

# Study on the Current Status and Influencing Factors of Psychological Adaptation of Relatives and Caregivers of Patients after Esophageal Cancer

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## Abstract

**Objective:** To investigate the Psychological Adaptation Scale (PAS) of the main relatives and caregivers of patients after esophageal cancer surgery and analyze its influencing factors. **Methods:** From December 2019 to January 2021, 290 postoperative patients with esophageal cancer and their main relatives and caregivers from a tertiary A tumor hospital in Guangzhou were selected as the research objects using the convenience sampling method. The general information questionnaire and the Chinese version were used. Psychological Adaptation Level Scale (PAS) and Zarit Caregiver Burden Interview (ZBI) were investigated. **Results:** The PAS score of the main relatives and caregivers after esophageal cancer surgery was 45.00 (32.00, 67.00) points, the lowest score was 27.00 points, and the highest score was 80.00 points. The level of the caregiver's psychological adaptation is positively correlated with the caregiver's burden. The multiple stepwise regression analysis shows that the families per capita income, whether there is care experience and the caregiver's burden are the influencing factors of the caregiver's psychological adjustment level. **Conclusion:** The psychological adaptation level of the caregivers of the main relatives of patients after esophageal cancer surgery is obviously low. Medical staff should improve the psychological adaptation level of the caregivers in a targeted manner and take effective measures according to different influencing factors to improve the psychological state of the caregivers.

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## Keywords

Esophageal Cancer, Relatives and Caregivers, Psychological Adaptation Level, Caregiver Burden Interview

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## 1. Introduction

Esophageal cancer is a malignant tumor mainly derived from the esophageal squamous epithelium and columnar epithelium. China is a country with a large incidence of esophageal cancer, in which new and dead patients both account for about 55% of the world, being the first in the world (National Health Commission, 2019). The majority of patients are in the middle and advanced stage when diagnosed, and the 5-year survival rate is 10% - 20% (Deng et al., 2021). Comprehensive treatment based on surgery is the preferred method to treat esophageal cancer (Esophageal Cancer Professional Committee of China Anti-Cancer Association, 2013). A series of postoperative complications may be caused due to the complex anatomical position and specificity of the esophagus itself, such as anastomotic fistula, recurrent laryngeal nerve injury, postoperative malnutrition, lung infection and high recurrence rate and so on (Li, 2017). Thus, if the family caregiver lacks related nursing experience and also needs to balance some emotional stress of the patient and himself/herself, there will be a huge challenge to his/her psychological adaptation ability. Psychological adaptation mainly refers to the ability that various personality characteristics to cooperate to adapt to the environment (Lamb et al., 2016). A caregiver's psychological adaptation will not only affect his quality of life but also affect his/her nursing ability for the patient (Henry et al., 2015; Malpert et al., 2015). This study intends to investigate the psychological adaptation scale and influencing factors of the family caregivers of patients with esophageal cancer, explore its relationship with the caregiver burden, and provides a theoretical basis and practice guidance for effectively evaluating and improving the psychological adaptation ability of caregivers.

## 2. Objects and Methods

### 2.1. Objects

From December 2019 to January 2021, the radical postoperative patients with esophageal cancer and their family caregivers were selected as the objects by the convenience sampling method in our hospital. And the questionnaire survey was taken. The sample size estimation formula of the cross-sectional study applies:

$$n = \frac{(Z_{\alpha} + Z_{\beta})\sigma_{\alpha}}{\delta},$$

$Z$  value is taken as 0.05 of Bilateral  $\alpha$ , and power of test  $\beta$  is taken as 0.8. According to the references, parameter settings of  $\sigma$  and  $\delta$  refer to the values with significant difference in the inter-group comparative data of the

current same type study researching all the dimensions of relative caring ability. The maximum estimate is taken as 242. The final sample size  $N = 290$  is calculated based on the estimated 20% missing. Inclusion criteria of patients: 1) The radical postoperative patients with esophageal cancer who is diagnosed in the histopathology; 2) The patients who are over 18 years old, conscious and able to communicate; 3) The patients whose esophageal cancer is a primary lesion and non-metastatic; 4) The patients who are informed consent to this study and volunteered to participate in this study. Exclusion criteria: 1) The patients with a mental disorder; 2) The patients unwilling to cooperate; 3) The patients with acute and critical diseases of other systems. Inclusion criteria of primary caregiver: 1) To be the main family caregiver of the patient (with the longest daily caring time, or identified by the patient in the case of multiple family caregivers); 2) The caregivers who are aged from 18 to 80 years old, conscious and able to cognitively communicate; 3) The patients who are informed consent to this study and volunteered to participate in this study. Exclusion criteria: 1) The person with mental disorders or cognitive abnormalities who is unable to fill in the questionnaire; 2) The employed caregivers.

