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Published in:
 Psycho-Oncology

DOI:
 [10.1002/pon.5174](https://doi.org/10.1002/pon.5174)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
 Publisher's PDF, also known as Version of record

Publication date:
 2019

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Zhu, L., Yao, J., Wang, J., Wu, L., Gao, Y., Xie, J., Liu, A., Ranchor, A., & Schroevers, M. J. (2019). The predictive role of self-compassion in cancer patients' symptoms of depression, anxiety, and fatigue: A longitudinal study. *Psycho-Oncology*, 28(9). <https://doi.org/10.1002/pon.5174>

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PAPER

The predictive role of self-compassion in cancer patients' symptoms of depression, anxiety, and fatigue: A longitudinal study

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Funding information

Project of Humanities and Social Sciences, Grant/Award Number: 16YJC190033; Fundamental Research Funds for the Central Universities, Grant/Award Number: GK201903108

Abstract

Objective

Self-compassion is consistently found to be related to better psychological outcomes. As most studies were cross-sectional, little is known about the predictive role of self-compassion for future psychological outcomes. This longitudinal study in cancer patients investigated the predictive role of self-compassion at the time of cancer diagnosis for the course of symptoms of depression, anxiety, and fatigue in the period of receiving cancer treatment.

Methods: This longitudinal study was conducted at the Shaanxi Provincial Tumour Hospital in Xi'an, China. A total of 153 heterogeneous cancer patients were assessed within 1 week after cancer diagnosis (T1) as well as at the start (T2) and the end (T3) of medical treatment. Hierarchical linear regression analyses were conducted to examine the research questions.

Results: Cross-sectional regression analyses at T1 showed that a self-compassion total score and negative self-compassion (and to a lesser extent positive self-compassion) were significantly related to symptoms of depression, anxiety, and fatigue. When controlling for symptoms at T1, positive self-compassion significantly predicted all three outcomes at T3. A self-compassion total score only predicted symptoms of anxiety at T2, controlling for T1 symptoms. In contrast, we found no significant predictive value of negative self-compassion.

Conclusions: This study suggests that the positive aspects of self-compassion are beneficial for cancer patients for their future functioning, in terms of fewer symptoms of depression, anxiety, and fatigue over time. Future interventions should test how and to what extent self-compassion can be cultivated and whether increases in self-compassion are associated with better outcomes.

KEYWORDS

cancer, oncology, positive and negative self-compassion, depression, anxiety, fatigue, longitudinal study

1 | INTRODUCTION

Self-compassion refers to a tendency of being understanding and kind to oneself in the face of failure, challenges, negative experiences, and personal weaknesses.¹ Meta-analyses including mostly cross-sectional studies have demonstrated a beneficial role of self-compassion for psychological well-being in students and community samples.^{2,3} In cancer patients, a few cross-sectional studies have provided preliminary evidence showing an association of self-compassion with psychological symptoms.⁴⁻⁷ Given the lack of empirical evidence on the predictive value of self-compassion over time, this longitudinal study examined to what extent cancer patients' self-compassion was related to the course of symptoms of depression, anxiety, and fatigue over time.

According to Neff,⁸ self-compassion consists of six facets: three positive and three negative facets. The three positive facets include self-kindness (being supportive and caring to oneself), common humanity (viewing personal failures and weaknesses as part of human life), and mindfulness (accepting the present moment without judging). The three negative facets reflect an absence of self-compassion including self-judgment (being self-judgmental when confronting with difficulties), isolation (feeling isolated and lonely during negative experiences), and overidentification (overidentifying painful thoughts and feelings). Most studies used a total score of self-compassion including all six facets.

Based on cross-sectional findings, a systematic review found a large effect size regarding the associations of self-compassion total scores with psychological symptoms including stress, depressive, and anxiety symptoms.² In the context of cancer, two studies in a heterogeneous sample of people with cancer found that higher levels of self-compassion were correlated to fewer symptoms of depression, anxiety, and stress, and a better quality of life.^{4,5} Similarly in breast cancer survivors⁶ and lung cancer patients,⁷ it was found that higher self-compassion was significantly related to fewer distress.

