

Latent profile analysis of flourishing and associated factors among young and middle-aged patients with hepatocellular carcinoma

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Abstract

Purpose

To identify latent profiles of flourishing among young and middle-aged patients with hepatocellular carcinoma and to explore factors associated with profile membership.

Methods Using convenience sampling, young and middle-aged patients with hepatocellular carcinoma were recruited from a tertiary hospital in China between January and May 2026. Surveys included the sociodemographic and disease-related questionnaire, Social Support Rating Scale, Connor-Davidson Resilience Scale, General Self-Efficacy Scale, and Chinese Revised Flourishing Scale. Latent profile analysis identified distinct flourishing profiles, and multinomial logistic regression was used to examine factors associated with profile membership.

Results Of the 217 patients who completed the survey, three flourishing profiles were identified: the low flourishing group (30.4%), the moderate flourishing group (48.9%), and the high flourishing group (20.7%). Multinomial logistic regression showed that employment status, cancer stage, metastasis status, social support, psychological resilience, and self-efficacy were significantly associated with flourishing profile membership (all $p < 0.05$).

Conclusion Flourishing among young and middle-aged hepatocellular carcinoma patients is heterogeneous. Tailored interventions based on patient characteristics are recommended to improve flourishing.

Implications for cancer survivors Screening for flourishing profiles and providing tailored psychosocial support based on employment status, disease characteristics, social support, psychological resilience, and self-efficacy may help promote positive adaptation among young and middle-aged cancer survivors.

Introduction

Hepatocellular carcinoma is the sixth most common cancer globally and the third leading cause of cancer death, with an estimated 906,000 new cases and 830,000 deaths in 2020 [1]. China faces a particularly severe situation, accounting for 60.5% of the global hepatocellular carcinoma cases [2]. In recent years, the incidence of hepatocellular carcinoma has shown a trend toward younger age, with the proportion of young and middle-aged patients continuing to rise [3]. Unlike older patients, young and middle-aged patients with hepatocellular carcinoma are at a critical stage of career development and bear primary financial and social role responsibilities for their families [4]. The disease and its treatment not only cause physical suffering but also impose multiple stressors, including career disruption, income reduction, and shifts in family roles [5]. In the absence of effective psychological adjustment resources, these stressors may trigger persistent fear of recurrence and death, as well as a sense of loss of control over one's future life, thereby exacerbating negative emotions such as anxiety and depression [6]. Compared with older patients, the psychological adjustment needs of young and middle-aged patients may be more pronounced [7].

Although young and middle-aged patients with hepatocellular carcinoma face multiple psychological stressors, not all of them exhibit maladaptive responses. In recent years, the field of positive psychology has

found that some patients are still able to maintain engagement and a sense of purpose despite adversity—a positive state termed "flourishing" [8]. Flourishing is a state of maintaining positive emotional, psychological, and social functioning in the face of adversity, characterized by engagement, acceptance of vulnerability, and the ability to find meaning in hardship [9]. Amonoo et al. have shown that higher levels of flourishing not only improve patients' negative emotions and enhance their life satisfaction, but also promote engagement in health behaviors and exert positive effects on immune function and survival outcomes [8]. Therefore, identifying factors associated with flourishing and developing targeted interventions are crucial for young and middle-aged patients with hepatocellular carcinoma.

Previous research has investigated the level of flourishing and its related factors in patients with breast cancer, thyroid cancer, and head and neck cancer [10–12]. However, most of these studies have assessed the level of flourishing based solely on total scale scores, which fails to capture individual differences and consequently limits the specificity of intervention strategies. Latent profile analysis (LPA), an exploratory classification approach, can divide individuals into latent profiles based on observed variables and identify differences among subgroups [13]. Therefore, guided by the theoretical framework of flourishing and informed by a literature review, this study identified potential factors associated with flourishing across demographic, physiological (disease-related), psychological (resilience), and sociological (social support) domains [10–12]. LPA was used to explore the latent profiles of flourishing among young and middle-aged patients with hepatocellular carcinoma, and to further analyze the factors influencing these profiles, with the aim of providing evidence for healthcare professionals to develop targeted intervention strategies.

Methods

Study design

From January 2026 to May 2026, a cross-sectional survey was carried out at a tertiary Grade A hospital in Shandong Province, China. The reporting of this study adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist.

