

# ความเครียดของบิดามารดาและปัจจัยอิทธิพลในมารดาที่มีบุตรเข้ารับการรักษาครั้งแรกที่ โรงพยาบาลด้วยโรคปอดบวม: การศึกษาแบบภาคตัดขวาง Parenting Stress and Its Factors among Mothers Having Infants with Pneumonia Hospitalized for the First Time: A Cross-sectional Study

นิพนธ์ต้นฉบับ

Original Article

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## บทคัดย่อ

**วัตถุประสงค์:** เพื่อประเมินระดับความเครียดของมารดาที่มีบุตรทารกป่วยด้วยโรคปอดอักเสบ โดยใช้โมเดลความเครียดในการเลี้ยงดูบุตรของบิดามารดา และตรวจสอบความสัมพันธ์ระหว่างความเครียดกับตัวแปรที่เลือก (ความรู้ด้านสุขภาพ การรับรู้ความสามารถของตนเอง การสนับสนุนทางสังคม ความวิตกกังวล ความรุนแรงของความเจ็บป่วยของทารก) **วิธีการศึกษา:** การวิจัยสุ่มตัวอย่างอย่างง่ายจำนวน 200 คน เป็นมารดาที่ดูแลบุตรทารกที่ป่วยด้วยโรคปอดอักเสบและเข้ารับการรักษาในโรงพยาบาลครั้งแรก จากแผนกกุมารเวชกรรม ของโรงพยาบาลที่ 2 มหาวิทยาลัยเวินโจว ประเทศจีน รวบรวมข้อมูลในช่วงกรกฎาคมถึงพฤศจิกายน 2564 โดยรวบรวมข้อมูลทั่วไป และใช้แบบสอบถามประเมินความรู้ด้านสุขภาพของบิดามารดาชาวจีน การสนับสนุนทางสังคม ความวิตกกังวลด้วยตนเอง ดัชนีความเครียดในการเป็นบิดามารดา (แบบสั้น-15) วิเคราะห์ความสัมพันธ์ด้วยสถิติเพียร์สันและการถดถอยพหุคูณ **ผลการศึกษา:** คะแนนเฉลี่ยความเครียดในการเป็นบิดามารดาเท่ากับ  $34.94 \pm 8.81$  คะแนน ปัจจัยความวิตกกังวล ( $\beta = 0.284$ ,  $P$ -value  $< 0.001$ ) ความรอบรู้ด้านสุขภาพของบิดามารดา ( $\beta = -0.192$ ,  $P$ -value  $< 0.05$ ) และการสนับสนุนทางสังคม ( $\beta = -0.175$ ,  $P$ -value  $< 0.05$ ) รวมกันอธิบายความแปรปรวนของความเครียดในการเป็นบิดามารดา ได้ร้อยละ 18.8 ( $P$ -value  $< 0.05$ ) **สรุป:** ความเครียดในการเป็นบิดามารดาและการสนับสนุนทางสังคมเป็นปัจจัยสำคัญในการลดความเครียดของการเป็นบิดามารดา ส่วนความวิตกกังวลเป็นเพิ่มความเครียด สามารถนำปัจจัยเหล่านี้ช่วยลดความเครียดของมารดาที่ทารกป่วยด้วยโรคปอดอักเสบ

**คำสำคัญ:** ความเครียดของการเป็นบิดามารดา; ปอดอักเสบ; มารดา; ทารก

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## Abstract

**Objective:** To evaluate the level of parenting stress among mothers of infants with pneumonia based on Parenting Stress Model and to examine its relationship with selected variables (health literacy, self-efficacy, social support, anxiety, the Severity of infants' illness). **Methods:** Simple random sampling technique was applied to recruit 200 participants who took care of their children with pneumonia, hospitalized at the first time from the pediatric department of the Second Affiliated Hospital of Wenzhou Medical University in Wenzhou, China from July to November 2021. Research instruments included demographic record form, Chinese Parental Health Literacy Questionnaire, Tool of Parenting Self-efficacy, Social Support scale, Self-rating Anxiety Scale, and the Parenting Stress Index-Short-15 Form. Data was using Pearson correlation and multiple regression analysis. **Results:** The mean score of parenting stress was  $34.94 \pm 8.81$  points. Anxiety ( $\beta = 0.284$ ,  $P$ -value  $< 0.001$ ), parental health literacy ( $\beta = -0.192$ ,  $P$ -value  $< 0.05$ ), and social support ( $\beta = -0.175$ ,  $P$ -value  $< 0.05$ ), together significantly explained 18.8% of variance in parenting stress ( $P$ -value  $< 0.05$ ). **Conclusion:** Parental stress of mothers was lower than the median. Parental health literacy and social support are important factors for reducing parenting stress, while anxiety is a risk factor for increasing parenting stress. Clinical medical staff can help mothers of children with pneumonia reduce parental stress by intervening these factors.

