Journal of Multidisciplinary Healthcare Dovepress

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Resilience in Chinese Spouses of Patients with Advanced Cancer: A Longitudinal Exploration

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Background: In China, spouses of patients with advanced cancer have reported experiencing psychological distress. However, little attention has been paid to the positive psychological health trajectories of these caregivers, particularly regarding their resilience and the factors influencing its development over time.

Purpose: To examine the trajectories of resilience in Chinese spousal caregivers over a nine-month post-treatment period and to identify the basic characteristics associated with these trajectory patterns.

Methods: This was a longitudinal, observational study conducted in mainland Chinese between January 2022 and May 2024. A total of 306 spouses of patients receiving cancer treatment were recruited from five local hospitals. Data was collected in four waves: within one month of initial treatment, and then at three-, six-, and nine-month intervals post-treatment. Socio-demographic questionnaires, the Connor-Davidson Resilience Scale, and the Beliefs in Chinese Familism Scale were used to collect data. Growth mixture modeling was employed to determine the various trajectories of resilience, followed by logistic regression analysis to examine the associated factors to predict types of trajectories.

Results: Growth mixture modeling showed two distinct trajectories of resilience were identified: an increased group ($N = 78$, 25.5%) and a stable group ($N = 228$, 74.5%). The increased group began with a low baseline level (intercept = 46.713) and showed a slight increase over time (slope = 7.505, $p < 0.001$), while the stable group had a moderate baseline level (intercept = 56.565) and remained stable over time (slope = 0.068, $p > 0.05$). Those in the stable group were more likely to be female, and to have achieved a middle school level of education, a lower family income, and greater Chinese familism at baseline than those in the increased group.

Conclusion: Our findings underscore the importance of tracking the trajectories of resilience and predictors of trajectory patterns among spouses caring for patients with advanced cancer within a specific cultural context. Healthcare providers should provide tailored interventions to enhance resilience in spousal caregivers, considering the trajectory patterns of mental health change.

Keywords: resilience, spouse, advanced cancer, caregivers, trajectories

Introduction

Global incidence rates of cancer are increasing significantly. In 2022, estimated deaths due to cancer worldwide were 9.7 million, with 2.5 million of these in China alone.[1] This suggests that the number of those suffering from advanced-stage cancer was even higher. Advanced cancer, which is defined by metastasis or recurrence and deemed incurable, is commonly classified as Stage III or IV according to the TNM Classification of Malignant Tumors, indicating a severe and life-threatening condition.[2] Approximately 52.8% of Chinese patients who have known cancer stages are diagnosed at an advanced level,[3] at which point the individual's capacity to manage stress and perform under high pressure is challenged, placing increased pressure on their spousal caregivers. The role of caregiver in relation to cancer patients can be associated with adverse physical and psychological outcomes, such as sleep disturbances, fatigue, and depression,[4] however, it can be correlated with positive outcomes, including post-traumatic growth, increased personal resilience, and strengthened marital bonds.[5] In China, the majority of caregivers for cancer patients are their spouses, however, in

Received: 15 August 2024
Accepted: 14 November 2024
Published: 26 November 2024

contrast to those caring for patient populations with other late-stage diseases, they tend to provide more intense care over shorter periods, while generally experiencing greater levels of distress.[5] Despite these considerations, research on the spouses of patients with advanced cancer remains scarce.

Resilience refers to the dynamic process of individuals navigating adversity to achieve a relatively improved well-being while also developing an ability to resist the negative impacts of stress.[6] Previous studies on family caregivers have shown that resilience as a positive psychological resource can not only increase a caregiver's own quality of life, but also positively affect the patient's health outcomes.[7,8] Studies have found that the resilience of family caregivers does not change uniformly over time; rather, a variety of trajectories of change can be seen.[8,9] It is therefore important to better understand how the resilience of spousal caregivers of patients with advanced cancer changes over time to provide tailored, timely interventions. Researchers have consistently emphasized the importance of resilience in family caregivers, and numerous studies have been conducted on this and other influencing factors in cancer care. Prior studies have reported socio-demographic factors affecting resilience such as age, gender, education, employment, ethnicity, and income.[10,11] However, existing findings are inconsistent and unclear across different countries and populations.[12,13] Furthermore, little research on this field exists particularly within the context of Chinese families and Chinese spousal caregivers.