## 2.2. Tools

### 1) General data questionnaire

The questionnaire includes family caregivers' age, gender, relationship with patients, education level, marital status, residence, family monthly income, chronic disease, regular job and caring experience.

### 2) Psychological Adaptation Scale (PAS)

The PAS was prepared by the American scholar Biesecker et al. (Biesecker et al., 2013) according to the pressure and response interaction theory, and used for evaluating the psychological adaptation of patients with chronic diseases and their caregivers. The Chinese version was revised by Wang Mengjia et al. (Wang et al., 2021), and Cronbach's  $\alpha$  coefficient is 0.900, with good reliability and validity. The PAS contains 4 dimensions with 20 items, including response ability (5), self-improvement (5), sociability (5), and psychological growth (5). All the items use Likert 5 scoring method, in which "never" to "almost always" be scored 1 - 5 in turn and the total score is 20 - 100. And a higher score indicates a better level of caregivers' positive psychological adaptation. In this study, the Cronbach's  $\alpha$  coefficient of the FCTI is 0.852 and the test-retest reliability is 0.804.

### 3) Zarit Caregiver Burden Interview (ZBI)

The ZBI was prepared by Hamad et al. (Hamad et al., 2018) to efficiently survey and evaluate the burden of the family caregiver. The Chinese version was revised by Wang Lie et al. (Wang et al., 2006), which Cronbach  $\alpha$  coefficient is 0.87, with good reliability and validity. The ZBI has two dimensions, Personal strain and Role strain. Item 22 is the total nursing burden felt by the caregiver. The ZBI uses Likert 5 scoring method, in which "never" to "always" are scored 0 - 4 in turn and the total score is 0 - 88. And a higher score indicates a heavier

burden. Burden level division: 19 and below mean no or little burden; 20 - 39 means mild burden; 40 - 59 means moderate burden; 60 and above mean a heavy burden. In this study, the Cronbach's  $\alpha$  coefficient of the FCTI is 0.851 and the test-retest reliability is 0.791.

### 2.3. Research Method

A cross-sectional survey was used in this study, and the researcher himself explained the survey objective and how to fill it to the respondents with unified guidance, distributed the questionnaires uniformly after informed consent, and retrieved the questionnaires on the spot after completing the filling. Check for any error or missing filling, timely improve the questionnaire to ensure the integrity, and guide the respondents who have doubts in time, but do not interfere with and or imply any filling. This paper is completed by the researchers. There is no fund support, no interests and disputes. There are 315 pieces of questionnaire released in total, with 290 valid ones taken back at the effective rate of 92.1%.

### 2.4. Statistical Method

SPSS 25.0 software is used for statistical analysis, and the enumeration data are described with frequency and percentage. ( $x \pm s$ ) is used to describe the measurement data conforming to the normal distribution, and t-test or one-way ANOVA is used in the inter-group comparison; The measurement data in abnormal distribution was presented by  $M (P_{25}, P_{75})$  and the comparison among groups was conducted by the rank sum test; Spearman correlation analysis is used between the psychological adaptation and the burden of the caregiver, and for multiple-factor analysis, multiple linear stepwise regression analysis applies. It is statistically significant if  $P$  is  $<0.05$ .

## 3. Results

### 3.1. Single-Factor Analysis of Common Features and Psychological Adaptation of the Respondents

290 main family caregivers of postoperative patients with esophageal cancer, aging from 23 to 71 ( $46.75 \pm 12.98$ ), were selected for this study. The results show that the statistical difference ( $P < 0.05$ ) is found by comparing the psychological adaptation scores of the caregivers' different gender, education levels, family income per capita, any stable job and experience of caring, as shown in **Table 1** for details.