**Keywords:** parenting stress; pneumonia; mother; infant

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## Introduction

In China, pneumonia has always been in the first place in the prevalence and mortality of children.<sup>1,2</sup> The younger the age, the higher the incidence and fatality of pneumonia<sup>3</sup>, especially in infants under the age of 1. This is because their immunity is poor which allows pneumonia to easily spread, fuse and extend to both lungs. If the child did not receive treatment in time, the condition will further deteriorate, or even death.<sup>4</sup> Severe pneumonia is the most common respiratory critical disease in pediatrics and the main cause

of death in children aged  $\leq 5$  years.<sup>5</sup> The families of children especially mothers during the hospitalization are easy to have a sense of fear. When the mothers are informed of the sudden illness of the child, it might cause physical, psychological, and family problem for the mothers, especially for the first time of the mothers to care their children in the hospital.<sup>6,7</sup> This is because the mothers lack disease-related knowledge and care experience, and they cannot well assume the responsibility of care for the child.<sup>8,9</sup>

Most pneumonia infants as high as 78%, are usually accompanied by their mothers during hospitalization.<sup>10</sup> Providing care for the child with acute illness needs physical force and mental effort, which cause anxiety, tension and distress. Therefore, it is very important to understand the psychological stress and influencing factors of mothers of children with pneumonia who were hospitalized for the first time for follow-up targeted intervention, especially infants under 1 year old.

In a review of chronic parenting stress, it was found that high parental stress was associated with poor psychological adjustment among caregivers and children with chronic illnesses.<sup>11</sup> The most prominent theories of parenting stress highlight the bidirectional relationship between parenting stress (including everyday agitations) and child adjustment issues. Parenting children with emotional or behavioral challenges increases parenting stress, and parents who experience greater parenting-related stress may be more likely to maintain or exacerbate child problems.<sup>12</sup> Abidin and Richard proposed that impaired parental mental health would increase levels of parenting stress because of difficulties with meeting the needs of the child and the high levels of parenting stress could impair the mental health of the caregiver.<sup>5,13</sup> This present study aimed to determine parenting stress among mothers having children with pneumonia and to examine factors predicting the stress.

When parents' health literacy is low, it will not only affect their own health outcomes, but also lead to worse health outcomes of their children, especially young children.<sup>15</sup> A high parenting self-efficacy (PSE) is associated with less depression, anxiety, stress and fewer behavioral problems in parents, and less stress in parenting.<sup>16,17</sup> A lot of studies had proved social support could reduce parenting stress.<sup>14</sup> Anxiety can predict various aspects of postpartum maternal parenting stress.<sup>18</sup> Compared with prenatal depression, anxiety has a greater impact on postpartum parenting stress, with a higher level of parenting stress.<sup>19</sup> The results of a comprehensive literature review showed that severity of acute illness was associated with parenting stress.<sup>20</sup> The framework of the present study was based on Parenting Stress Model<sup>13</sup> and literature review. The purpose of this present study was to investigate the predictive relationship between health literacy, self-efficacy, social support, anxiety, Severity of infants' illness and parenting stress among mothers having children with pneumonia.

## Methods

This was a cross sectional, correlation predicative study on parenting stress and related factors among mothers of infants with pneumonia. Data collection was from July 2021 to November 2021. Participants were mothers who took care of children with pneumonia hospitalized at the first time at the 2<sup>nd</sup> Affiliated Hospital and Children's Hospital of Wenzhou Medical University. Inclusion criteria of the mothers included 1) the mother's age of at least 18 years old, 2) having a hospitalized infant of  $\leq 1$  year old, 3) their babies hospitalized for pneumonia for the first time, 4) having their baby hospitalized for two to three days, and 5) ability to communicate, read and write in Chinese. Exclusion criteria of the mothers was having the baby with chronic diseases other than pneumonia.