Participants

Participants were recruited through convenience sampling. The inclusion criteria were: (1) aged ≥ 18 years and ≤ 59 years; (2) diagnosed with hepatocellular carcinoma [14]; (3) no recent exposure to other major traumatic events; (4) able to communicate normally; and (5) aware of their diagnosis and had provided written informed consent. Exclusion criteria were: (1) unstable or critically ill condition; (2) currently undergoing psychological intervention or treatment; (3) presence of psychiatric disorders; and (4) coexisting other cancers. The sample size was estimated using G*Power 3.1 software [15]. To achieve 80% statistical power ($r = 0.20$, $\alpha = 0.05$), a minimum of 194 participants were required. Considering a 5% non-response rate, the sample size was determined to be at least 204 cases.

Data collection

Before the survey, all investigators were uniformly trained. Standardized instructions were provided to participants to explain the study objectives, significance, and filling requirements before questionnaire distribution. Following written informed consent, one-on-one paper-based surveys were administered. When participants had questions during completion, investigators provided objective clarification. For participants unable to complete the questionnaire independently, responses were recorded verbatim based on their oral answers. After data collection, two researchers independently verified and entered the data, and questionnaires with stereotyped responses or clear logical inconsistencies were removed as invalid.

Measures

Sociodemographic and disease-related questionnaire

Sociodemographic data comprised age, sex, marital status, education, residence, employment status, monthly per capita household income, and medical expense types. Clinical characteristics included the number of hospitalizations, disease duration, cancer stage, comorbid hepatitis B, and metastasis status.

Social Support Rating Scale

Social support was measured with the Social Support Rating Scale, a 10-item instrument comprising three subscales: objective support, subjective support, and social support utilization [16]. The total score ranges from 12 to 66, with higher scores reflecting greater perceived social support. The Cronbach's alpha coefficient for this scale in the present study was 0.872.

The 10-item Connor-Davidson Resilience Scale (CD-RISC-10)

Psychological resilience was measured with the CD-RISC-10, a 10-item self-report scale using a 5-point Likert response format (total scores ranging from 0 to 40) [17]. Higher scores reflect higher levels of psychological resilience. The Cronbach's alpha for this scale in the present study was 0.891.

General Self-Efficacy Scale (GSES)

Self-efficacy was measured with the GSES, a 10-item instrument using a 4-point Likert response format (from 1 = "not at all true" to 4 = "exactly true") [18]. Higher total scores reflect greater general self-efficacy. The Cronbach's alpha for this scale in the present study was 0.890.

Chinese Revised Version of the Flourishing Scale

Flourishing was assessed using the Chinese Revised Version of the Flourishing Scale [19]. This scale consists of 8 items, each rated on a 7-point Likert scale, with total scores ranging from 8 to 56. Higher scores indicate higher levels of flourishing. In this study, the Cronbach's alpha coefficient of the scale was 0.925.

Ethical consideration

This study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committee of Shandong Provincial Hospital Affiliated to Shandong First Medical University (approval number: NO.2026-758).

Data analysis

LPA was conducted using Mplus version 8.3. We estimated models with an increasing number of profiles, beginning with a single-class solution, and determined the best-fitting model by integrating statistical fit indices with clinical plausibility. The goodness-of-fit was evaluated using the Akaike information criterion (AIC), Bayesian information criterion (BIC), sample-size-adjusted BIC (aBIC), the Lo-Mendell-Rubin (LMR) adjusted likelihood ratio test, the bootstrap likelihood ratio test (BLRT), and entropy. Lower AIC, BIC, and aBIC values reflected superior model fit. An entropy value exceeding 0.80 indicated high classification certainty. Significant LMR and BLRT results ($p < 0.05$) suggested that a k -class model provided a significantly better fit than a $k-1$ -class model. Additionally, each identified class was required to comprise a sufficient number of participants, with the smallest class representing at least 5% of the total sample.

SPSS 26.0 software was used for statistical description and analysis. Continuous variables with a normal distribution were presented as mean $\pm$ standard deviation, and comparisons between groups were performed using one-way analysis of variance (ANOVA). For continuous data that were not normally distributed, data were expressed as median (P_{25} , P_{75}), and group comparisons were conducted using the Kruskal-Wallis H test. Categorical variables were presented as frequencies, percentages, or rates. For between-group comparisons, unordered categorical data were analyzed using the chi-square test or Fisher's exact test, while ordinal data were analyzed using the Kruskal-Wallis H test. Multinomial logistic regression analysis was employed to identify factors associated with latent profiles of flourishing. A two-sided P -value < 0.05 was considered statistically significant.