A limitation of previous studies is the use of a cross-sectional design. Up till now, only a handful longitudinal studies examined the predictive role of self-compassion in psychological symptoms in students⁹ and people with depression,¹⁰ and no longitudinal study has been performed in the context of cancer. A second limitation is that previous studies in cancer patients did not distinguish between the positive and negative components of self-compassion and examined their role in psychological symptoms. As such, it remains unclear whether the association of self-compassion with psychological symptoms is due to the presence of positive self-compassion (eg, self-kindness) or the absence of negative self-compassion (eg, self-criticism). Recent research found that the three positive and three negative facets of self-compassion in fact measure two components, positive self-compassion and negative self-compassion/self-coldness, respectively.^{3,11,12} A meta-analysis including mostly cross-sectional studies in students found that the negative facets of self-compassion were more strongly related to psychological symptoms than the positive facets of self-compassion.³ Cancer patients normally report higher levels of stress than the general population,

due to the uncertainty of cancer prognosis, survival odds, as well as physical and psychological problems caused by cancer and cancer-related treatments. An examination on the predictive role of positive and negative self-compassion over the pretreatment and posttreatment period in people with cancer may provide more insight into the beneficial role of self-compassion for psychological functioning in this population.

The current study in cancer patients aimed to overcome the above gaps in the literature, by using a longitudinal design (with three assessments) and examining a total score of self-compassion as well as the two separate positive and negative components. Assessments were made around diagnosis (T1) and at the start (T2) and end (T3) of medical treatment. The primary aim was to examine concurrent associations around cancer diagnosis and the predictive role of self-compassion around cancer diagnosis in the report of symptoms of depression and anxiety (the most common psychological problems)^{13,14} in the period of receiving medical treatment. Moreover, fatigue, as another highly prevalent problem reported by cancer patients,¹⁵ was also examined as an outcome in relation to self-compassion. Based on previous research,³ it was hypothesized that higher self-compassion capacities at diagnosis would predict fewer symptoms of depression and anxiety over time. As no studies examined the relationship between self-compassion and fatigue, we did not have specific hypothesis.

2 | METHOD

2.1 | Participants and settings

Participants were recruited consecutively in Shaanxi Provincial Tumour Hospital from August 2016 to May 2018. The inclusion criteria were (1) diagnosed with cancer for the first time, (2) age between 18 and 75 years old, and (3) comprehension of Chinese. The exclusion criteria were (1) having a psychiatric disorder diagnosed by professional psychiatrists, (2) having a cancer recurrence, and (3) already started medical treatment. This study was approved by the ethics committee at the Shaanxi Provincial Tumour Hospital (2017-2). Written informed consent was obtained from all cancer patients included in the study.

For potential participants, the trained research nurses screened for eligibility. After providing written informed consent form, eligible participants were asked to complete a self-reported questionnaires independently at three time points: within 1 week after the first cancer diagnosis (T1), within 1 week after the starting of medical treatment (T2), and within 1 week after the end of medical treatment (T3). The flow chart of participant recruitment can be seen in Figure 1. Of the 435 screened participants, 127 participants were excluded: 75 had benign tumours and 52 were having cancer recurrence. Of the 308 eligible cancer patients, 243 patients gave written informed consent and completed the T1 assessment (response rate = 79%). Of the 243 participants, 209 participants completed the T2 assessment, and 153 participants completed the T3 assessment. The data analyses were conducted based on the 153 participants who completed all

