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Family Communication Status and Influencing Factors Among advanced cancer patient-caregiver dyads: A Cross-Sectional Study

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Abstract

Objective

This study aimed to investigate family communication status and identify its influencing factors among patients with advanced cancer and their family caregivers in China.

Design:

A cross-sectional study.

Methods

A total of 200 patient–family caregiver dyads were recruited from two tertiary hospitals in Anhui Province. Data were collected using the general information questionnaire, CCAT-PF, APGAR, FoP-Q-SF, FoP-Q-SF/C, SIAQ-CF, and CBS-CP. SPSS 27.0 was used for statistical analyses, including multiple linear regression.

Results

The mean CCAT-P score was 59.18 ± 20.12 for patients, and the mean CCAT-F score was 58.23 ± 18.32 for caregivers, indicating moderate-to-high communication barriers. Multiple linear regression showed that education level, monthly income, family function, fear of progression, social isolation, and caregiver burden were independent influencing factors (all $P < 0.05$).

Conclusion

Family communication among advanced cancer patients and caregivers is suboptimal.Clinicians should prioritize interventions for households demonstrating family dysfunction, psychological dysregulation related to fear of disease progression, elevated social isolation among patients, low education levels, and limited average monthly household income. Tailored clinical interventions are recommended to enhance positive family communication dynamics and thereby improve the quality of life of families of patients with advanced cancer.

1 | Introduction

Advanced cancer is an important global public health burden with increasing incidence and mortality rates worldwide[1]. According to the International Agency for Research on Cancer (IARC), in 2020, approximately 19.3 million new cancer cases and nearly 10 million cancer-related deaths occurred globally[2,3]. Of these global cases, China accounted for approximately 23.7%[4]. Moreover, IARC data indicate that China bears a disproportionately high burden of cancer, with a significant majority of patients diagnosed with advanced cancer stages[5]. Advanced cancer has evolved into a chronic condition requiring long-term management and sustained ambulatory care. Patients with advanced cancer face multifaceted challenges, including physical deterioration, treatment-related toxicities, economic hardship, and psychological distress, which collectively underscore the critical need to enhance their quality of life during the terminal phase[6]. Therefore, constant interaction between patients and caregivers is becoming increasingly important, and the role of caregivers is becoming crucial for optimal cancer care. Strong communication between patients and caregivers is vital for a successful relationship[7]. Effective family communication has emerged as a cornerstone in addressing these challenges as it facilitates emotional support, decision-making, and symptom management among patients and their caregivers[8]. However, empirical evidence indicates that family communication is often suboptimal in advanced cancer care in China, contributing to increased anxiety, depressive symptoms, and relational strain among patients and caregivers [9]. Furthermore, current research in China primarily focuses on the communication dynamics between patients with cancer and their spouses. Although the existing Family Avoidance of Communication About Cancer (FACC) scale

evaluates communication patterns, it predominantly assesses the degree of openness versus avoidance within family discourse. Notably, the FACC scale does not evaluate communication congruence or content specificity between patients with advanced cancer and their family caregivers[10]. In contrast, the Cancer Communication Assessment Tool for Patients and Families (CCAT-PF), which has been internationally validated for its ability to characterize unique dyadic communication patterns between patients with cancer and their caregivers, has not yet been applied within the Chinese context. International studies have consistently validated the psychometric properties of Family Communication Scale (CCAT-PF). Specifically, American scholars such as Siminoff et al.[11] demonstrated its validity and specificity through a psychometric evaluation of 190 patient-caregiver dyads. Similarly, a large-scale study by Korean researchers Dong et al.[12] confirmed high internal consistency and reliability (Cronbach's α > 0.90) in a cohort of 990 patients with cancer. Further supporting these findings, German investigators Natasha et al.[13] replicated the scale's structural validity and internal consistency in 189 patient-caregiver dyads, reinforcing its cross-cultural applicability. Therefore, this study aimed to This study aimed to: (1) validate the psychometric properties of the Chinese CCAT-PF; (2) describe family communication status; and (3) identify key influencing factors. The findings of this study provide valuable insights for developing targeted interventions to improve family communication and quality of life of patients with advanced cancer and their families.