Caring for cancer patients represents a distinctive and culturally nuanced experience, often characterized by challenges. Generally speaking, Chinese culture, rooted in Confucian values, emphasizes relational and collectivist principles, with a strong focus on familial concepts.[14] Compared to Western cultures, Asian societies often exhibit greater familial interdependence, where cultural norms emphasize family harmony, cohesion, and a dedication to caring for sick family members.[15] Familism in the Chinese context has remained relatively stable across time, but has developed as contexts of acculturation have changed.[16] Consistent with cultural norms in China, spouses often assume the role of caregivers for family members afflicted with cancer, viewing this as an inherent part of their relationship dynamics.[17] This cultural expectation can profoundly shape the caregiving experience.[18] Although a growing amount of evidence has shown that familism culture impacts the psychological health of caregivers,[19,20] few studies have examined the association between Chinese familism and the trajectory of caregivers' resilience. While Chinese familism may motivate spouses to provide care for their sick family member and meet their needs, it may also be associated with increased levels of anxiety and depression.[20] Meanwhile, weak levels of family solidarity or family pride may cause spouses to lose confidence in their caregiving, which may lead to the development of a deep sense of loss and burnout if they feel restricted in fulfilling the support needs of their sick family member or unable to do so.[21] These findings are in line with the distinct values of family-oriented culture common in many Asian countries which emphasizes family cohesiveness and harmony, with a particular focus on filial piety and familism. This underscores the importance of further exploring how the cultural emphasis on familism in China influences the resilience of spouses caring for their partners with advanced cancer over time.

The theoretical underpinnings of this study are informed by some established frameworks. The first is Bonanno's temporal framework,[22] which highlights the process of resilience and its outcomes, noting that these can be developed in response to stressors or adversity, and that they may change over time. This framework further suggests a strong correlation between resilient outcomes and the beliefs or values of familism. The second is Walsh's family resilience framework,[23] which consists of three key processes: family belief systems, family organization, and family communication. The third is the theoretical synthesis of the resilience process in family caregivers of individuals with advanced cancer. It has demonstrated that sociocultural factors significantly impact how caregivers cope with the subsequent adversity of having a family member diagnosed with advanced cancer.[24] Taking into account these three theoretical perspectives, the current study hypothesized that both Chinese familism and the basic characteristics of caregivers and patients would be relevant to trajectories of resilience in Chinese spouses of patients with advanced cancer.

To our knowledge, trajectories of resilience, which could guide early interventions for individuals at high risk for low resilience, have not yet been measured in families affected by cancer, with the exception of our previous short-term investigation.[25] Although there is increasing evidence indicating that family caregivers of patients with cancer tend to experience significant positive adaptation,[6,8,26] few studies have been conducted on this in the Chinese cultural context. Therefore, the aim of this study was to identify the trajectories of resilience among spouses of patients with advanced

cancer within the context of Chinese familism. We hypothesized that trajectories of resilience would be identified in multiple distinct subgroups including increasing, worsening, or consistently stable patterns over time. Additionally, we sought to examine the demographic and clinical characteristics of both spouses and patients that are associated with each resilience trajectory subgroup. We hypothesized that basic demographic characteristics of patients and their spousal caregivers would be significantly linked to resilience trajectory class membership.

Methods

Design and Study Sample

A longitudinal observational study design was adopted, with the sample comprising spousal caregivers of patients with advanced cancer in China. The longitudinal quantitative study design is particularly suited to map the trajectory of changes over time, which is crucial for capturing the dynamic nature of resilience.[22] This method aligns well with our research objectives and allows us to explore the temporal dimensions of resilience. This research extends our previous short-term study with a more comprehensive, long-term follow-up investigation.[25] Participants were recruited using convenience sampling from five tertiary hospitals located in Jiangsu Province, China. Participants were all the spouses of a newly-diagnosed advanced cancer patient who had recently begun to receive anti-cancer treatment (ie, within one month). Eligible participants were primary caregivers, which was defined as being unpaid and providing the most physical, emotional, or financial support to the patient. Inclusion criteria were: (1) age 18 or older, (2) Chinese language proficiency, and (3) the ability to complete all parts of the four-wave survey. Exclusion criteria were: (1) divorce from the cancer patient, or (2) the patient's death within nine months of treatment initiation. This study adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for reporting.

Data Collection

This study was conducted between January 2022 and May 2024. Researchers identified the first day of treatment as a marker event. Then, we decided on one month window of eligibility commencing from the first day of treatment because the one-month window remained reasonably close to the initial transition into cancer caregiving. In addition, decisions about the frequency of data collection involved theoretical and practical considerations.[27] Thus, we chose to collect data at four assessment points, with three-month intervals, to allow for the observation of resilience trajectory variations over time. At time point 1 (T1), a total of 360 participants completed the face-to-face survey within the first month following their spouse's initial treatment. Researchers then followed up with the participants at three time points: at three months (T2), at six months (T3), and at nine months (T4) after the initial survey (T1). We utilized paper questionnaires to collect data from all participants. The questionnaires used in the first session took approximately 20 minutes to complete, whereas each subsequent follow-up survey took about 10 minutes. To reduce the rate of attrition during the follow-up period, participants received reminder calls before each follow-up investigation, and each participant received a small gift after each session as a token of appreciation. Although there is no general rule for calculating acceptable sample size in growth mixture modeling, multiple regression was used to estimate the sample size needed for this study. G*Power was applied within 11 factors to achieve a power of 95% with an R^2 of 0.15 at a confidence level of 0.05, which resulted in an acceptable minimum sample size of 178. Ultimately, 306 participants completed all four assessment sessions and were included in the data analyses, representing an attrition rate of 15%. Figure 1 shows participant totals and reasons for attrition at each measurement time point.