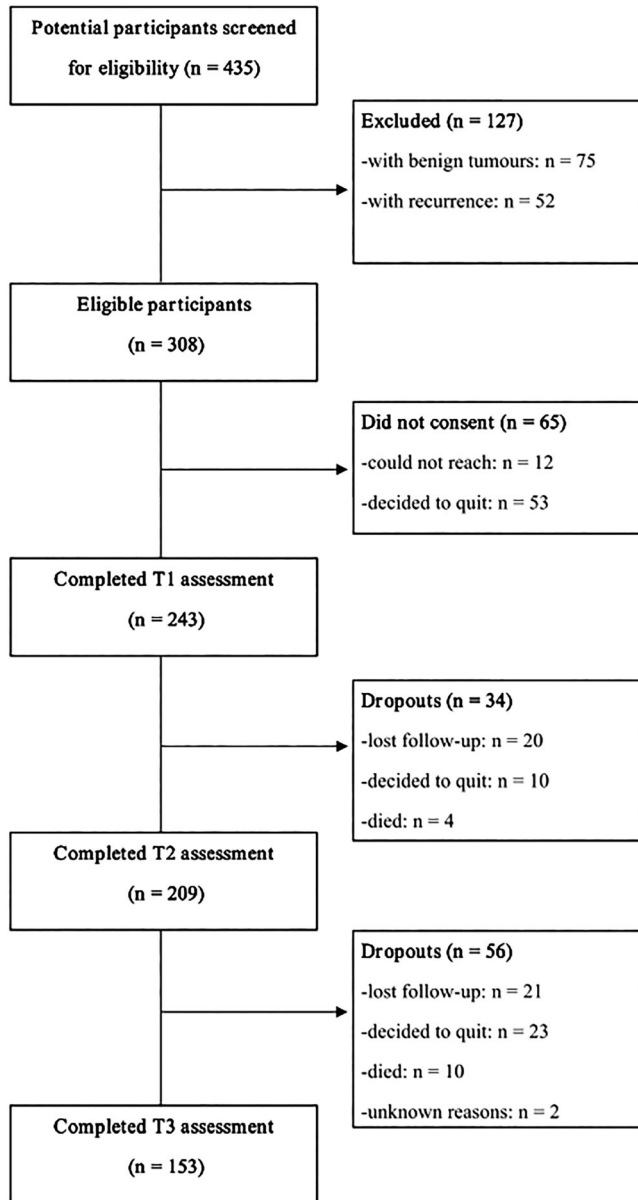


FIGURE 1 The flow chart of the study

three assessments. In comparison with the 90 people who dropped out after the T1 assessment, the 153 follow-up participants reported less severe cancer ($P < 0.05$) and higher education ($P < 0.01$).

2.2 | Measures

2.2.1 | Demographic and medical variables

A self-reported questionnaire was used to collect participants' demographic variables including their age, gender, educational level, marriage status, and salary. Medical variables were tracked from the medical record of hospital including diagnosis time, cancer type, cancer stage, and received medical treatment.

2.2.2 | Self-compassion

The 12-item version of Self-Compassion Scale (SCS-12) was used to measure participants' self-compassion.¹⁶ The SCS-12 has high correlations with the original 26-item SCS.¹⁶ Each item was answered on a 5-point Likert scale from 1 (*almost never*) to 5 (*almost always*). In this study, the scores of positive self-compassion (ie, self-kindness, common humanity, and mindfulness) and negative self-compassion (ie, self-judgment, isolation, and overidentification; items were reversed) were calculated separately.^{11,12} As such, a higher positive self-compassion indicated higher positive self-compassion, whereas a higher negative self-compassion score implied lower levels of negative self-compassion. Self-compassion total scores were calculated by summing the positive and negative self-compassion: Higher scores

TABLE 1 Demographical and medical characteristics of participants

		Percentage (N)
Age, years	Mean (SD)	50.78 (11.61)
	Range	18-79
Gender	Male	34.2% (52)
	Female	65.8% (100)
Education level	Low (elementary school)	10.5% (16)
	Middle (middle or high school)	67.8% (103)
	High (college/university or above)	19.7% (30)
	Missing	2% (3)
Marital status	Unmarried	1.3% (2)
	Married	92.1% (140)
	Divorced	1.3% (2)
	Widowed	3.9% (6)
	Missing	1.3% (2)
Salary	<¥3000	58.6% (89)
	¥3000-5000	29.6% (45)
	¥5000-10 000	7.2% (11)
	>¥10 000	0.7% (1)
	Missing	3.9% (6)
Cancer type	Breast cancer	28.4% (43)
	Lung cancer	15.1% (23)
	Gastric cancer	3.3% (5)
	Gynaecological cancer	22.4% (34)
	Colorectal cancer	5.9% (9)
	Lymph cancer	3.9% (6)
	Others	14.5% (22)
	Missing	6.6% (10)
Cancer stage	Stage I	18.4% (28)
	Stage II	39.5% (60)
	Stage III	23.7% (36)
	Stage VI	11.8% (18)
	Missing	6.6% (10)
Received types of medical treatment at T3	Chemotherapy	42.1% (64)
	Operation	14.5% (22)
	Radiotherapy	15.1% (23)
	Traditional Chinese medicine	7.9% (12)
	Chemotherapy + operation + radiotherapy	2% (3)
	Others	2.6% (4)
	Missing	15.8% (24)