2 | Materials and methods

2.1 | Study design and participants

This cross-sectional study, conducted between September 2024 and June 2025, investigated family communication patterns among patients with advanced cancer and caregiver dyads in China. Participants were recruited using a convenience sampling method from two tertiary-level general hospitals in Anhui Province, targeting individuals who met the following inclusion criteria: (1) patient inclusion criteria: Age ≥ 18 years; diagnosed with stage III or IV cancer (according to American Joint Committee on Cancer staging system)[14]; clinician-estimated life expectancy of 3–6 months (determined using validated prognostic tools); ability to provide written informed consent and sufficient cognitive capacity to independently complete self-report questionnaires.

(2) Caregiver inclusion criteria: Age ≥ 18 years; identified by the patient as the primary unpaid caregiver; provision of ongoing care and support at home and during hospitalizations. Exclusion criteria (for both patients and caregivers): mental illness, cognitive impairment, or other serious medical conditions.

The study protocol was approved by the Institutional Review Board of The First Affiliated Hospital of Wannan Medical University (Yijishan Hospital of Wannan Medical University) [2024] Lun Shen Yan No. 91. All participants provided written informed consent after receiving detailed information regarding the purpose and procedures of the study. Participation was voluntary, with the right to withdraw at any time[15].

Sample size calculation followed statistical guidelines for multiple linear regression analysis, which recommended a minimum of 102–204 participants, 17 predictor variables each for patients with advanced cancer and their family caregivers, and a 20% non-response rate[12]. This yielded a target range of 102–204 patient-caregiver dyads. In total, 210 dyads were initially approached. After excluding 10 dyads due to incomplete questionnaires, 200 dyads with recurrent tumors were enrolled (response rate of 95.24%), meeting the sample size requirement.

2.2 | Measurements

2.2.1 | General information questionnaire

The general information questionnaire, which measures sociodemographic characteristics related to family communication, was developed through literature review and discussions by our research group. This questionnaire included asked about the general information of the patient (e.g., religious beliefs, residence, marital status, education

level, monthly income, healthcare insurance, and course and modalities of treatment) and caregiver (e.g., age, sex, education level, employment status, living with patient, and relationship with patient).

2.2.2 | The Chinese version of the Cancer Communication Assessment Tool for Patients and Families (CCAT-PF)

The CCAT-PF, originally developed by Siminoff et al. [11]in 2008, comprised 30 items and demonstrated excellent internal consistency (Cronbach's α = 0.94). The instrument was subsequently refined into an 18-item version. The Chinese adaptation contains two parallel subscales: CCAT-P (patient version) and CCAT-F (family-caregiver version). Each subscale encompasses four dimensions and 17 items; items 2, 5, 6, 7, 11, 12, 13, 14, 15, 16, and 17 are reverse-scored. The subscales can be administered either separately or simultaneously; in the present study, they were distributed individually. Total scores range from 17–102, with higher scores indicating greater communication barriers between patients and their family caregivers. In this investigation, both the patient and caregiver versions (Cronbach's α coefficients of 0.902 and 0.869, respectively) had good reliability and validity.

2.2.3 | The Adaptation Partnership Growth Affection and Resolve (APGAR)

The family APGAR index was originally developed by Smilkstein et al. [17] in 1978 to assess perceived family functioning among adolescents and adults. A Chinese version was subsequently introduced by Lü et al. [18] in 1999 for use in patients with cerebrovascular disease; in a prior study involving patients with advanced cancer, the scale demonstrated acceptable internal consistency (Cronbach's α = 0.830)[10]. The instrument comprises five domains: adaptation, partnership, growth, affection, and resolve. Total scores range from 0–10, with scores of 0–6 indicating family dysfunction and 7–10 indicating good family functioning. In the present study, the Cronbach's α coefficient was 0.962, which indicated good reliability and validity.

2.2.4 | Fear of progression questionnaire-short form (FoP-Q-SF) and Fear of progression questionnaire for caregiver (FoP-Q-SF/C)

The FoP-Q-SF scale, originally abbreviated from the Fear of Progression Questionnaire-Short Form, was streamlined by Mehnert et al. [19] in 2006 to assess disease-related fear among patients with breast cancer, and had a total Cronbach's α coefficient of 0.87. Subsequently, Qiyun Wu et al.[20] adapted and validated a Chinese version in 2015 to evaluate fear of disease progression in patients with primary liver cancer. This adapted version comprises two dimensions: physical health and social/family impact across 12 items, with total scores ranging from 12–60. A total score ≥ 34 indicates psychological dysfunction stemming from fear of disease progression, and higher scores reflect greater psychological distress related to fear of disease progression. The FoP-Q-SF/C variant modifies select items of the original spouse-focused FoP-Q-SF used to evaluate cancer caregivers' apprehension regarding patient recurrence and disease advancement during caregiving. Both versions have identical item counts and scoring methods. In this study, both the patient and caregiver versions demonstrated robust reliability and validity, with Cronbach's α coefficients of 0.883 and 0.876, respectively.

