi.org/10.1007/s12144-022-04188-3.

Lang-Rollin, I., and G. Berberich. 2018. "Psycho-Oncology." *Dialogues in Clinical Neuroscience* 20: 13–22. https://doi.org/10.31887/DCNS.2018.20.1/ilangrollin.

Leske, S., A. B. Smith, S. D. Lambert, and A. Girgis. 2018. "A Protocol for an Updated and Expanded Systematic Mixed Studies Review of Fear of Cancer Recurrence in Families and Caregivers of Adults Diagnosed With Cancer." *Systematic Reviews* 7: 134. https://doi.org/10.1186/s13643-018-0795-5.

Leung, J. T. Y., D. T. L. Shek, and C. M. Tang. 2023. "Development and Validation of the Chinese Family Resilience Scale in Families in Hong Kong." *International Journal of Environmental Research and Public Health* 20: 1929. https://doi.org/10.3390/ijerph20031929.

Li, Y., Y. Qiao, X. Luan, S. Li, and K. Wang. 2019. "Family Resilience and Psychological Well-Being Among Chinese Breast Cancer Survivors and Their Caregivers." *European Journal of Cancer Care* 28: e12984. https://doi.org/10.1111/ecc.12984.

Lin, D., D. Liang, M. Huang, X. Xu, Y. Bai, and D. Meng. 2024. "The Dyadic Effects of Family Resilience and Social Support on Quality of Life Among Older Adults With Chronic Illness and Their Primary Caregivers in Multigenerational Families in China: A Cross-Sectional Study." *Heliyon* 10: e27351. https://doi.org/10.1016/j.heliyon.2024.e27351.

Liu, L., Y. Sun, Y. Wang, et al. 2023. "Impact of Alexithymia on Suicidal Ideation Among Patients With Ovarian Cancer: A Moderated Mediation Model of Self-Perceived Burden and General Self-Efficacy." *Supportive Care in Cancer: Official Journal of the Multinational Association of Supportive Care in Cancer* 31: 177. https://doi.org/10.1007/s00520-023-07610-z.

Liu, Y., Y. Li, L. Chen, Y. Li, W. Qi, and L. Yu. 2018. "Relationships Between Family Resilience and Posttraumatic Growth in Breast Cancer Survivors and Caregiver Burden." *Psycho-Oncology* 27: 1284–1290. https://doi.org/10.1002/pon.4668.

Nordlinger, B., H. Sorbye, B. Glimelius, et al. 2013. "Perioperative FOLFOX4 Chemotherapy and Surgery Versus Surgery Alone for Resectable Liver Metastases From Colorectal Cancer (EORTC 40983): Long-Term Results of a Randomised, Controlled, Phase 3 Trial." *Lancet Oncology* 14: 1208–1215. https://doi.org/10.1016/s1470-2045(13)70447-9.

Northcott, S., B. Moss, K. Harrison, and K. Hilari. 2016. "A Systematic Review of the Impact of Stroke on Social Support and Social Networks: Associated Factors and Patterns of Change." *Clinical Rehabilitation* 30: 811–831. https://doi.org/10.1177/0269215515602136.

O'Rourke, L., P. L. Fisher, S. Campbell, A. Wright, and M. G. Cherry. 2021. "Factors Associated With Fear of Cancer Recurrence in Family Caregivers of Cancer Survivors: A Systematic Review." *Frontiers in Psychology* 12: 625654. https://doi.org/10.3389/fpsyg.2021.625654.

Palacio, C., A. Krikorian, and J. T. Limonero. 2018. "The Influence of Psychological Factors on the Burden of Caregivers of Patients With Advanced Cancer: Resiliency and Caregiver Burden." *Palliative & Supportive Care* 16: 269–277. https://doi.org/10.1017/s1478951517000268.

Palacio, G. C., A. Krikorian, M. J. Gómez-Romero, and J. T. Limonero. 2020. "Resilience in Caregivers: A Systematic Review." *American Journal of Hospice & Palliative Care* 37: 648–658. https://doi.org/10.1177/1049909119893977.

Pinyopornpanish, K., M. Pinyopornpanish, N. Wongpakaran, T. Wongpakaran, A. Soontornpun, and P. Kuntawong. 2020. "Investigating Psychometric Properties of the Thai Version of the Zarit Burden Interview Using Rasch Model and Confirmatory Factor Analysis." *BMC Research Notes* 13: 120. https://doi.org/10.1186/s13104-020-04967-w.