### 3.2. Scores of PAS and ZBI

PAS and ZBI scores are shown in **Table 2**. The total score of caregivers' burden is ( $24.46 \pm 3.18$ ). Caring burden: No or little burden accounts for 34.2%, mild burden accounts for 49.8%, moderate burden accounts for 13.1%, and heavy burden accounts for 2.9%.

**Table 1.** General data of caregivers and comparison on PAS Scores of caregivers with different features (n = 290).

Item	Number of cases (%)	Total PAS score	$t/\chi^2$	<i>P</i>
<b>Age/years old</b>			0.622	0.416
18 - 40	90 (31.03)	43.31 ± 0.32		
41 - 60	128 (44.13)	42.84 ± 0.25		
>60	72 (24.82)	42.86 ± 0.36		
<b>Gender</b>			0.311	<b>-0.014</b>
Male	122 (42.07)	42.90 ± 2.92		
Female	168 (57.93)	43.05 ± 3.07		
<b>Relationship with patients</b>			0.621	0.314
Spouse	119 (41.03)	43.03 ± 0.24		
Children	144 (49.66)	43.13 ± 0.27		
Spouses of children	3 (1.03)	41.67 ± 2.85		
Siblings	24 (8.28)	42.65 ± 0.68		
<b>Education level</b>			0.451	<b>0.002</b>
Primary school and below	49 (16.90)	42.96 ± 0.38		
Middle school	76 (26.21)	42.96 ± 0.32		
High school	65 (22.41)	42.98 ± 0.43		
Secondary specialized school and college for professional training	56 (19.31)	43.27 ± 0.46		
Undergraduate	37 (12.76)	42.70 ± 0.42		
Master degree and above	7 (2.41)	43.29 ± 0.89		
<b>Marital status</b>			4.515	0.237
Married	256 (88.28)	43.07 ± 2.98		
Unmarried	21 (7.24)	42.05 ± 3.35		
Celibate	11 (3.79)	42.99 ± 3.01		
Widowed	1 (0.34)	32		
<b>Place of residence</b>			3.747	0.127
Village	52 (17.93)	42.69 ± 2.75		
Town	138 (47.59)	43.12 ± 3.08		
City	100 (34.48)	42.99 ± 3.05		
<b>Have any chronic diseases</b>			0.839	0.216
Yes	31 (10.69)	42.90 ± 3.08		
No	259 (89.31)	43.00 ± 3.01		

## Continued

<b>A stable job</b>			-0.621	<b>0.005</b>
Yes	222 (76.55)	47.07 ± 3.02		
No	68 (23.45)	40.72 ± 2.97		
<b>Family income per capita/yuan</b>			0.476	<b>0.042</b>
<2000	44 (15.17)	43.91 ± 3.06		
2000 - 6000	147 (50.69)	42.91 ± 3.05		
6000 - 10,000	81 (27.93)	46.22 ± 3.03		
>10,000	18 (6.21)	52.78 ± 2.58		
<b>Any experience in caregiving</b>			-3.270	<b>&lt;0.001</b>
Yes	61 (21.03)	48.94 ± 2.97		
No	229 (78.97)	33.03 ± 3.02		

**Table 2.** PAS scores and burden of family caregiver (n = 290).

Item	Minimum value	Maximum value	Total score [M (P <sub>25</sub> , P <sub>75</sub> )]	Item [M (P <sub>25</sub> , P <sub>75</sub> )]	Scoring rate (%)
PAS					
Total PAS score	27	80	45.00 (32.00, 67.00)	2.25 (1.25, 3.07)	44.7
Coping capacity	7	21	13.00 (9.25, 17.00)	2.12 (1.07, 2.93)	47.6
Self-improvement	6	20	14.00 (7.25, 16.75)	2.24 (1.17, 3.09)	52.1
Social capacity	7	22	15.00 (9.00, 16.25)	2.31 (1.05, 3.35)	52.8
Psychological growth	5	23	15.00 (8.75, 17.75)	2.37 (1.15, 3.29)	53.1
ZBI					
Total ZBI score	6	68	24.00 (8.25, 20.00)	1.82 (0.72, 2.95)	25.7
Personal strain	6	32	13.00 (7.25, 15.00)	2.03 (1.42, 3.12)	23.2
Role strain	3	18	11.00 (4.50, 15.00)	1.56 (1.02, 2.45)	16.9

### 3.3. The Correlation Analysis between the Psychological Adaptation and the Burden of the Main Family Caregiver of Postoperative Patient with Esophageal Cancer (Table 3)

The correlation analysis between the psychological adaptation and the burden of the main family caregiver of postoperative patient with esophageal cancer (Table 3).