This research got approved from the faculty of nursing in Burapha University Institutional Review Board (approval number: G-HS036/2564) and the 2<sup>nd</sup> Affiliated Hospital of Wenzhou Medical University in China Institutional Review Board (approval number: 2021-K-63-02).

The sample size for this study was estimated from the number of independent variables.<sup>23</sup> Sample size was 40 per 1 independent variable. Since this study consisted of 5 independent variables, a total of 200 participants were required.

A simple random sampling method was used in this study. Approximately 8 - 10 infants were admitted for pneumonia each day, numbered according to the order of admission, and 5 were selected from them by lottery, and researchers completed the drawing of the list of eligible participants by 12 a.m. each day. In the afternoon, mothers filled out questionnaires. Mothers agreed to participate in the study and signed a consent form. This process was repeated until 200 individuals were recruited.

### Data Collection Procedure

The researchers explained the purpose, process, and voluntary nature of the study to the mothers and invited them to participate in the study. They were assured that they could withdraw from the study at any time with no consequences on the care their babies received. The questionnaires were filled out by the mothers themselves. A total of 210 mothers participated in the study, and 10 mothers dropped out of the survey. This was because the questionnaire was too long, so they refused to fill in the

questionnaire. A total of 200 completed questionnaires were obtained as planned.

### Research instruments

A questionnaire was used to collect data. The first part was to collect demographic characteristics of the infant and mother. Demographic characteristics of infants included age, gender, weight, embryonic age, ranking of siblings, past history, type of disease, length of hospital stay, severity of infants' illness, payment method of medical expenses. For the mother, we collected age, occupation, education, current employment status, marital status, average mothers' income monthly, average family income monthly, main sources of family income, types of family, family human relationships, number of brothers and sisters, number of children, daily time to take care of the children (except sleep time), family history of psychiatric pathology.

For psychosocial factors, a set of questionnaires was used to assess parenting stress (as a dependent variable), and a set of independent variables including health literacy, parenting self-efficacy, social support, anxiety, and severity of infants' illness.

The Parenting Stress Index-Short Form-15 (PSI-SF-15) was used to measure parenting stress.<sup>24</sup> It was the short Chinese version of the Parenting Stress Index (PSI-SF), that consists of the proposed three-factor structure including parental distress (PD), difficult children (DC), and parent-child dysfunctional interaction (PCDI). It has 15 items, with five items in each factor. The response is a 5-point Likert-type rating scale ranging from 1-strongly disagree, to 5-strongly agree. Total scores range from 15 to 75, with higher scores indicating higher parenting stress. The internal consistency reliability was acceptable with a Cronbach's alpha coefficient of 0.70.

Health literacy of the mother was evaluated using the Chinese Parental Health Literacy Questionnaire (CPHLQ).<sup>25</sup> The scale was designed to test the knowledge level among caregivers. The 39-question Chinese Parental Health Literacy Questionnaire demonstrated high internal consistency reliability (Cronbach's alpha coefficient of 0.89), split-half reliability (Spearman-Brown coefficient of 0.92) and test-retest reliability (Pearson's correlation coefficient = 0.82). The internal consistency reliability coefficients were over 0.6 which was considered as acceptable reliability for subscales.<sup>25</sup> For true/false questions, the correct answer

would score 4 points. For multiple choice questions there were 4 options in a question, each option was a true/false question, and one correct choice would score 1 point. Each question also had an option of "Don't know" which would get a 'zero' score. Therefore, each question had a score ranging from 0 to 4. The range of the CPHLQ score is between 0 and 100 points, a higher score indicates higher parental health literacy level.<sup>25</sup>

Parenting self-efficacy was rated using the Tool of Parenting Self-efficacy (TOPSE)<sup>26</sup> which was specifically used to evaluate the effectiveness of PSE interventions. The assessment tool was a self-rating scale with 48 items, which were divided into 8 dimensions specifically emotion, play, empathy, control, self-discipline/rule-making, stress, self-acceptance, and learning self-efficacy. The original tool had high internal consistency reliability with Cronbach's alpha coefficients of 0.80 ~ 0.89 for the 8 dimensions and 0.94 for the whole scale. Test-retest reliability coefficients were 0.58 to 0.88 for the 8 dimensions. The Chinese version of TOPSE's had Cronbach's alpha coefficients of 0.59 to 0.87 for the 8 dimensions, and 0.91 for the overall scale. The test-retest reliability coefficient were 0.51 to 0.71 for the 8 dimensions.<sup>27</sup> The response was a 11-level Likert-type rating scale where scale, where 0 represents complete disagreement and 10 represents complete agreement. The higher score indicates higher self-efficacy.