Poodt, I. G. M., G. Vugts, R. J. Schipper, and G. A. P. Nieuwenhuijzen. 2018. "Repeat Sentinel Lymph Node Biopsy for Ipsilateral Breast Tumor Recurrence: A Systematic Review of the Results and Impact on Prognosis." *Annals of Surgical Oncology* 25: 1329–1339. https://doi.org/10.1245/s10434-018-6358-0.

Rappaport, L. M., A. B. Amstadter, and M. C. Neale. 2020. "Model Fit Estimation for Multilevel Structural Equation Models." *Structural Equation Modeling: A Multidisciplinary Journal* 27: 318–329. https://doi.org/10.1080/10705511.2019.1620109.

Regan, T. W., S. D. Lambert, B. Kelly, M. Falconier, D. Kissane, and J. V. Levesque. 2015. "Couples Coping With Cancer: Exploration of Theoretical Frameworks From Dyadic Studies." *Psycho-Oncology* 24: 1605–1617. https://doi.org/10.1002/pon.3854.

Ruisoto, P., I. Contador, B. Fernández-Calvo, et al. 2020. "Mediating Effect of Social Support on the Relationship Between Resilience and Burden in Caregivers of People With Dementia." *Archives of Gerontology and Geriatrics* 86: 103952. https://doi.org/10.1016/j.archger.2019.103952.

Salman Aminwala, M., S. Jaffar Abbas Zaidi, M. Ashraf Ganatra, M. Taqi, D. Hamid, and Z. Aminwala. 2024. "Evaluating Quality of Life Changes in Patients With Cleft Lip or Palate: A Mixed Method Pre- and Postsurgical Analysis in Karachi." *BMC Oral Health* 24: 1509. https://doi.org/10.1186/s12903-024-05293-4.

Saltzman, W. R., R. S. Pynoos, P. Lester, C. M. Layne, and W. R. Beardslee. 2013. "Enhancing Family Resilience Through Family Narrative Co-Construction." *Clinical Child and Family Psychology Review* 16: 294–310. https://doi.org/10.1007/s10567-013-0142-2.

Sebastian, N. T., R. E. Merritt, M. Abdel-Rasoul, et al. 2020. "Recurrence After Stereotactic Body Radiation Therapy Versus Lobectomy for Non-Small Cell Lung Cancer." *Annals of Thoracic Surgery* 110: 998–1005. https://doi.org/10.1016/j.athoracsur.2020.03.073.

Setchell, S., P. T. Fritz, and J. Glasgow. 2017. "Relation Between Social Information Processing and Intimate Partner Violence in Dating Couples." *Aggressive Behavior* 43: 329–341. https://doi.org/10.1002/ab.21692.

Simmons, L. A. 2007. "Self-Perceived Burden in Cancer Patients: Validation of the Self-Perceived Burden Scale." *Cancer Nursing* 30: 405–411. https://doi.org/10.1097/01.NCC.0000290816.37442.af.

Steiger, J. H. 1990. "Structural Model Evaluation and Modification: An Interval Estimation Approach." *Multivariate Behavioral Research* 25: 173–180. https://doi.org/10.1207/s15327906mbr2502_4.

Sung, H., J. Ferlay, R. L. Siegel, et al. 2021. "Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries." *CA: A Cancer Journal for Clinicians* 71: 209–249. https://doi.org/10.3322/caac.21660.

Xia, C., X. Dong, H. Li, et al. 2022. "Cancer Statistics in China and United States, 2022: Profiles, Trends, and Determinants." *Chinese Medical Journal* 135: 584–590. https://doi.org/10.1097/cm9.0000000000002108.

Xing, J., Y. Kang, F. Kuo, X. Sun, J. Xi, and Z. Kang. 2025. "A Serial Mediation Model of Resilience Among Caregivers of Children With Autism." *American Journal of Occupational Therapy* 79: 7901205170. https://doi.org/10.5014/ajot.2025.050789.

Zarit, S. H., P. A. Todd, and J. M. Zarit. 1986. "Subjective Burden of Husbands and Wives as Caregivers: A Longitudinal Study." *Gerontologist* 26: 260–266. https://doi.org/10.1093/geront/26.3.260.

Zulkifli, M. M., R. Abdul Rahman, R. Muhamad, A. Abdul Kadir, N. S. Roslan, and N. Mustafa. 2024. "The Lived Experience of Resilience in Chronic Disease Among Adults in Asian Countries: A Scoping Review of Qualitative Studies." *BMC Psychology* 12: 773. https://doi.org/10.1186/s40359-024-02296-2.

Supporting Information

Additional supporting information can be found online in the Supporting Information section.