Results

Participant characteristics

A total of 230 questionnaires were distributed, and 217 valid questionnaires were collected, yielding an effective response rate of 94.3%. The study population had a median age of 55 (50, 58) years. Most participants were male (71.0%), married (88.9%), had a middle school education or below (61.3%), lived in rural areas (73.7%), were unemployed (59.0%), had a monthly per capita household income of $< 3,000$ RMB (48.4%), and were covered by resident basic medical insurance (63.6%). Regarding clinical characteristics, most patients had been hospitalized fewer than three times (78.3%), had a disease duration of < 3 months (62.2%), were at cancer stage II (38.2%), had comorbid hepatitis B infection (72.4%), and had no metastasis (81.6%) (Table 1).

Table 1
General characteristics of young and middle-aged patients with hepatocellular carcinoma and univariate analysis of latent profiles of flourishing

Variables	n (%) / Median (P ₂₅ , P ₇₅)				p-value
	Total (n = 217)	C1 (n = 66)	C2 (n = 106)	C3 (n = 45)	
Age (years)	55 (50,58)	54 (49,58)	57 (52,59)	54 (48,58)	0.018
Gender					< 0.001
Male	154 (71.0)	52 (78.8)	90 (84.9)	12 (26.7)	
Female	63 (29.0)	14 (21.2)	16 (15.1)	33 (73.3)	
Marital status					< 0.001
Married	193 (88.9)	63 (95.5)	102 (96.2)	28 (62.2)	
Unmarried, divorced, or widowed	24 (11.1)	3 (4.5)	4 (3.8)	17 (37.8)	
Education					0.537
Middle school and below	133 (61.3)	38 (57.6)	70 (66.0)	25 (55.6)	
High school or technical secondary school	53 (24.4)	16 (24.2)	25 (23.6)	12 (26.7)	
College degree or above	31 (14.3)	12 (18.2)	11 (10.4)	8 (17.7)	
Residence					0.619
Rural	160 (73.7)	47 (71.2)	84 (79.2)	29 (64.4)	
Urban	57 (26.3)	19 (28.8)	22 (20.8)	16 (35.6)	
Employment status					0.002
Employed	56 (25.8)	5 (7.6)	26 (24.5)	25 (55.6)	
Retired	33 (15.2)	9 (13.6)	17 (16.1)	8 (17.8)	
Unemployed	128 (59.0)	52 (78.8)	63 (59.4)	12 (26.6)	
Monthly per capita household income (RMB)					0.929
< 3000	105 (48.4)	29 (43.9)	54 (50.9)	22 (48.9)	
3000–5000	68 (31.3)	23 (34.8)	31 (29.2)	14 (31.1)	
> 5000	44 (20.3)	14 (21.3)	21 (19.8)	9 (20.0)	
C1 = Class 1 (Low flourishing group); C2 = Class 2 (Moderate flourishing group); C3 = Class 3 (High flourishing group).					

Variables	n (%) / Median (P ₂₅ , P ₇₅)				p-value
	Total (n = 217)	C1 (n = 66)	C2 (n = 106)	C3 (n = 45)	
Medical expense types					0.668
Residents' medical	138 (63.6)	40 (60.6)	67 (63.2)	31 (68.9)	
Employee medical	79 (36.4)	26 (39.4)	39 (36.8)	14 (31.1)	
Number of hospitalizations					0.069
< 3	170 (78.3)	47 (71.2)	90 (84.9)	33 (73.3)	
≥ 3	47 (21.7)	19 (28.8)	16 (15.1)	12 (26.7)	
Disease duration (months)					0.284
< 3	135 (62.2)	39 (59.1)	65 (61.3)	31 (68.9)	
3–6	22 (10.1)	7 (10.6)	9 (8.5)	6 (13.3)	
> 6	60 (27.6)	20 (30.3)	32 (30.1)	8 (17.8)	
Cancer stage					0.036
Stage I	69 (31.8)	19 (28.8)	31 (29.2)	19 (42.2)	
Stage II	83 (38.2)	19 (28.8)	50 (47.2)	14 (31.1)	
Stage III	43 (19.8)	18 (27.2)	19 (17.9)	6 (13.3)	
Stage IV	22 (10.2)	10 (15.2)	6 (5.7)	6 (13.3)	
Comorbid hepatitis B					0.062
No	60 (27.6)	16 (24.2)	18 (17.0)	26 (57.8)	
Yes	157 (72.4)	50 (75.8)	88 (83.0)	19 (42.2)	
Metastasis					< 0.001
No	177 (81.6)	50 (75.8)	96 (90.6)	31 (68.9)	
Yes	40 (18.4)	16 (24.2)	10 (9.4)	14 (31.1)	
Social support	46 (43,48)	45 (41,47)	45 (45,46)	47 (44,50)	0.007
Psychological resilience	31 (28,36)	30 (26,36)	30.5 (28,33)	31 (30,39)	< 0.001
Self-efficacy	30 (28,33)	30 (26,33)	30 (28,33)	32 (30,35)	< 0.001
C1 = Class 1 (Low flourishing group); C2 = Class 2 (Moderate flourishing group); C3 = Class 3 (High flourishing group).					