Measures

Socio-Demographics and Clinical Characteristics

The socio-demographic characteristics of the spousal caregivers encompassed variables such as gender, age, religious affiliation, duration of marriage, education level, employment status, monthly family income, and health status. The clinical characteristics of the patients included age, type of cancer, TNM stage of cancer, and treatment methods.

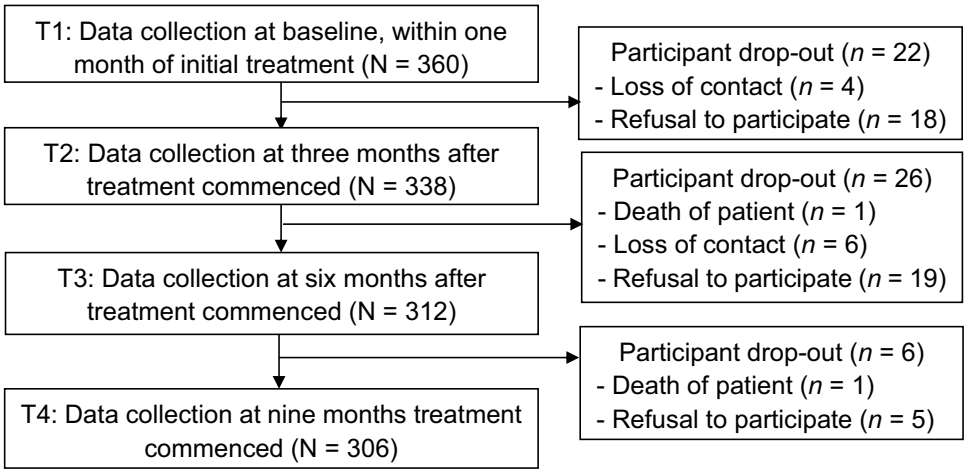

Figure 1 Flow chart of study participants.

Chinese Familism

Chinese familism was measured using two subscales of the Beliefs in Chinese Familism Scale.[14] This scale uses 40 items rooted in Confucian philosophy to measure three constructs: family solidarity and harmony (21 items), family prosperity (10 items), and continuation of posterity (9 items). The subscales used in this study were family solidarity and harmony and family prosperity, a total of 31 items. The family solidarity and harmony subscale assesses beliefs on family mutuality, forbearance, protection of family members, and family compliance, while the family prosperity subscale measures beliefs on family pride with 10 items. Responses were recorded on a six-point Likert scale, from 1 (strongly disagree) to 6 (strongly agree). Possible total scores range from 30 to 186, with a higher total score indicating a higher endorsement of beliefs in Chinese familism. In the current study, the Cronbach's α for the two subscales combined was 0.86, indicating good internal consistency.

Resilience

Resilience levels among caregivers were quantified using the Connor-Davidson Resilience Scale (CD-RISC).[28] The Chinese version uses 25 items to assess three dimensions: tenacity, strength, and optimism. Each item is rated using a five-point Likert scale ranging from 0 (not true at all) to 4 (true nearly all the time). The total score ranges from 0 to 100, with higher scores indicating greater resilience. The CD-RISC has been validated in the general population, as well as in family caregivers of patients with advanced cancer.[29] In this study, Cronbach's α for the total scale ranged from 0.84 to 0.89. Resilience was measured at each study timepoint (ie, T1, T2, T3, and T4).

Ethical Considerations

This study was approved by the Clinical Research Ethics Committee of Jiangsu Medical College (202403-SL-007). The study was also conducted in compliance with the Declaration of Helsinki. All participants were informed about their rights in the study, and each provided their written informed consent before data collection began. Participation was voluntary throughout the process, and all information was kept confidential.