indicated higher self-compassion. In this study, exploratory and confirmatory factor analyses confirmed the two-factor structure (ie, positive and negative self-compassion) of the 12-item SCS. Previous studies reported good reliability and validity of the SCS-12 in general population.¹⁷ In our study, the Cronbach α s of self-compassion total score, positive self-compassion, and negative self-compassion across three measurements were 0.71 to 0.75, 0.84 to 0.87, and 0.70 to 0.79, respectively.

2.2.3 | Depression

The Patient Health Questionnaire (PHQ-9) was used to assess cancer patients' depression.¹⁸ The PHQ-9 contained nine items measuring cancer patients' symptoms of depression according to the diagnosis criteria of major depressive disorder of DSM-V. Each item was answered on a 4-point Likert scale from 0 (*never*) to 3 (*nearly every day*). Total scores ranged from 0 to 27: Higher PHQ-9 scores indicated more severe depression. Previous research in cancer patients has shown good reliability and validity.¹⁹ In this study, the Cronbach α s were 0.89 to 0.92 from T1 to T3.

2.2.4 | Anxiety

The six-item State Trait Anxiety Inventory (STAI-6) was used to assess cancer patients' anxiety symptoms.²⁰ Each item was answered on a 4-point Likert scale from 1 (*not at all*) to 4 (*very much*). The total scores of the STAI-6 ranged from 6 to 24. A higher score showed more severe anxiety symptoms. This scale has demonstrated good reliability and validity in cancer patients.²¹ In this study, Cronbach α s were 0.77 to 0.83 across three measurements.

2.2.5 | Fatigue

The Checklist Individual Strength (CIS) was used to assess participants' symptoms of fatigue.²² The CIS contained 20 items that can be divided into four subscales: eight-item subjective fatigue, five-item concentration, four-item motivation, and three-item activity. Each item was answered on a 7-point Likert scale from 1 (*yes, that is true*) to 7 (*no, that is not true*). The total scores ranged from 20 to 140, with higher scores indicating more severe fatigue. The CIS has good reliability and validity in cancer patients.²³ In this study, Cronbach α s ranged from 0.86 to 0.90 across three measurements.

2.3 | Data analyses

Statistical analyses were performed in SPSS 22.0. Several multiple hierarchical linear regression analyses were conducted to examine the cross-sectional and longitudinal relationships between self-compassion and symptoms of depression, anxiety, and fatigue. A total of six regression analyses were performed to examine the cross-sectional relationships between self-compassion at T1 (including total score or the two components of self-compassion) and as outcome, symptoms of depression, anxiety, or fatigue at T1.

About the longitudinal relationships, five regression analyses were conducted to examine the role of self-compassion total score at T1 in symptoms at T2 and T3. As self-compassion total score at T1 was not correlated with depression at T3, we did not perform regression analyses on T3 depression. Six regression analyses were performed to examine the role of positive and negative self-compassion at T1 in T2 and T3 symptoms. These longitudinal regression were controlled for baseline symptoms. To identify potential confounders, correlation, *t* tests, and ANOVAs were performed to examine the relationships between demographic and medical variables and depression, anxiety,