**Table 3.** Correlation analysis between the psychological adaptation and the burden of the caregiver (n = 290, r value).

Item	Total PAS score	Coping capacity	Self-improvement	Social capacity	Psychological growth
Total ZBI score	<b>-0.522<sup>a</sup></b>	-0.371	<b>-0.648<sup>a</sup></b>	-0.174	-0.078
Personal strain	<b>-0.731<sup>a</sup></b>	<b>-0.468<sup>b</sup></b>	<b>-0.604<sup>a</sup></b>	<b>-0.701<sup>a</sup></b>	<b>-0.437<sup>b</sup></b>
Role strain	<b>-0.607<sup>a</sup></b>	-0.201	<b>-0.544<sup>a</sup></b>	<b>-0.623<sup>a</sup></b>	<b>-0.711<sup>a</sup></b>

Note: <sup>a</sup> $P < 0.01$ ; <sup>b</sup> $P < 0.05$ .

### 3.4. Multiple Stepwise Regression Analysis on Influencing Factors of Psychological Adaptation of the Main Family Caregivers of Postoperative Patients with Esophageal Cancer

Multiple linear stepwise regression analysis is carried out by taking the total PAS score as a dependent variable and taking 6 variables with the statistical significance of single-factor analysis and correlation analysis as independent variables. The assignment method of the independent variables is shown in **Table 4**. The 3 independent variables, including the burden of the caregiver, the family income per capita, and experience of caring, enter a regression equation, as shown in **Table 5**.

## 4. Discussion

### 4.1. Psychological Adaptation of Family Caregivers of Postoperative Patients with Esophageal Cancer to Be Improved

For the main family caregiver of postoperative patients with esophageal cancer, PAS score is 45.00 (32.00, 67.00), the lowest score is 27, the highest is 80, and the overall scoring rate is 44.71%, which is consistent with the study of MJ Bull, et al. (Bull et al., 1990). The reasons are analyzed as follows: Esophageal cancer surgery is complex and takes a long time, and most postoperative patients will have a series of complications, which increases the mental pressure on most caregivers. On the one hand, caregivers need to envisage the multiple and complicated nursing, and on the other hand, they need to build a strong belief to provide emotional support. The study by Grunfeld E (Grunfeld, 2004) shows: a significant proportion of the caregivers suffer from anxiety and depression at the same time, which indicates that there is an unmet need for caregivers during the nursing of patients and points to the need for early mental assessment and potential intervention for caregivers. The scores, from low to high, of PAS in all dimensions are as follows: response ability, self-improvement, sociability and psychological growth, indicating that the caregiver is the poorest in response ability, which is probably because the caregiver feels stressed, nervous, anxious and so on after long-time care. During the process of getting along with the

**Table 4.** Assignment of independent variables.

Independent variable	Assignment method
Gender	Male = 1; Female = 2
Education level	Primary school and below = 1; Junior middle school = 2; Senior high school = 3; Secondary specialized school and College for professional training = 4; Bachelor degree = 5; Master degree and above = 6
A stable job	Yes = 1; No = 0
Family income per capita/yuan	<2000 yuan = 1; 2000 - 6000 yuan = 2; 6000 - 10,000 yuan = 3; >10,000 = 4
Any experience in caregiving	Yes = 1; No = 0
Score of caregiver burden	Original value

**Table 5.** Multiple linear regression analysis of influencing factors of psychological adaptation of family caregivers (N = 290).

Item	Partial regression coefficient	Standard error	Standardized regression coefficient	t value	P value
Constant term	-33.761	4.377	-	12.671	<0.001
Family income per capita/yuan	2.781	1.881	0.771	2.861	0.012
Any experience in caregiving	2.318	1.737	0.782	2.751	0.007
Score of caregiver burden	-0.771	0.087	-0.351	-3.765	<0.001

Note:  $F = 16.652$ ,  $R^2 = 0.735$ , Adjustment  $R^2 = 0.727$ ,  $P < 0.001$ .