Data Analysis

Growth mixture modeling (GMM) was used to analyze the subgroup classifications and distribution numbers of the various resilience trajectories. GMM can be used to identify the presence of unknown latent classes that follow distinct developmental trajectories, as well as to provide information about the growth factors (intercept and slope) of each trajectory. The growth factors are generally interpreted through longitudinal modeling, that is, by estimating the level of the initial outcome (intercept) and its rate of change over time (slope).[30] In this study, descriptive statistics were obtained

using SPSS 25.0, and Mplus 8.0 was used to explore the longitudinal trajectories of resilience. The analyses applied robust maximum likelihood estimations to deal with non-normal distribution.[31]

Three types of indicators were used to determine the optimal number of latent trajectory classes.[32,33] The first indicator was the goodness of fit values of the Bayes Information Criteria (BIC), the Akaike Information Criteria (AIC), and the sample-size adjusted BIC (aBIC); lower values represent a better model fit. The second indicator was the results of the likelihood ratio tests, specifically the Lo–Mendell–Rubin (LMR) statistic and the adjusted Lo-Mendell-Rubin likelihood-ratio test (LRT). Both LMR and LRT test a model by contrasting the results of a K-class model versus a K-1 class model; a significant *p*-value indicates that the K-class model fits the data better than the K-1 class model. The third indicator used was the quality of the model in terms of posterior probability diagnostics, namely the entropy for each trajectory class; a high-entropy value (ie, close to 1.0) indicates the more accurate the classification. Additionally, the optimal numbers of each trajectory class were determined using a combination of statistical criteria, parsimony, and interpretability, for example, a threshold of average posterior probabilities of group membership (AvePP) of more than 0.70 and group membership probabilities of more than 5% were used to assess the plausibility of each model.[34]

After determining the number of different types of trajectory classes present, the different subgroups of resilience development were named according to their class characteristics and with consideration of the aforementioned theories influencing the study framework. The influence of demographics on the trajectory development in each class was then examined. Due to the multicollinearity in spouse age, duration of marriage, and patient age, only spouse age was included in the binary logistic regression analysis. In the end, 11 covariates with potential for association with trajectory group membership were included (ie, gender, spouse age, education, religion, employment status, family income, health status, cancer type of patients, cancer stage, medical treatment method, and Chinese familism), chosen a priori based on the existing literature and clinical judgment to the 2-class model. Next, binary logistic regression was used to examine the baseline covariates linked to trajectory class membership, with the trajectory with the smallest sample size used as a reference. To eliminate non-significant variables from the model, the backward stepwise method was used. Statistical significance was set at $P < 0.05$, and all tests were two-tailed.

Results

Descriptive Characteristics of Spouses and Their Patients

Data on demographics, clinical information of patients, and treatment outcomes were available for 306 caregiver participants, which included 178 (58.2%) wives and 128 (41.8%) husbands. The spouses' mean age was 56.30 ± 10.44 years, and the average marriage duration was 29.96 ± 11.30 years. Most reported no religious affiliation (91.5%), and most had either a part-time or full-time job (62.4%), in addition to being their partner's caregiver. Those with a high level of education (23.5%) were in the minority in this study, those as well as reporting a low monthly family income (11.4%). Furthermore, only a relatively small minority of participants self-reported experiencing poor health (8.5%). Regarding the patients, their mean age was 56.36 ± 10.96 years. The most common cancer sites diagnosed were lungs (29.7%), colorectum (20.6%), stomach (20.3%), breast (15.4%), and liver (14.0%). Of all patients in the study, 73.5% had Stage III cancer, and 85.3% were receiving two or more therapeutic methods (ie, combined treatment such as surgery with chemotherapy and radiation therapy). The mean scores for Chinese familism at T1 were moderate among spouses (140.70 ± 9.44), while the mean total resilience scores were low (53.98 ± 7.67). These total resilience scores increased at T2 (56.22 ± 6.39), with another slight increase at T3 (57.98 ± 6.73) and remained similar at T4 (58.09 ± 6.33). See Table 1 for full clinical socio-demographic characteristics.

Patterns in Trajectories of Resilience

The parameter estimation results of the unconditional GMM models are shown in Table 2. Upon comparing the best-fitting two- to five-class models with linear growth trajectories, we determined that the two-class model exhibited the optimal fit, as indicated by the lowest BIC. Following our study framework and data interpretation, two distinct resilience trajectories were identified: slight increase and stability (Figure 2). Class 1, the slight increase group, accounted for 25.5% (n = 78) of participants, and Class 2, the stable group, accounted for 74.5% (n = 228). Class 1 had a low initial

Table 1 Socio-Demographic Clinical Characteristics (N = 306)