2.2.5 | Social Isolation Assessment Questionnaire for Patients with Cancer (SIAQ-CF)

The SIAQ-CF was developed by Su et al. [21] in 2023 to quantify perceived social isolation in patients with cancer. The instrument comprises 17 items distributed across four dimensions: self-isolation, loneliness, social estrangement, and feelings of meaninglessness. Total scores range from 17–85, with higher scores indicating greater levels of social isolation. In the present study, the SIAQ-CF demonstrated excellent internal consistency (Cronbach's α = 0.902), with good reliability and validity.

2.2.6 | Caregiver Burden Scale for Patients with Cancer (CBS-CP)

The CBS-CP scale was developed by Li et al. [22] in 2017 to measure caregiver burden among family members of patients with cancer. It consists of five dimensions comprising 29 items, each rated on a 5-point Likert-type scale ranging from "Never" (scored as 0) to "Always" (scored as 4). Total score ranged from 0–116. Based on the total score, caregiver burden is categorized as follows: No Burden (≤ 29 points), Mild Burden (29–58 points), Moderate Burden (58–87 points), and Severe Burden (> 87 points). In this study, this scale demonstrated a Cronbach's α coefficient of 0.858, indicating good reliability and validity.

2.3 | Data collection

This study employed a dual-mode approach for data collection: in-person distribution of paper questionnaires, and online distribution via electronic versions through scannable QR codes. Investigators who had undergone systematic training distributed paper questionnaires to eligible participants and provided personal guidance to ensure accurate and complete responses. The investigators verbally administered the questionnaire to participants with lower education levels or visual impairments. All questionnaires were collected on site and checked for completeness, and any missing items were promptly supplemented. A total of 210 questionnaires were distributed and 200 valid questionnaires were recovered, yielding a valid response rate of 95.24%.

2.4 | Data analysis

Statistical analyses were performed using SPSS software (version 27.0) for data entry and processing. Continuous data were described as obtained, while categorical data were presented as the mean ± standard deviation ($\overline{\text{varvec}x}$ **± s**) of frequencies and percentages. Univariate analyses included the chi-square test for group comparisons, independent sample t-test for normally distributed continuous variables, and Mann–Whitney U test for non-normally distributed variables. Spearman's rank correlation was used to assess the relationships between the variables. Predictors demonstrating statistical significance in the univariate analyses were subsequently incorporated into a multiple linear regression model to identify independent influencing factors. A *P*-value < 0.05 was considered statistically significant.

3| Results

3.1 | Characteristics of the participants

We enrolled 200 patients with advanced cancer and 200 family caregivers. Of the 200 patients, 107 (53.5%) were male and 93 (46.5%) were female; the mean CCAT-P score was 59.18 ± 20.12 for the patients with advanced cancer and 58.23±18.32 for the caregivers. Of 200 caregivers, 76 (38.0%) were male and 124 (62.0%) were female, with a mean CCAT-P score of 57.34 ± 18.56. Univariate analyses showed that within the patient group, age, marital status, educational level, monthly household income, employment status, presence of comorbid medical conditions, Charlson comorbidity index (CCI), and living with a caregiver were significantly associated with the family communication score ($P < 0.05$). In the caregiver group, marital status, education level, monthly household income, employment status, presence of comorbid medical conditions, and living with the patient were significantly associated with the family communication score ($P < 0.05$). The participant characteristics are presented As shown in

Table 1

Table 1

Table 1 Differences in family communication by sociodemographic characteristics (n = 200)