Latent profiles of flourishing

Using the eight items of the Flourishing Scale as manifest indicators, we performed exploratory LPA to examine the flourishing levels of participants, testing models with one to four latent profiles. As the number of profiles increased, AIC, BIC, and aBIC values all decreased. However, the LMR test for the four-class model was not statistically significant ($p > 0.05$). The three-profile model demonstrated significant LMR and BLRT results ($p < 0.001$), an entropy value of 0.930 (> 0.80), and relatively low AIC, BIC, and aBIC values, indicating that the three-profile solution provided the most reliable fit. Although the four-profile model showed slightly lower AIC and aBIC values, the LMR and BLRT tests were not significant and one profile contained only 1.8% of participants, indicating insufficient clinical interpretability. Therefore, the three-profile model was selected (Table 2).

Table 2
Model fit indices for latent profiles of flourishing among young and middle-aged patients with hepatocellular carcinoma (N = 217)

Number of profiles	AIC	BIC	aBIC	Entropy	P-value		Profiles probabilities
					LMR	BLRT	
1	6372.149	6426.228	6375.526	-	-	-	1
2	5453.544	5538.042	5458.820	0.984	< 0.001	< 0.001	0.309/0.691
3	5281.006	5395.923	5288.181	0.930	< 0.001	< 0.001	0.304/0.488/0.207
4	5264.570	5409.905	5273.644	0.947	0.652	0.682	0.284/0.217/0.018/0.480
AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; aBIC = adjusted BIC; LMR = Lo-Mendell-Rubin likelihood ratio test; BLRT = bootstrap likelihood ratio test.							

Class 1 comprised 66 participants (30.4%) with a mean flourishing score of 25.08 ± 2.92 , which was the lowest among all profiles, and was therefore classified as the low flourishing group. Class 3 included 45 participants (20.7%) with the highest mean flourishing score of 50.27 ± 2.03 , and was designated as the high flourishing group. Class 2 consisted of 106 participants (48.9%) with a mean flourishing score of 40.63 ± 2.85 , falling between the other two groups, and was named the moderate flourishing group (Fig. 1).

Univariate analysis of latent profiles of flourishing

According to the univariate analysis, the three latent profiles showed statistically significant differences in age, gender, marital status, employment status, cancer stage, metastasis, social support, psychological resilience, and self-efficacy ($p < 0.05$) (Table 1).

Multinomial analysis of latent profiles of flourishing

Taking the three latent profiles of flourishing as the dependent variable and the indicators that showed statistically significant differences in the univariate analysis as independent variables, we performed

multinomial logistic regression analysis. The results showed that employment status, cancer stage, metastasis, social support, psychological resilience, and self-efficacy were significant factors associated with flourishing profiles (all $p < 0.05$) (Table 3).