Characteristics	Categories	*n* (%) or *M* ± *SD*
Spouse characteristics		
Gender		
	Male	128 (41.8)
	Female	178 (58.2)
Age (years)		56.30 ± 10.44
Marriage duration (years)		29.96 ± 11.30
Religious		
	No	280 (91.5)
	Yes	26 (8.5)
Level of education		
	Primary school	55 (18.0)
	Middle school	73 (29.9)
	High school	106 (34.6)
	College/university	72 (23.5)
Employment status		
	Unemployed/retired	115 (37.6)
	Part-time job	77 (25.2)
	Full-time job	114 (37.2)
Family income (RMB/month)		
	< 2000	35 (11.4)
	2000 to 6000	137 (44.8)
	> 6000	134 (43.8)
Health status		
	Poor	26 (8.5)
	Average	199 (65.0)
	Good	81 (26.5)
Patient characteristics		
Age		56.36±10.96
Cancer type		
	Lung	91 (29.7)
	Colorectum	63 (20.6)
	Stomach	62 (20.3)
	Breast	47 (15.4)
	Liver	43 (14.0)
Cancer stage		
	III	225 (73.5)
	IV	81 (26.5)
Medical treatment		
	Single	45 (14.7)
	Combined	261 (85.3)
Main variables		
Chinese familism	T1	140.70 ± 9.44
Resilience		
	T1	53.98 ± 7.67
	T2	56.22 ± 6.39
	T3	57.98 ± 6.73
	T4	58.09 ± 6.33

Abbreviations: *M*, mean; *SD*, standard deviation; T1, within one month of initial treatment; T2, three months after treatment commenced; T3, six months after treatment commenced; T4, nine months after treatment commenced.

Table 2 Fit Statistics of Unconditional Growth Mixed Model (N = 306)

Model	k	LL	AIC	BIC	aBIC	Entropy	LMR *p*	LRT *p*	Group size
One-class	10	−3310.262	6640.524	6677.759	6646.044	n/a	n/a	n/a	1(100%)
Two-class	**13**	**−3283.933**	**6593.865**	**6642.272**	**6601.042**	**0.823**	**< 0.001**	**0.001**	**78/228**
Three-class	16	−3276.443	6584.887	6644.464	6593.719	0.728	0.0608	0.0703	184/41/81
Four-class	19	−3273.765	6585.530	6656.278	6596.019	0.770	02090	0.2273	10/74/47/175
Five-class	22	−3269.485	6582.971	6664.890	6595.116	0.754	0.4479	0.4709	26/138/37/48/57

Notes: The bold values in the Two-class model represent the best-fit relative to other group models.
Abbreviations: k, number of parameters; LL, Log likelihood; AIC, Akaike information criterion; BIC, Bayesian information criterion; aBIC, Sample-size adjusted BIC; LMR *p*, Lo-Mendel-Rubin adjusted LRT *p*-value; LRT *p*, Likelihood ratio test *p*-value.

level at T1 (intercept = 46.713) and increased slightly over time (slope = 7.505, $p < 0.001$). Class 2 reported a moderate level at T1 (intercept = 56.565) and remained stable over time (slope = 0.068, $p > 0.05$). The group membership probabilities exceeded 5%, and the AvePP values were all more than 0.70 across both subgroups. Comparisons of participants' resilience in each trajectory class can be seen in Table 3. We identified significant differences between the reported resilience of the two classes at each of the four timepoints, with those in Class 2 having higher resilience than those in Class 1 at T1 and T2. However, due to the slight growth in the trajectory of Class 1, participants in Class 2 showed lower resilience than those in Class 1 at T3 and T4.

Characteristics Associated with Trajectory Group Membership

Table 4 shows the significant odds ratios (OR) values of the different subgroup predictors. Class 1, the increasing group, was used as the reference group for the adjusted values of OR and 95% confidence intervals (CI) to reflect the effects of the different covariates on Class 2, the stable group. The predictive factors for the stable resilience trajectory were as follows: female, OR = 2.57, 95% CI= [1.32, 5.00]; middle school education, OR = 4.13, 95% CI= [1.14, 14.93], monthly family income between 2000 and 6000 RMB, OR = 0.05, 95% CI= [0.01, 0.18]; monthly family income > 6000 RMB, OR = 0.22, 95% CI= [0.09, 0.54]. Additionally, the effect of Chinese familism on the stable group was positive, OR = 1.06, 95% CI= [1.03, 1.10]. No significant differences were seen between the two classes in terms of the influences of age, religion, employment status, health status, cancer type, cancer stage, or treatment method.