Characteristics	CCAT-P		F/t	*p*	CCAT-F		F/t	*p*
	Total (n = 200)	score ($\bar{x}\pm s$)			Total (n = 200)	score ($\bar{x}\pm s$)		
Age								
< 40	46(23.0%)	58.08±18.90	3.214	0.040	54(27.0%)	53.25±17.44	1.578	0.061
40–60	87(43.5%)	61.45±14.91			83(41.5%)	59.67±18.03		
> 60	67(33.5%)	63.04±17.46			63(31.5%)	62.70±10.80		
Gender								
Male	113(56.5%)	66.35±19.00	1.746	0.078	94(47.0%)	63.35±14.50	1.425	0.166
Female	87(43.5%)	59.38±18.86			106(53.0%)	59.86±13.12		
Religious beliefs								
Yes	15(7.5%)	62.97±19.04	0.631	0.428	8(4.0%)	60.77±12.13	0.721	0.324
No	185(92.5%)	59.24±16.15			192(96.0%)	58.71±19.04		
Residence								
Towns	92(46.0%)	61.24±19.15	2.177	0.142	123(61.5%)	59.24±8.23	1.051	0.331
Rural	108(54.0%)	65.23±12.44			77(38.5%)	60.23±9.35		
Marital status								
Married	137(68.5%)	58.08±18.90	15.200	< 0.001	145(72.5%)	51.34±7.56	20.080	< 0.001
Unmarried	63(31.5%)	62.15±10.20			55(27.5%)	56.45±14.91		
Education level								
Primary and below	61(30.5%)	68.5±12.30	4.425	0.021	56(28.0%)	52.1±10.20	1.311	0.018
Junior high school	83(41.5%)	62.3±11.70			59(29.5%)	55.4±9.80		
High school/Technical Secondary school	36(18.0%)	50.25±17.44			45(22.5%)	40.25±6.32		
College degree or above	20(10%)	57.90±14.80			40(20.0%)	59.7±8.50		
Monthly income(yuan)								
≤ 3000	99(49.5%)	68.2±13.10	7.046	< 0.001	78(39.0%)	63.3±11.40	3.046	0.040
3001–5000	61(30.5%)	63.4±12.00			64(32.0%)	61.42±10.16		
5001–8000	34(17.0%)	60.76±15.16			45(22.5%)	56.72±13.59		

≥ 8000	6(3.0%)	60.9±11.50			13(6.5%)	55.20±12.80		
Healthcare insurance								
Yes	167(83.5%)	62.27±22.07	1.220	0.304	188(94.0%)	61.74±22.97	0.836	0.476
No	33(16.5%)	66.18±19.19			12(6.0%)	61.21±20.06		
Course								
< 1 year	63(31.5%)	55.98±17.86	1.942	0.065	-	-	-	-
1–3 years	89(44.5%)	63.16±18.34			-	-		
> 3 years	48(24.0%)	63.90±11.38			-	-		
Modalities of treatment								
Radiotherapy	41(20.5%)	58.08±18.90	1.643	0.052	-	-	-	-
Chemotherapy	57(28.5%)	61.45±14.91			-	-		
Targeted therapy	52(26.0%)	73.04±7.46			-	-		
Mixed treatments	43(21.5%)	72.15±10.20			-	-		
Others	7(3.5%)	58.08±18.90			-	-		
Employment Status								
Employment	26(13.0%)	41.82±15.37	39.085	< 0.001	59(29.5%)	42.00±14.35	29.085	< 0.001
Unemployment	103(51.5%)	74.95±15.01			72(36.0%)	63.42±10.16		
Retired	71(35.5%)	61.77±18.24			69(34.5%)	50.25±17.44		
Comorbid medical conditions								
Yes	138(69.0%)	76.71 ± 7.93	5.21	0.025	89(44.5%)	75.11 ± 9.21	4.800	0.012
No	62(31.5%)	68.13 ± 11.68			111(55.5%)	69.45 ± 10.34		
CCI								
Mild	23(21.5%)	45.98±17.86	8.708	< 0.001	-	-	-	-
Moderate	124(62.0%)	63.16±18.34			-	-		
Severe	53(26.5%)	73.90±11.38			-	-		
Caregiver's relationship with patient								
Spouse	68(34.0%)	53.93±21.88	1.942	0.065	70(35.0%)	54.13±15.11	1.534	0.101
Son/daughter	53(26.5%)	59.96±20.50			43(21.5%)	57.00±15.56		
Son-/daughter-in-law	9(4.5%)	65.78±13.86			6(3.0%)	61.74±22.97		