Table 3
Multinomial logistic regression analysis of latent profiles of flourishing among young and middle-aged patients with hepatocellular carcinoma (N = 217)

Variables	C2				C3			
	β	OR	95% CI	P-value	β	OR	95% CI	P-value
Age	0.765	2.149	0.485–4.164	0.635	0.802	2.230	0.367–7.582	0.385
Gender								
Female, ref: Male	0.285	1.330	0.424–4.164	0.625	0.896	2.450	0.509–3.776	0.264
Marital status								
Married, ref: Others (e.g., divorced or widowed)	0.912	2.490	0.163–5.335	0.916	1.608	4.991	0.995–13.452	0.843
Employment status								
Unemployed, ref: Employed	-0.738	0.478	0.012–0.996	0.031	-0.641	0.527	0.090–0.857	0.048
Retired, ref: Employed	-0.457	0.633	0.245–0.635	0.021	-0.272	0.762	0.127–0.711	0.032
Cancer stage	-0.403	0.668	0.190–0.832	0.015	-0.509	0.601	0.003–0.812	0.002
Metastasis								
Yes, ref: No	-0.496	0.609	0.434–0.901	0.010	-0.937	0.392	0.102–0.631	< 0.001
Social support	1.351	3.861	1.104–4.871	0.003	1.362	3.904	1.210–4.892	< 0.001
Psychological resilience	1.126	3.083	1.181–6.905	0.005	1.181	3.258	1.068–4.946	< 0.001
Self-efficacy	1.041	2.832	1.091–3.875	< 0.001	1.822	6.185	3.391–8.917	< 0.001
Reference group: Low flourishing group; OR = Odds ratio; CI = Confidence interval								

Discussion

Flourishing among young and middle-aged patients with hepatocellular carcinoma exhibits significant population heterogeneity

Using latent profile analysis, this study identified three latent profiles of flourishing in young and middle-aged patients with hepatocellular carcinoma, with marked heterogeneity observed across the profiles. The low flourishing class, comprising 30.4% of the sample, exhibited the lowest mean flourishing scores, indicating the most impaired sense of life meaning, value, and purpose. The higher prevalence of unemployment, advanced tumor stage (III–IV), and metastatic disease within this group may largely account for this finding; these patients experience substantial disease burden while simultaneously lacking the social identity and financial stability associated with employment, compounded by lower levels of social support and psychological resilience that limit their access to external coping resources. Healthcare professionals should pay particular attention to the psychological status of such patients. Evidence-based psychological interventions, such as mindfulness-based cognitive training and meaning-centered therapy, can be used to guide patients in discovering the value and purpose of life during treatment [20], thereby gradually improving their level of flourishing. The moderate flourishing group accounted for 48.9%, indicating a moderate level of flourishing and representing the largest transitional subgroup among young and middle-aged patients with hepatocellular carcinoma. For these patients, healthcare professionals should not merely aim to maintain the status quo, but should proactively identify early warning signs of a potential decline toward the low flourishing group. In addition, structured group psychological interventions can be used to guide patients in sharing their illness experiences and exploring sources of meaning in daily life, thereby promoting an overall improvement in their level of flourishing [21]. The high flourishing group accounted for 20.7% of the sample, and patients in this group demonstrated the best level of flourishing adaptation. For these patients, healthcare professionals should fully acknowledge their internal strengths and positive coping experiences, identify the key strategies that help maintain their flourishing, and encourage them to serve as peer educators and role models in patient mutual-support groups, thereby assisting patients in the low and moderate flourishing groups in reconstructing positive perceptions of life value.

Factors associated with flourishing profiles among young and middle-aged patients with hepatocellular carcinoma

The results of this study showed that patients who were unemployed or retired were more likely to be classified into the low flourishing group. Work is not only a source of income, but also an important way to maintain social roles, self-worth, and social connectedness [22]. For patients with stable employment, although the disease may affect their daily lives, work can still help them maintain a certain level of engagement and a sense of social value, which contributes to their psychological well-being. In contrast, unemployed patients often experience career interruption due to illness and face problems such as financial pressure, reduced social support, and decreased self-worth, resulting in a heavier psychological burden [23]. Retired patients may experience weakened social roles, changes in daily structure, and an increased disease burden, making it more difficult for them to obtain effective external support resources. Therefore, healthcare professionals should pay particular attention to unemployed and retired patients, help them connect with employment support, community resources, or social support systems, and promote the

reconstruction of their social connectedness and sense of self-worth [24], thereby improving their level of flourishing.

The results of this study indicate that patients with earlier cancer stages are more likely to be classified into the moderate and high flourishing groups. Yu et al. found that patients with advanced-stage hepatocellular carcinoma exhibited more severe psychological problems compared with those at early stages [25]. Patients with advanced-stage disease typically face a heavier symptom burden, more frequent treatments, and greater uncertainty about the illness, such as the risk of disease progression and the threat of death [26]. These factors can weaken their sense of control over life and confidence in the future, increase existential distress, and consequently reduce their level of flourishing. Therefore, tumor stage not only reflects the severity of the disease, but may also affect patients' psychological resources and meaning-making ability. Healthcare professionals should pay close attention to the psychological needs of patients with advanced hepatocellular carcinoma and, through early palliative care help them reconstruct a sense of life value and improve their level of flourishing [27].