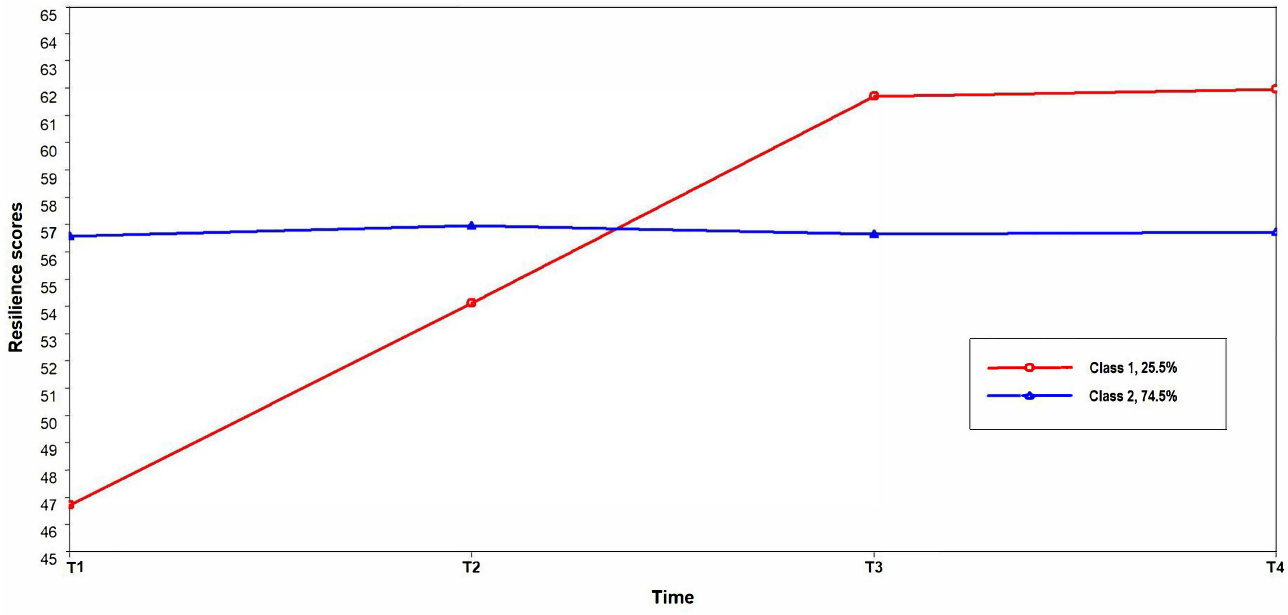

Figure 2 Trajectories of resilience in the two-class solution across timepoints.

Table 3 Comparisons of Resilience Between the Two Classes Over Four Time Points

Group	*n*	T1	T2	T3	T4
Class 1 (increasing)	78	46.37±5.53	53.97±6.11	61.88±6.19	62.22±5.86
Class 2 (stable)	228	56.58±6.48	56.98±6.31	56.64±6.39	56.68±6.29
t-test		−12.447	−3.660	6.309	6.818
P		< 0.001	< 0.001	< 0.001	< 0.001

Abbreviations: T1, within one month of initial treatment; T2, three months after treatment commenced; T3, six months after treatment commenced; T4, nine months after treatment commenced.

Table 4 Binary Logistic Regression Analysis of Resilience Using Class 1 as Reference

Predictors	Estimates	*SE*	*P*	OR	95% CI
Constant	1.42	0.34	< 0.001	4.16	
Gender (female)	0.94	0.34	0.005	2.57	1.32, 5.00
Education (Middle school)	1.42	0.65	0.030	4.13	1.14, 14.93
Education (High school)	0.30	0.57	0.598	1.35	0.43, 4.21
Education (College/university)	0.40	0.51	0.427	1.50	0.55, 4.07
Family income (2000 to 6000 RMB)	−2.90	0.61	< 0.001	0.05	0.01, 0.18
(> 6000 RMB)	−1.50	0.45	0.001	0.22	0.09, 0.54
Chinese familism	0.06	0.01	< 0.001	1.06	1.03, 1.10

Abbreviations: *SE*, Standard error; OR, Odds ratio; CI, confidence interval.

Discussion

This study examined the trajectories of resilience in spouses of patients with advanced cancer and used GMM to identify the associations with these trajectories over a nine-month post-treatment follow-up period. The findings extend previous cross-sectional research results by revealing that levels of resilience have two latent trajectories among Chinese spousal caregivers. Four demographic characteristics were found to significantly increase the probability of spousal caregivers being in the stable resilience group: being female, having a middle-school education, a lower family income, and higher Chinese familism. These results are consistent with temporal frameworks that suggest that resilience changes over time in response to different contextual factors.[22–24] Furthermore, we suggest that examining the basic characteristics of spouses of cancer patients could help identify whether they will have a stable or increasing development of resilience during the initial period of caregiving, and who to prioritize for early interventions. The findings of the current study were markedly different from those of our earlier work.[25] We identified two distinct resilience trajectories over four time points, with the growth rate of the increasing group showing a notable deceleration. Moreover, this study revealed different factors associated with these trajectory groups, which may guide the development of future intervention strategies. Lastly, the present study confirmed that Chinese familism is a cultural factor influencing resilience change.