Parent	56(28.5%)	56.71±10.93			65(32.5%)	52.27±22.07		
Sibling	7(3.5%)	58.93±21.88			5(2.5%)	62.89±22.28		
Other	7(3.5%)	77.60±6.58			11(5.5%)	68.13±15.11		
Living with patients								
Yes	-	-	-	-	59(29.5%)	65.11 ± 9.21	1.542	0.012
No	-	-			141(70.5%)	69.45±10.348		
Presence of co-caregivers								
Yes	-	-	-	-	107(53.5%)	45.11 ± 6.34	1.223	0.052
No	-	-	-	-	93(46.5%)	55.43 ± 7.78		
Duration of caregiving (Months)								
< 3	-	-	-	-	57（28.5%）	51.82±15.37	1.085	0.051
3–6	-	-			59（29.5%）	41.77±18.24		
6–12	-	-			60（30.0%）	64.95±9.01		
> 12	-	-			24（12.0%）	68.93±8.07		

Note: CCI = Charlson comorbidity index

3.2 | Correlations between APGAR, FoP-Q-SF, FoP-Q-SF/C, SIAQ-CF, and CBS-CP scores among patients with advanced cancer and caregivers

Spearman's correlation analyses revealed that among patients with advanced cancer, family APGAR scores were inversely correlated with family communication scores ($P < 0.05$), whereas both the FoP-Q-SF and SIAQ-CF scores were positively correlated with family communication scores ($P < 0.05$). Among the family caregivers, family APGAR scores were negatively associated with family communication scores ($P < 0.05$), while FoP-Q-SF and CBS-CP scores were positively correlated with family communication scores ($P < 0.05$). Additional participant characteristics are presented in As shown in Table 2Table 3

Table 2

Table 2 Analysis of differences between APGAR, FoP-Q-SF, FoP-Q-SF/C, SIAQ-CF, and CBS-CP scores of patients with advanced cancer and caregivers (n = 200)

Variables	Patients ($\bar{x}\pm s$)	t	*p*	Caregivers ($\bar{x}\pm s$)	t	*p*
CCAT-P	59.18±20.12	-	-	-	-	-
CCAT-F	-	-	-	58.23±18.32	-	-
APGAR	7.97±1.09	6.061	< 0.001	6.24±1.78	5.237	< 0.001
FoP-Q-SF	31.58±6.38	10.408	< 0.001	30.80±9.16	9.167	< 0.001
FoP-Q-SF/C						
SIAQ-CF	49.35±11.83	18.382	< 0.001	-	-	-
CBS-CP	-	-	-	52.13±7.34	13.887	< 0.001

Table 3

Table 3 Correlation between CCAT-P, CCAT-F, APGAR, FoP-Q-SF, FoP-Q-SF/C, SIAQ-CF, and CBS-CP scores of patients with advanced cancer and caregivers (n = 200)

Variables	CCAT-P	APGAR	FoP-Q-SF	SIAQ-CF
CCAT-P	1	-	-	-
APGAR	–0.572**	1	-	-
FoP-Q-SF	0.712**	–0.806**	1	-
SIAQ-CF	0.843**	–0.478**	0.651**	1
Variables	**CCAT-F**	**APGAR**	**FoP-Q-SF/C**	**CBS-CP**
CCAT-F	1	-	-	-
APGAR	–0.551**	1	-	-
FoP-Q-SF/C	0.694**	-0.806**	1	-
CBS-CP	0.895**	-0.480**	0.638**	1

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

3.3 | Risk factors associated with patients with advanced cancer and caregivers

Variables that exhibited statistical significance in the univariate analyses were entered into a multiple linear regression model. The results indicated that educational level, per capita monthly household income, family function, fear of disease progression, and social alienation of patients with advanced cancer were independent determinants of family communication score. Regarding family caregivers, education level, per capita monthly household income, family function, fear of disease progression, and caregiver burden were independently associated with family communication score. Additional participant characteristics are presented inTable 4

Table 4

Table 4 Multivariate analysis of family communication scores between patients with advanced cancer and caregivers (n = 200)						
Patients						
Characteristics	***B***	***SE***	***β***	***t***	***P***	***95%CI***
Constant term	−5.148	1.912	-	−2.693	0.008	-
Education level	−0.720	0.312	−2.308	−2.308	0.016	−1.332, −0.108
Monthly income	0.850	0.282	3.014	3.014	0.003	0.297, 1.403
APGAR	2.713	1.919	1.314	1.314	< 0.001	1.508, 6.474
FoP-Q-SF	1.115	0.813	1.372	1.371	< 0.001	−0.478, 2.708
SIAQ-CF	2.123	1.502	1.413	1.413	< 0.001	−0.821, 5.067
Caregivers						
Characteristic	***B***	***SE***	***β***	***t***	***P***	***95%CI***
Constant term	−6.244	1.985	-	−3.146	0.002	-
Education level	−1.184	0.317	−3.735	3.735	< 0.001	0.563, 1.805
Monthly income	0.889	0.210	4.234	4.234	< 0.001	0.477, 1.301
APGAR	1.951	0.459	4.250	4.250	< 0.001	1.051, 2.851
FoP-Q-SF/C	1.458	0.342	4.263	4.263	< 0.001	0.788, 2.128
CBS-CP	2.432	0.510	4.772	4.772	< 0.001	1.432, 3.432