TABLE 2 Pearson correlations between study variables

	M (SD)	1	2	3	4	5	6	7	8	9	10	11	12
1. T1 self-compassion	39.7 (6.49)	-											
2. T1 positive self-compassion	19.48 (5.37)	0.77**	-										
3. T1 negative self-compassion	20.21 (4.16)	0.55**	-0.11	-									
4. T1 depression	7.27 (5.74)	-0.38**	-0.12	-0.40**	-								
5. T1 anxiety	14.44 (4.14)	-0.40**	-0.21*	-0.34**	0.59**	-							
6. T1 fatigue	78.57 (23.88)	-0.37**	-0.17	-0.35**	0.47**	0.55**	-						
7. T2 depression	8.11 (6.47)	-0.33**	-0.12	-0.32**	0.64**	0.48**	0.40**	-					
8. T2 anxiety	14.49 (3.89)	-0.42**	-0.25**	-0.30**	0.44**	0.57**	0.44**	0.61**	-				
9. T2 fatigue	79.12 (20.81)	-0.33**	-0.21*	-0.23**	0.22*	0.26**	0.60**	0.40**	0.43**	-			
10. T3 depression	8.78 (5.2)	-0.15	-0.23**	0.08	0.14	0.09	0.06	0.10	0.16*	0.07	-		
11. T3 anxiety	13.6 (3.48)	-0.24**	-0.18**	-0.11	0.19*	0.24**	0.24**	0.25**	0.45**	0.39**	0.61**	-	
12. T3 fatigue	77.1 (19.47)	-0.26**	-0.23*	-0.11	0.18*	0.18*	0.32**	0.18*	0.26**	0.39**	0.50**	0.67**	-

* $P < 0.05$. ** $P < 0.01$.

and fatigue. Age and education were significantly related to symptoms and were controlled as confounders in step 1 in the regression analyses.

Around one-third of our participants were diagnosed with breast cancer, 22.4% of cancer patients had gynaecological cancer, and 15.1% had lung cancer. The majority of patients were in stage II or III of cancer. Half patients received chemotherapy.

3 | RESULTS

3.1 | Sample characteristics

Table 1 provides the demographic and medical characteristics of our sample of patients. The mean age was 50.78 years. Most patients were female, had middle levels of education, and were married.

3.2 | Correlations between self-compassion and symptoms of depression, anxiety, and fatigue

Pearson correlations between self-compassion at T1 and symptoms of depression, anxiety, and fatigue at T1 to T3 are presented in Table 2. We found a weak negative correlation between positive and negative

TABLE 3 Hierarchical regression analyses between self-compassion at T1 and symptoms of depression, anxiety, fatigue at T1, T2, and T3

Predictors	Depression		Anxiety		Fatigue		
	Beta	ΔR^2	Beta	ΔR^2	Beta	ΔR^2	
Self-compassion total score							
T1	Step 1						
	Self-compassion	-0.366***	0.134***	-0.403***	0.163***	-0.371***	0.137***
	Total R^2		0.182 ^a		0.163		0.137
T2	Step 1		0.117***		0.168***		0.110***
	Self-compassion	-0.342***		-0.411***		-0.332***	
	Step 2		0.265***		0.191***		0.247***
	Self-compassion	-0.134		-0.227**		-0.087	
	T1 symptoms	0.569***		0.475***		0.554***	
	Total R^2		0.436 ^a		0.443 ^b		0.357
T3	Step 1				0.052**		0.053*
	Self-compassion			-0.228**		-0.231*	
	Step 2				0.027		0.046*
	Self-compassion			-0.162		-0.150	
	T1 symptoms			0.176		0.229*	
	Total R^2				0.126 ^a		0.139 ^c
Positive and negative self-compassion							
T1	Step 1		0.195***		0.183***		0.167***
	Positive self-compassion	-0.181*		-0.255**		-0.212*	
	Negative self-compassion	-0.431***		-0.376***		-0.370***	
	Total R^2		0.244 ^a		0.183		0.167
T2	Step 1		0.153***		0.169***		0.115**
	Positive self-compassion	-0.189*		-0.332***		-0.228*	
	Negative self-compassion	-0.370***		-0.289***		-0.267**	
	Step 2		0.231***		0.194***		0.243***
	Positive self-compassion	-0.092		-0.211**		-0.059	
	Negative self-compassion	-0.13		-0.118		-0.073	
	T1 symptoms	0.553***		0.480***		0.552***	
	Total R^2		0.438 ^a		0.444 ^b		0.357
T3	step 1				0.068*		0.075*
	Positive self-compassion	-0.197*	0.039*	-0.232**		-0.268**	
	Negative self-compassion	0.011		-0.152		-0.075	
	Step 2		0.014		0.032*		0.054*
	Positive self-compassion	-0.173*		-0.183*		-0.210*	
	Negative self-compassion	0.068		-0.08		0.001	
	T1 symptoms	0.131		0.196*		0.250*	
	Total R^2		0.099 ^c		0.099		0.128

^aRegression analyses were controlled for education.