In this study, following the two-class GMM model, Class 1 included spousal caregivers with a relatively low level of resilience at T1 which increased over time, comprising approximately one quarter (25.5%) of all participants. This result is in line with previous findings.[8] A possible reason for the existence of this pattern of change may be the individual's recovery in response to potentially traumatic events. This psychological basis that makes it possible for us to adapt in the face of traumatic experiences to reach a dynamic adjustment. This is consistent with the view of the human capacity to respond with resilience after experiencing trauma.[35] However, this psychological basis represents just one of many contributing factors to the emergence of resilience.[22] Class 2 included spousal caregivers with a high level of resilience at

T1, which remained stable, showing no obvious change trends across time. This could in part be explained by the resilience paradox.[35] Stable resilience has been characterized by continuous, steady levels of individual assets and community resources. For example, Galatzer-Levy et al[36] labeled one trajectory of resilience by identifying consistently low levels of distress which remained stable across time, which was the most commonly observed response in their study (65.7%). Meanwhile, Ungar[37] describes a resilient individual as being one who demonstrates relative stability in their mental state, while a recovering individual is one who demonstrates increased adaptation over time. With this in mind, 74.5% of the spousal caregivers in this study did not exhibit an increasing resilience trajectory that carries significant clinical implications. This may encourage healthcare providers to explore the specific characteristics and resources that these individuals possess, thereby offering a background for the development of future interventions.

Previous studies have suggested a variety of factors that can impact changes in resilience, but different factors have been observed to exhibit distinct effects in various situations.[38,39] As predicted this study, the latent trajectories observed in participants were more closely linked to the intrinsic characteristics of the spousal caregivers rather than the medical aspects of the patients. Regarding socio-demographic factors, female spouses were more likely to exhibit the stable trajectory patterns. As a result, women had a higher probability of being classified in Class 2, namely the stable group. This is consistent with the findings of a five-year follow-up study which showed that female caregivers had highly resilient coping patterns.[12] One possible reason for this could be that female caregivers for cancer patients must develop more stable levels of internal resources and personal mastery. The gender-based variation in resilience may be attributed to its heritability, which is reportedly greater in men than in women.[40] This is because men seem to gain additional benefits from environmental mastery. Therefore, husband caregivers in this study were more in the increased group. However, the observation that female spousal caregivers had a greater level of resilience is inconsistent with the findings of an earlier study focused on the context of dementia care.[41] Compared to the female spouses, male spousal caregivers seemed to experience more exposure to stressful environments demanding increased levels of responsibility, which helped to boost their adaptability to adversity and resulted in their exhibiting a gradual increase in their resilience.[13] In other words, the male spouses had a low level of resilience at the start of caregiving, which increased over time and eventually exceeded that of the female spouses. Despite these contrasting findings, the current study does support the existence of significant gender differences in the trajectory of resilience development.

Existing research on education-level differences in the trajectory of resilience development is relatively limited. Many cross-sectional studies found that caregivers who were low education level had lower resilience levels.[10,42] However, no longitudinal studies have examined the effects of education level on the trajectory of resilience development. The current study found a significant association between having a middle school education and a stable trajectory pattern of resilience, which is particularly noteworthy. This is somewhat in line with the findings of existing studies that suggest that a higher level of education reduces the risk of caregiver burden in maintaining mental health stability.[43] However, the stable group (Class 2) included no participants with a higher level of education in this study. It is difficult to explain this particular outcome. One possible reason for this could relate to the increased complexity of one's life experience as their level of education increases.

Regarding family income, significant differences were seen between the two trajectory classes, with participants with a higher monthly family income being more likely to be in the increasing resilience trajectory group (Class 1). This finding aligns with the results of previous studies indicating that caregivers with a higher monthly income also have higher levels of resilience,[12] and that family income can influence family resilience over time.[44] Greater family income is generally recognized as associated with lower levels of depressive symptoms, as families with higher income levels are more likely to experience advantages in social resources, be able to afford better cancer treatments, and have a greater sense of control over their own lives. Taken together, these findings suggest that special attention should be paid to spouse caregivers with a low level of family income, particularly during the later period of anti-cancer treatments which may increase the family's financial burden.