Notes: R^2 = 0.565; R_{od} = 0.554; F = 48.797; P < 0.001.

4 | Discussion

4.1 | Family communication levels of patients with advanced cancer and caregivers

Our findings indicate that the total CCAT-P scores for patients with advanced cancer and family caregivers were 59.18 ± 20.12 and 58.23 ± 18.32, respectively. These scores are higher than those reported in studies by Michael[13]and Siminoff [23]. This discrepancy may be attributed to the cultural differences between Eastern and Western societies, particularly in terms of communication style, emotional expression, and family dynamics. Compared with the open communication patterns advocated in Western cultures, the more reserved and implicit communication style prevalent in Chinese culture may result in incomplete information exchange, exacerbating patients' feelings of isolation and familial misunderstandings, which could lead to communication barriers within the family[24].

4.2 | Influential factors related to family communication of patients with advanced cancer and caregivers

4.2.1 | Education level

This study identified low education levels as a significant risk factor for impaired family communication among patients with advanced cancer (P < 0.05), consistent with findings from Qiao et al.[8]The underlying mechanisms may involve cultural norms where traditional Chinese families frequently employ "protective silence" and emotional suppression

strategies to mitigate psychological burden on patients. This contrasts with the Western emphasis on open communication paradigms[12]. In Asian cultural contexts, caregivers often maintain surface harmony by avoiding negative topics, which can compromise information completeness and potentially exacerbate patient misunderstandings or loneliness[12]. Less-educated patients exhibit diminished self-efficacy due to limited expressive capabilities, adopting a passive acceptance of familial decisions that establish unidirectional communication patterns. This phenomenon undermines patient autonomy and further deteriorates interfamilial interactions[25]. Concurrently, cognitive limitations and health literacy deficits in these families impair a patients' comprehension of disease information, treatment regimens, and prognostic outcomes. Their restricted vocabulary and expression skills also hinder their recognition of their family's emotional needs, collectively reducing communication efficacy[25]. To address these challenges, healthcare providers should consider implementing visual aids (e.g., illustrated manuals) to simplify the dissemination of medical information. Collaborative community workshops focused on "family health communication" could enhance active engagement among less-literate households. In addition, patient-centered care approaches characterized by patience and meticulous explanations are recommended to ensure comprehension. These interventions aim to strengthen communication competencies in culturally disadvantaged families, ultimately improving their quality of life and treatment adherence of the patient.

4.2.2 | Monthly income

We found that lower per capita monthly household income was a significant risk factor for impaired family communication among patients with cancer ($P < 0.05$), consistent with the findings of Qiao et al.[8]The underlying mechanism may stem from the direct correlation between financial capacity and medical cost burden. Empirical evidence indicates that an increase in economic stress by one unit increases the risk of family conflict by 27%[26]. Financial strain forces families to prioritize treatment costs over emotional needs, leading to the "instrumental communication dominance" phenomenon. Low-income families that have a member with cancer often bear substantial economic burdens, exacerbating caregiver anxiety levels and diminishing empathetic responses. This cascade of effects (e.g., increased anxiety/depression in both patients and relatives) ultimately undermines competence and the willingness to communicate. Furthermore, socioeconomic disadvantages limit access to high-quality medical resources and social support systems, hindering the timely resolution of communication issues[27]. To address these challenges, healthcare providers should establish dual support pathways that integrate health insurance policy education with psychological counseling. By creating accessible channels for economic assistance and psychosocial interventions, professionals can alleviate the "double burden" of financial stress and mental health demands faced by low-income families with a member with advanced-stage cancer. Such targeted interventions aim to enhance communication efficacy within these populations while improving their overall quality of life.