^bRegression analyses were controlled for education and gender.

^cRegression analyses were controlled for gender.

* $P < 0.05$. ** $P < 0.01$. *** $P < 0.001$.

self-compassion ($r = -0.11$). A self-compassion total score and negative self-compassion at T1 were negatively correlated to symptoms of depression, anxiety, and fatigue at T1 (r ranged from -0.34 to -0.40 , all P s < 0.01). Positive self-compassion at T1 was to a lesser extent only significantly correlated with symptoms of anxiety at T1 ($r = -0.21$, $P < 0.05$).

About the longitudinal correlations, a self-compassion total score and negative self-compassion at T1 were negatively associated with symptoms of depression, anxiety, and fatigue at T2 (r ranged from -0.23 to -0.42 , all P s < 0.01); positive self-compassion at T1 was correlated to symptoms of anxiety ($r = -0.25$, $P < 0.01$) and fatigue at T2 ($r = -0.21$, $P < 0.01$). A different picture emerged at T3, with a self-compassion total score significantly related only to symptoms of anxiety ($r = -0.24$, $P < 0.01$) and fatigue ($r = -0.26$, $P < 0.01$) and not depression, and positive self-compassion related to all three types of symptoms (r ranged from -0.28 to -0.23 , all P s < 0.01), while negative self-compassion was not significantly related to symptoms.

3.3 | The predictive role of self-compassion in symptoms depression, anxiety, and fatigue over time

3.3.1 | The role of self-compassion total score

Cross-sectional regression analyses showed that self-compassion at T1 was significantly related to symptoms of depression, anxiety, and fatigue at T1, explaining 14% to 18% of the variance of symptoms (see Table 3). The longitudinal regression analyses showed that self-compassion at T1 only significantly predicted symptoms of anxiety at T2 and T3, when controlling for symptoms at T1 (and not symptoms of depression and fatigue).

3.3.2 | The role of positive and negative self-compassion

Cross-sectional regression analyses showed that negative self-compassion at T1 and to a lesser extent also positive self-compassion were significantly associated with depressive, anxiety, and fatigue symptoms at T1, explaining 17% to 24% of the variance.

About the longitudinal relationships, when accounting for symptoms at T1, positive self-compassion at T1 predicted symptoms of anxiety at T2 and T3, as well as symptoms of depression and fatigue at T3 (see Table 3).

4 | CONCLUSION

Our study in cancer patients is one of the first longitudinal studies to examine the beneficial role of self-compassion in psychological well-being over time. Cross-sectional regression analyses showed that, around cancer diagnosis, a self-compassion total score and negative self-compassion, and to a lesser extent positive self-compassion, were significantly related to symptoms of depression, anxiety, and fatigue. Particularly, positive self-compassion around diagnosis was the most consistent predictor of symptoms of depression, anxiety, and fatigue over time, in the period of medical treatment.

A key finding of our study is that the positive component of self-compassion was found to be more significantly related to the course of symptoms of depression, anxiety, and fatigue over time, than the negative component of self-compassion. Specifically, we found that higher levels of positive self-compassion shortly after cancer diagnosis (characterized by self-kindness, common humanity, and mindfulness) predicted patients' symptoms in the period when receiving medical treatment. No significant predictive role of negative self-compassion (characterized by self-judgment, isolation, and overidentification) for the course of symptoms was found. This finding suggests that, for people who are confronting with life-threatening diseases, being kind and understanding toward themselves, recognizing that suffering is part of life, and holding an open, accepting, mindful attitude towards difficulties in life, are more powerful for our future functioning than merely not being self-critical, not getting caught up by our negative experiences, and not feeling different and isolated. A possible reason could be that the negative components of self-compassion reflected a detrimental attitude toward oneself and were partly fused with psychological symptoms.²⁴ Therefore, after controlling for baseline levels of psychological symptoms, negative self-compassion at T1 may have little contribution to the symptoms at T3, given the strong correlation between negative self-compassion and symptoms at baseline. Considering the lack of longitudinal studies on the predictive value of self-compassion for psychological outcomes, the above explanations can only be taken as preliminary. Moreover, literature has provided preliminary evidence showing that self-compassion could promote one's emotion regulation even when confronting with stressful events.^{25,26} However, it remained unknown about whether it was positive or negative self-compassion that promoted emotion regulation. Future research is needed to examine the possible different role of positive and negative self-compassion on emotion regulation as well as the mediating role of emotion regulation between positive and negative self-compassion and psychological outcomes in general population and cancer patients.