Social support revalued scale (SSRS) was used to measure social support. The SSRS adopts the questionnaire developed by scholar Xiao Shuiyuan.<sup>28</sup> It had 10 questions and contains three dimensions, namely, subjective support (4 items), objective support (3 items), and utilization of support (3 items). The scale scoring method is unique. Items 1 - 4 and 8 -10 are rated with a 4-point scale between 1 and 4 points. Item 5 is divided into five sub-items A, B, C, D, and E where each sub-item is rated with a 4-point scale of 1-none to 4-full support. For items 6 and 7, the score is 0 points for answer "no source" or "following sources" and 1 point for each source. Higher scores indicating higher levels of social support.

Anxiety was assessed using the Self-Rating Anxiety Scale (SAS) which was mainly used to evaluate the subjective feelings of patients with anxiety.<sup>29</sup> It had 20 items, and each item was rated with a 4-point Likert-type scale ranging from 1-No or little time, to 2-A small portion of time, 3-Quite a lot of time, and 4-Most or all of the time, based on

the experience of the last week. The Cronbach's  $\alpha$  of the questionnaire was 0.931. Total scores ranged from 25 to 100 points, with higher scores indicating higher levels of social anxiety.

The severity of infants' illness was assessed using the Pediatric Early Warning Score (PEWS).<sup>30</sup> The PEWS was developed by Monaghan et al in 2015 based on early warning scores. PEWS is composed of three significant signs and symptoms that include consciousness (1 item), cardiovascular (1 item), and respiratory evaluation initiatives (1 item). Observation indices contain 11 distinct indications (irritability, hypnosis, lethargy, coma, skin color, capillary refill time, heart rate, breathing, aspirating depression, groan, and the fraction of inspiration  $O_2$ ). Evaluation of each item is rated on a three-point scale ranging from "0" to "3." The total score ranges from 0 to 9, with higher scores indicating the more severe illness.

### Data analysis

Descriptive statistics including mean with standard deviation and frequency with percentage were used to summarize the participants' demographic characteristics and study variables. Correlations between study variables were tested using Pearson's product moment correlation analysis. Multiple linear regression analysis was used to quantify the predictive effect of each of independent variables on parenting stress. Statistical significance level was set at a type I error of 5% (or P-value < 0.05). All statistical analyses were performed using the SPSS 20.

## Results

Of the 200 participants, most of the infants were 1 - 6 months old (65%). More than half of infants were male (57%). Most of the infants were the second child in the family (48%). The majority of the infants (61%) had severe of illness and the weight/height of most of infants were 2-50<sup>th</sup> percentile (56.5%) (Table 1).

For the mothers, most of them were 30 - 39 years old (51%), married (99.5%) and with college education or higher (51.5%). Most mothers were unemployed (54%) and earned monthly personal income less than 3,000 RMB (29.50%) and 3,000-5,000 RMB (26.5%). The main source of household income was from their husband and their wages (50%). The majority of the mothers had medical insurance

for their infants (68%). Most of them took care of their infants for more than 6 hours per day (75%). Most mothers had no family history of psychiatric pathology (99.5%) (Table 2).

**Table 1** Demographic characteristics of infants (N = 200).

Infants Characteristics	N	%
Age ( <i>M</i> = 5.44, <i>SD</i> = 3.03, <i>Range</i> = 1- 12)		
1 - 6 months	130	65.00
7 - 12 months	70	35.00
Gender		
Male	114	57.00
Female	86	43.00
Ranking of siblings		
1 <sup>st</sup>	86	43.00
2 <sup>nd</sup>	96	48.00
3 <sup>rd</sup>	18	9.00
Weight / height ( <i>M</i> = 49.97, <i>SD</i> = 31.34, <i>Min</i> = 2, <i>Max</i> = 108)		
2 - 50 <sup>th</sup> percentile	113	56.50
50 - 97 <sup>th</sup> percentile	80	40.00
97 - 110 <sup>th</sup> percentile	7	3.50
Severity of infants' illness ( <i>M</i> = 1.41, <i>SD</i> = 1.257, <i>Min</i> = 0, <i>Max</i> = 5)		
0-1	78	39.00
2-5	122	61.00