4.2.3 | FoP-Q-SF and FoP-Q-SF/C

We identified FoP-Q-SF and FoP-Q-SF/C as significant risk factors for impaired family communication among patients with cancer and their caregivers ($P < 0.05$), consistent with the findings of Li et al.[28]The underlying mechanism may involve maladaptive responses, where families of patients experiencing heightened fear tend to focus excessively on disease deterioration (e.g., "worsening pain" or "treatment failure"), which predisposes them to catastrophic thoughts and impedes collaborative decision-making processes. Research[29]demonstrated that a five-point increase in fear of disease progression scores correlated to a 1.8-fold increased risk of avoidant communication behaviors. Pathological fear cognitions and emotions in patients with cancer can transmute into familial anxiety, intensifying tension within the household and altering communication patterns. This includes reduced positive interaction frequency and increased negative expression, thereby exacerbating communicative barriers. Healthcare providers are advised to implement targeted interventions to address these challenges. First, clinicians should proactively assess patients' fear levels and enhance patient-clinician dialogues to mitigate distress. Second, cognitive behavioral therapy (CBT) should be employed to restructure maladaptive disease perceptions, and family emotion-focused therapy (EFT) could be used to interrupt

negative emotional transmission. These dual approaches aim to empower families with accurate disease understanding, reduce fear-anxiety cycles, and facilitate shared decision-making.

4.2.4 | APGAR

We identified family dysfunction as a significant risk factor for impaired communication among advanced patients with cancer ($P < 0.05$), consistent with the findings of Fan et al.[30]The underlying mechanism may involve maladaptive coping strategies in functionally impaired families, where "blame" or "silence" often replaces problem-solving approaches, thereby compromising communication quality. Research evidence indicates that patients with low family functioning exhibit only 31% of conflict resolution efficiency compared to a high-functioning family[31]. Family dysfunction erodes mutual support and cohesion, preventing collaborative disease management. This leaves patients feeling isolated, and caregivers experiencing exhaustion. Furthermore, interpersonal tension and frequent conflicts within dysfunctional families exacerbate emotional distress and psychological stress, further diminishing the willingness to communicate [30]. Healthcare providers should implement family-focused interventions to address these challenges. Specifically, professional family therapy, which includes encouraging patient participation in cancer support groups, should be provided for affected households. Additionally, structured intervention programs can assist family members in identifying and modifying maladaptive communication patterns and establishing effective mechanisms to foster mutual understanding and support. These efforts aim to restore family functionality and enhance communication quality between patients with cancer and their relatives.

4.2.5 | SIAQ-CF

We identified social alienation among patients with cancer as a significant risk factor for impaired family communication when a family member has advanced cancer ($P < 0.05$), consistent with the findings of Zou et al.[32]The underlying mechanism likely involves multidimensional psychological and physical distress, including pain, fatigue, and existential struggles, which drive emotional withdrawal from family members, thereby obstructing effective communication. Research evidence indicates that 61% of healthy individuals avoid interacting with patients with cancer and their families during group activities because of the fear of contagion[32]. Prolonged exposure to despair, hopelessness, and anxiety further exacerbates self-imposed isolation in patients, which, in turn, reduces familial engagement and worsens communicative barriers[33]. Therefore, to address these challenges, clinicians are advised to implement proactive assessments upon admission to identify high-risk socially isolated patient households. Tailored psychological interventions should focus on alleviating negative emotions and fostering social reintegration through early recognition of identity strategies. Complementary training programs targeting both patients and caregivers are essential for establishing a structured communication framework. These multifaceted approaches aim to meet holistic needs (physical, psychological, and sociological) while enhancing the quality of life of patients with advanced cancer and their families.

4.2.6 | CBS-CP

We identified caregiver burden as a significant risk factor for impaired family communication among patients with advanced cancer ($P < 0.05$), consistent with the findings of Carli et al.[34]The underlying mechanisms may involve compound stressors in which deteriorating patient conditions necessitate frequent chemotherapy/radiotherapy regimens, leading to escalating financial pressure. Concurrently, treatment-related physical symptoms, such as nausea, vomiting, anorexia, and hair loss, not only inflict direct suffering on patients but also impose substantial psychological strain on caregivers. The synergistic effect of economic hardship and emotional demands further exacerbates the caregiver burden, thereby increasing the likelihood of communicative barriers within the household[35]. These findings underscore the necessity for healthcare providers to implement systemic support interventions that target caregivers' well-being. Specifically, multidimensional strategies should include psychological counseling, economic assistance programs, practical caregiving skills training, and communication facilitation workshops[36]. By alleviating caregivers' dual burden through structured support, clinical teams can enhance resilience and foster more effective intrafamilial interactions. This

approach aims to restore equilibrium in familial communication dynamics while improving the overall quality of life of both patients and their caregivers.