patient, some emotional changes the patient can also affect the personal emotion of the caregiver. Foreign studies show that (Weitzner et al., 1999): When the patient is in advanced disease, caregiver's psychological adaptation becomes lower and burden increases significantly. In the aspects of the evaluation of the supporting resources of the family and the society, and balancing of the caregiving needs and the personal needs, the caring ability of the caregiver who is jobless or has a low household income is relatively low, which is probably because that cancer needs support from all aspects and the caregiver cannot balance all needs. In the aspects of learning and adapting to the role of caregivers, and assistance provided as required by the patients, most caregivers cannot adapt to the role from the beginning, and as time goes by, the caregivers gradually adapt to their roles and can provide assistance in multiple aspects. The study by Coristine M (Coristine et al., 2003) shows that caregivers focus on their own roles so much that their own medical demands is unattended. It indicates that the medical staff should provide targeted assistance and mental support for the caregivers, enhance the household nursing training of the patients with esophageal cancer after operation for the caregivers, effectively improve the sense of self-support of the caregivers, advocate for the patients to establish the response plan of household

nursing, and take the improvement of the life quality of the patient oriented. While caring for the patients, the physical and mental status of the caregivers should also be observed to provide various assistance for the recovery of patients.

## **4.2. Influencing Factor of Family Caregiver's Psychological Adaptation**

### **4.2.1. Caregivers with Heavy Burdens Have Weak Psychological Adaptation**

This study shows caring burden score of the family caregiver of postoperative patients with esophageal cancer is upper-moderate, and the caregiver's psychological adaptation and ZBI's two dimensions, personal strain and role strain, are inversely correlated; that is, the higher the caring burden score is, the weaker the psychological adaptation is. Foreign reports (Papastavrou et al., 2007) also indicate that there is a correlation between the psychological adaptation and caring burden of the caregiver of cancer patients. It indicates that the psychological adaptation of caregiver, such as self-response feeling and psychological acceptance, will affect caregiver's own sense of caring experience, and over caring burden will increase the negative emotion and reduce the enthusiasm of the caregiver, which will reduce the psychological adaptation of caregiver. It indicates that in the clinical practice, we should pay attention to reducing the burden and enhancing the enthusiasm of the family caregiver. And we should encourage and guide the patient and caregiver to enhance the psychological adaptation of caregiver, so as to further improve their quality of life.

### **4.2.2. Family Income Per Capita Will Affect the Psychological Adaptation of Caregiver**

The study (McMillan, 1996) shows that medical expense is the most important part of the family financial burden of the caregiver. The result of this study indicates that the caregiver with poor family financial status has the heaviest psychological adaptation. Esophageal cancer surgery is difficult and the procedure of postoperative rehabilitation and nursing is complex. High medical costs bring more difficulties to the family with poor economic conditions, which will not only affect the patient's recovery expectations, but also make it easier to produce depression and sadness for the family caregiver. As a result, it makes the psychological adaptation further reduced. It indicates that medical workers should pay attention to assessing the patient's family financial status, try not to increase medical expense burden when the illness allows, and assist and provide social support to low-income families.

### **4.2.3. The Experience of Caring Will Affect the Psychological Adaptation of Caregiver**

This study shows that caregiver with the experience of caring has higher psychological adaptation. The family caregiver, with the experience of caring for the postoperative patient, has a better psychological adaptation and response ability, which can satisfy the corresponding needs of patients. Certain study (Nijboer et

al., 1998) shows that early teaching of the caring experience to caregiver can improve the quality of life and recovery expectations of patients and caregivers. It indicates that according to the different needs of caregivers, the medical workers should make the targeted promotion and education. Especially for the caregivers lacking caring experience, the workers should help them study how to do the postoperative caring as soon as possible, communicate more, provide support in emotion, and enhance the psychological adaptation.

## 5. Conclusion

This study shows that the psychological adaptation of the main family caregiver of a postoperative patient with esophageal cancer is lower than moderate. The caring burden, family financial status and caring experience are the influencing factors of the psychological adaptation of the caregiver. In this study, most of the caregivers were middle-aged or elderly, with the localized feature, which influenced the score of the caregiver's psychological adaptation to some extent. In the future, medical staff should attach importance to the caregiver's psychological adaptation and offer targeted promotion and education guidance and mental support to enhance their psychological adaptation. It is expected that the insufficiency of research can be made up, and the influencing factors and solutions will be studied in depth in the future.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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