In this study, participants with a stronger belief in Chinese familism were more likely to be included in the stable resilience trajectory group (Class 2). This result indicates that a higher level of belief in Chinese familism can help one maintain stability in their level of resilience, while a low level of Chinese familism may also stimulate an increase in one's level of resilience. This result is in line with the philosophical thoughts of Confucianism regarding family beliefs.[18]

This is also similar to the impact of Latinx familism.[45,46] Meanwhile, in Chinese culture, caring for a sick family member is considered a natural part of family life, often grounded in principles of filial piety or loyalty, which then contributes to the caregiver's psychological health.[47] However, in this study we observed that a stronger belief in Chinese familism was more likely to reduce caregivers' resilience throughout the follow-up period, which indicates that Chinese familism may undermine the psychological adjustment of caregivers. In particular, traditional cultural expectations of family caregivers may result in spousal caregivers experiencing greater stress, increased emotional distress, and a decrease in quality of life and resilience. This might explain why, in this study, caregivers' resilience levels were lower at T1, just after the patient received their initial treatment after diagnosis, than at T2, T3, and T4. Overall, this finding suggests that increasing a caregiver's belief in Chinese familism could be a promising way to help primary family caregivers acquire the support they require to help them foster family harmony over time. In clinical practice, health policymakers can create harmonious environments to increase familial support.

The present study used the GMM to determine the different trajectories of resilience in spousal caregivers, resulting in slightly different findings than those of previous related results. First, the number of recognized trajectory categories differed. We believed that this difference was due primarily to differences in study samples, as well as research purposes. Another difference seen is in the characteristics of the identified groups. Unlike previous studies,[48,49] which often identified a subgroup showing a decline in resilience over time, our findings did not include such a pattern. In the present study, the group differences were characterized by variations in the rate of change in resilience and the initial resilience levels at the start of the caregiving experience. In Class 1, the increasing resilience group, which had a lower resilience at T1, its resilience gradually increased over time, eventually exceeding that of the stable group. In Class 2, the stable resilience group could maintain stability in cancer family care. These suggest that spouses could cope with difficult times by utilizing various resources to influence changes in resilience.

Limitations

This study does have some limitations. First, this study used only a self-reported scale to assess participants' resilience. A single tool alone may not have been sensitive enough to detect subtle changes in resilience over time. Future longitudinal studies should use multidimensional tools to measure resilience with increased accuracy. Second, the factors that impact resilience may not be limited to the variables considered in this study. Future research should consider additional socio-environmental factors, such as social support and coping abilities, to allow for a more comprehensive analysis of the effects of various factors on the trajectory of resilience development. Third, this study used the convenience sampling method to recruit its participants from five local hospitals in China, which could have limited the generalizability of our findings to spousal caregivers residing in other regions. Fourth, this study focused on the spouses of patients with advanced cancer, which limited the applicability of our findings to other population groups. Future research should explore other family caregivers, including children and siblings, to enrich our understanding of familial cultural factors in fostering resilience within the cancer care setting. Finally, this study used only quantitative data, which is unable to provide us with in-depth personal insights into the resilience development process in spousal caregivers of patients with advanced cancer. Future research should employ a longitudinal qualitative design to provide a deeper understanding of how resilience evolves over time in this population.

Implications

The implications of this study underscore the importance of accounting for group heterogeneity when examining factors that influence the development of resilience trajectories, which has rarely been explored in prior studies. By identifying distinct latent growth classes, we inferred how the different characteristics of Chinese spousal caregivers may play a significant role in their resilience, showing that individual characteristics may impact caregiver resilience in different directions. Another highlight of this research is its use of GMM to determine the data fit. This modeling method overcomes the problematic assumption that each latent class must follow a normal distribution. This study found differences between the two subgroups in terms of resilience levels at T1, as well as differences in the rate of change over time. This acts as a reminder that the ongoing development of methodologies enables future researchers to examine a broader range of population characteristics with greater depth and precision.

To accurately depict the basic characteristics associated with the two trajectories of resilience development in spousal caregivers, we recommend routine assessments of their resilience, as well as classifying them in terms of whether they are involved in patient care, particularly during the early period of treatment. The findings of this study also contribute to the understanding of Chinese cultural environmental factors, providing a foundation for the development of targeted interventions that align with the changing patterns of individual resilience among spousal caregivers of cancer patients. Moving forward, healthcare providers can employ interventions to enhance resilience, such as psycho-education, supportive therapies, and guided self-care practices.

Conclusion

This study used GMM to identify two different trajectories of resilience development, while also examining the basic characteristics of participants that may affect the resilience trajectory among spouses of patients with advanced cancer. Our findings partially supported our hypothesis that two different trajectory patterns of resilience existed, and that these could change due to several individual characteristics, including gender, education level, family income, and belief in Chinese familism. Healthcare providers should be informed of the importance of the trajectories of resilience of spousal caregivers during the cancer treatment process. Furthermore, tailored, appropriate interventions for creating a harmonious family cultural atmosphere should be developed, as they may help strengthen the resilience of spouses of patients with advanced cancer.

Data Sharing Statement

The data of this study are available on request from the first author.

Acknowledgments

We are grateful to all participation in this study.

Funding

This study was supported by Ministry of Science and Technology Foreign Expert Project of China (G2023014081L).

Disclosure

The authors report no conflicts of interest in this work.

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