4.3 | Clinical Implications

Our findings underscore the critical need for integrated clinical strategies to address impaired family communication in advanced cancer care, particularly among patients with a low education level, limited household income, high fear of disease progression, social isolation, and caregiver burden. First, clinicians are urged to adopt standardized tools such as the CCAT-PF to systematically identify families at risk of communication barriers. This proactive approach enables early interventions tailored to specific stressors, such as culturally adapted psychoeducational programs for less-literate households and financial navigation support for economically disadvantaged families. Second, multidisciplinary collaboration is essential for implementing family-centered care models that incorporate CBT for patients experiencing maladaptive fear responses alongside emotion-focused family therapy to mitigate intergenerational communication gaps. Third, systemic support mechanisms must be established to alleviate the caregiver burden, including structured training on symptom management, peer support networks, and policy-driven access to respite care. Fourth, digital health platforms should be explored to bridge geographical disparities, enabling real-time decision-making aids and virtual family conferences that prioritize shared meaning-making in end-of-life contexts. Finally, longitudinal studies are required to evaluate the efficacy of these interventions in reducing emotional distress and enhancing treatment adherence. By integrating these evidence-based practices, healthcare providers can foster resilient family units, optimize symptom control, and improve quality of life outcomes for both patients with advanced cancer and their caregivers.

5 | Conclusion

Our findings indicate that family communication among patients with advanced cancer is characterized by significant dysfunction. The key determinants identified were education level, per capita monthly household income, fear of disease progression, patient social isolation, and caregiver burden. These results suggest that nursing personnel can utilize standardized, disease-specific assessment tools to identify families at ahigh risk of communication barriers. Furthermore, exploring the potential application of digital tools for family communication support is promising for overcoming geographical and resource limitations and enabling the timely delivery of personalized clinical interventions. Tailored strategies, including training in culture-sensitive communication skills, psychosocial support, and financial assistance, are recommended based on individual patient characteristics and needs. Concurrently, establishing an effective end-of-life communication model, led by palliative care specialist nurses in collaboration with clinical psychologists and physicians, is proposed. This model involves regular simulated family conferences focusing on shared decision-making regarding disease information, emotional management, and advanced care planning, thereby enhancing communication quality through comprehensive intervention protocols. Such multifaceted approaches aim to holistically support families of patients with advanced cancer, improve communication dynamics, and elevate overall family communication competence.

6 | Limitations

This study employed a cross-sectional design with samples drawn from two tertiary hospitals in the Anhui Province, China, which imposes certain limitations concerning temporal scope and population representativeness. Future research requires multicenter, large-sample, longitudinal studies to track the dynamic trajectories of the quality of family communication over time. Additionally, as the current analysis relied solely on separate surveys administered to patients with cancer and their primary family caregivers using the CCAT-P tool, intrafamily communication congruence may have been underestimated. Subsequent studies incorporating dual-subject data collection are recommended to refine the analytical framework and elucidate the influencing factors. This enhanced understanding will provide a robust evidence base for developing targeted interventions to improve family communication and, ultimately, enhance the quality of life of families navigating advanced cancer.

Declarations

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by the Institutional Review Board of The First Affiliated Hospital of Wannan Medical University (Yijishan Hospital of Wannan Medical University) (No. [2024] Lun Shen Yan No. 91). All participants provided written informed consent prior to study participation.

Consent to participate

Written informed consent was obtained from all individual participants included in the study. Participation was voluntary, and all participants had the right to withdraw from the study at any time without penalty.

Consent to publish

All participants provided written informed consent for the publication of the study's anonymized results and findings.

Competing interests

The authors declare that they have no relevant financial or non-financial interests to disclose that are related to the content of this article.

Clinical trial number

Clinical trial number: not applicable.

Author Contribution

Ruirui Ma Contributed to this manuscript Corresponding author: R-RM was responsible for the study design, data compilation, and analysis and completed the draft manuscript. X-LF, and X-BT participated in the data collection and coordination of the study. Z-BI and TC were responsible for the quality control and manuscript review. All the authors have read and approved the final version of the manuscript.

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Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

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