This study also found that patients with metastasis were more likely to be classified into the low flourishing group. Similarly, Zhang et al. reported that recurrence and metastasis of hepatocellular carcinoma can affect patients' beliefs about life and confidence in treatment [28]. Tumor metastasis usually indicates a heavier symptom burden, and symptoms may gradually increase during the course of treatment. As a result, patients are more likely to perceive the threat of the disease and experience survival-related stress [26]. If patients lack effective symptom-management knowledge and self-care ability, they often feel that their condition is difficult to control, which in turn affects their level of flourishing [29]. Therefore, healthcare professionals should use case management to continuously assess patients' symptoms and psychological stress at each stage, and provide timely psychological counseling and support to improve their level of flourishing.

The results of this study also showed that patients with higher levels of social support were more likely to be classified into the moderate and high flourishing groups, which is consistent with the findings of Zeng et al [30]. Young and middle-aged patients with hepatocellular carcinoma often face multiple stressors brought on by the disease, treatment, and changes in family and social roles, making them more prone to negative emotions [5]. As an important external resource, social support from healthcare professionals, family members, friends, and others can help patients reduce psychological distress, strengthen their confidence in recovery and courage in treatment, and promote the rediscovery of life value and meaning, thereby enhancing their level of flourishing [31]. Therefore, healthcare professionals should dynamically assess patients' social support status, pay particular attention to those with insufficient social support, provide family-centered support programs, and encourage them to participate in peer support groups, so as to improve their level of flourishing and long-term quality of life.

The results of this study showed that patients with higher levels of psychological resilience were more likely to be classified into the moderate and high flourishing groups, which is similar to the findings of Fastame et al [32]. Psychological resilience is a psychological response that occurs when individuals are exposed to traumatic events, reflecting the tenacity and perseverance they demonstrate in the face of adversity or stress [33]. When patients mobilize their resilience in response to the stressful event of being diagnosed with hepatocellular carcinoma, actively cope with disease-related challenges, and strengthen their confidence

and courage to overcome cancer, their level of flourishing may be enhanced [34]. Healthcare professionals can use acceptance and commitment therapy to help patients improve their psychological resilience, thereby enhancing their flourishing and reducing negative experiences among young and middle-aged patients with hepatocellular carcinoma [10].

The results of this study showed that patients with higher levels of self-efficacy were more likely to be classified into the moderate and high flourishing groups. The findings of Qian et al. also indicated that emotional regulation self-efficacy is a factor associated with maintaining flourishing levels in patients undergoing hemodialysis [35]. Self-efficacy reflects an individual's confidence in coping with challenges and achieving goals. For young and middle-aged patients with hepatocellular carcinoma, higher self-efficacy may help them face the difficulties associated with the disease and treatment more actively and adopt proactive coping strategies, thereby maintaining better psychological functioning [36]. Therefore, healthcare professionals can guide patients in setting phased and achievable rehabilitation goals, help them accumulate successful experiences through the gradual achievement of these goals, enhance their self-efficacy, and thereby promote improvements in their level of flourishing.

This study has several limitations. First, the data were collected from only one hospital, which may limit the generalizability of the findings. Future studies could conduct multicenter, large-sample investigations to further optimize intervention strategies. Second, this study adopted a cross-sectional design, which did not allow for the assessment of dynamic changes in the long-term flourishing levels of young and middle-aged patients with hepatocellular carcinoma or the inference of causal relationships among variables. Future studies could dynamically track flourishing levels to reveal their trajectory characteristics over time and identify key factors associated with flourishing.

Conclusion

This study identified three distinct flourishing profiles among young and middle-aged patients with hepatocellular carcinoma: the low flourishing group (30.4%), the moderate flourishing group (48.9%), and the high flourishing group (20.7%). Employment status, cancer stage, metastasis, social support, psychological resilience, and self-efficacy were associated with profile membership. These findings underscore the need for individualized interventions to improve flourishing in this population. Clinical healthcare professionals can develop targeted intervention strategies based on these factors to improve patients' flourishing levels.

Declarations

Conflict of interest

The authors declare no competing interests.