At a conceptual level, our findings add to the ongoing debate about whether or not self-compassion should be conceptualized as a holistic state or whether positive and negative self-compassion should be considered as independent constructs.^{3,27} We found only a weak correlation between positive and negative self-compassion, and distinct patterns of relationships between positive and negative self-compassion on the one hand and symptoms on the other hand. This warrants for more research investigating in depth the benefits of positive self-compassion and downsides of negative self-compassion. Particularly, future research should examine whether a higher level of positive self-compassion would help to counteract a detrimental effect of negative self-compassion in people with cancer as well as other populations.

4.1 | Clinical implications

Although more research is needed before drawing any mature conclusions, findings of the present research highlighted that holding a self-compassionate attitude toward oneself could be beneficial for one's

psychological functioning when confronting a life-threatening disease such as cancer. Particularly, a positive self-compassion, that is, being kind and caring toward oneself, accepting suffering is normal life, and being mindful toward life difficulties, seemed to be important to help people to adapt with cancer in a longer run. These findings emphasized the importance of developing psycho-oncological interventions targeting the cultivating of positive self-compassionate attitudes and skills in people with cancer. Regarding the role of negative self-compassion, it would be premature at the moment to conclude whether interventions should focus on eliminating negative self-compassion or not, given the mixed findings regarding negative self-compassion in the current study. More longitudinal research is needed to further examine the role of negative self-compassion in one's adaptation to cancer.

4.2 | Study limitations

When interpreting findings of the current study, several limitations need to be considered. First, as we were only able to investigate associations of self-compassion with symptoms levels over time, no conclusions about causality can be made. Recent research suggest that, in line with our assumptions, self-compassion predicts depressive symptoms, rather than the other way around.¹⁰ Future studies, for example, applying an experimental design are needed to further examine the causality between self-compassion and psychological symptoms. Second, as we did not include positive outcomes such as positive affect, it was hard to draw conclusions regarding the role of self-compassion in cancer patients' resilience over time. Future longitudinal research in people with cancer should examine the predictive role of self-compassion in their positive outcomes. Third, even though our cross-sectional results were in line with previous studies in Western countries, findings of the current study in Chinese patients may not generalize to patients in other countries. It is needed to repeat our findings in cancer patients from other cultures. Fourth, as this study used a short form of the SCS, we could not examine the predictive role of the six facets of self-compassion in cancer patients' symptoms. Future studies using the 26-item SCS should be performed to examine whether the six facets of self-compassion played a differential role in predicting future psychological outcomes.

The present study was the first examining the longitudinal relationships between self-compassion and symptoms of depression, anxiety, and fatigue in people with cancer. Our findings clearly show that, although the cancer trajectory may be a particularly challenging life experience, being supportive and caring to oneself, embodying a balanced humanity, and accepting the present moment without judging are important to individual's adaptation to cancer. Clinicians and psychologists may pay special attention to help cancer patients to cultivate a positive self-compassion attitude toward themselves. Compassion-based therapy has been found to be effective in helping people to cope with psychological symptoms in cancer patients.²⁸ Future research is needed to particularly develop effective psychological therapy aiming at cultivating patients' positive self-compassion

and examine to what extent such therapy could increase positive self-compassion and how such changes are related to patients' psychological well-being.

ACKNOWLEDGEMENT

This study was financially supported by the Project of Humanities and Social Sciences, Ministry of Education of the People's Republic of China (grant number: 16YJC190033) and the Fundamental Research Funds for the Central Universities (grant number: GK201903108).

CONFLICT OF INTEREST

None to declare.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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How to cite this article: Zhu L, Yao J, Wang J, et al. The predictive role of self-compassion in cancer patients' symptoms of depression, anxiety, and fatigue: A longitudinal study. *Psycho-Oncology*. 2019;28:1918-1925. <https://doi.org/10.1002/pon.5174>