Clinical trial number

not applicable.

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Author Contribution

Jiurui Wang: Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. Zeping Yan: Writing—review & editing, Data curation, Supervision. Qiuyue Zhang: Writing—review & editing, Methodology, Conceptualization. Cuicui Xin: Data curation, Supervision.

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Figures

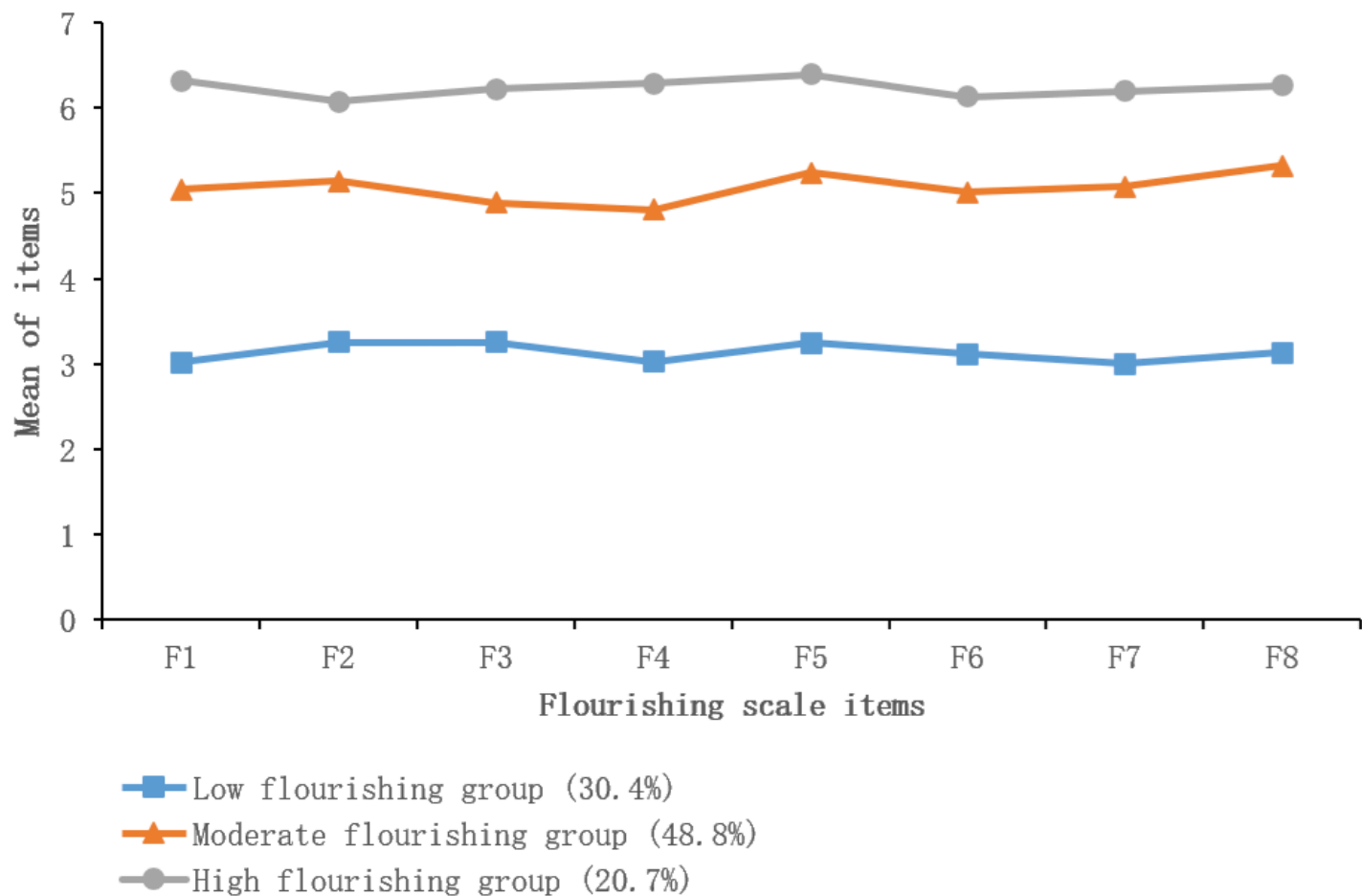


Figure 1

Latent profile of flourishing among young and middle-aged patients with hepatocellular carcinoma