**Table 2** Demographic characteristics of mothers (N = 200).

Mother Characteristics	N	%
Age (years) ( <i>M</i> = 30.03, <i>SD</i> = 4.29, <i>Min</i> = 21, <i>Max</i> = 45)		
20 - 29	94	47.00
30 - 39	102	51.00
40 - 45	4	2.00
Marital status		
Single	1	0.50
Married	199	99.50
Education		
Primary school	5	2.50
Secondary	46	23.00
High school	46	23.00
College or higher	103	51.50
Current employment situation		
Unemployment	108	54.00
Part-time employment	11	5.50
Full-time employment	81	40.50
Monthly personal income		
Less than 3,000 RMB	59	29.50
3,000 - 5,000 RMB	53	26.50
5,001 - 8,000 RMB	45	22.50
8,001 - 10,000 RMB	18	9.00
More than 10000 RMB	22	11.00
Main source of household income		
Husband	96	48.00
Mother	4	2.00
Family wages	100	50.00
Payment for medical expenses		
Medical insurance	137	68.00
Self-payment	63	32.00
Family human relation		
Good	82	41.00
Moderate	17	8.50
Poor	1	0.50
The time of take care the infant per day		
< 3 hours	9	4.50
3-6 hours	41	20.50
> 6 hours	150	75.00
Family history of psychiatric pathology		
Yes	1	0.50
No	199	99.50

The overall parenting stress of the mothers was  $34.94 \pm 8.81$  points by average which was about half of the highest possible score of 75 points. Dimension with the highest mean score was parental distress ( $13.48 \pm 3.73$  points), followed by difficult child ( $12.11 \pm 4.30$  points), and parent-child dysfunctional interaction ( $9.35 \pm 3.34$  points) (Table 3).

**Table 3** Scores of parenting stress among the mothers (N = 200).

PSI-SF-15	Range of scores		M	SD
	Possible scores	Actual scores		
Parenting stress	15 - 75	15 - 60	34.94	8.81
- Parental distress	5 - 25	5 - 24	13.48	3.73
- Parent-child dysfunctional interaction	5 - 25	5 - 20	9.35	3.34
- Difficult child	5 - 25	5 - 25	12.11	4.30

For the independent factors, mean score of parental health literacy of  $58.89 \pm 8.60$  points (or about 59% of 100 points) suggested that the literacy level was not high (Table 4). Parenting self-efficacy, on the other hand, was at  $336.97 \pm 59.78$  points by average (or about 70% of 480 points) which could be considered not low. It was fortunate that the score of severity of infants' illness was at  $1.41 \pm 1.26$  points by average (or about 16% of 9 points) indicating a low level of severity. The mean score of social support  $39.79 \pm 4.97$  points (or about or about 61% of 66 points) could be considered moderate to high level. Finally, the mean score of anxiety was  $46.66 \pm 9.68$  points (or about 47% of 100 points) indicating non-negligible level of anxiety (Table 4).

**Table 4** Scores of independent factors among the mothers (N = 200).

Factors	Range of scores		M	SD
	Possible scores	Actual scores		
Parenting self-efficacy	0 - 480	57 - 468	336.97	0.78
Parental health literacy	0 - 100	25 - 72	58.89	8.60
Social support	12 - 66	26 - 55	39.79	4.97
Anxiety	25 - 100	28.5 - 80	46.66	9.68
Severity of infants' illness	0 - 9	0 - 5	1.41	1.26

It was found that parenting stress had significantly, negative correlations with health literacy, parenting self-efficacy, and social support, and positively with anxiety (P-value < 0.01 for all). However, parenting stress and severity of infants' illness were not significantly correlated (Table 5).

**Table 5** Correlations<sup>§</sup> between factors and parenting stress (N = 200).

	1	2	3	4	5	6
1. Health literacy	1.00	0.227*	0.099	-0.132	-0.050	-0.263*
2. Parenting self-efficacy		1.00	0.362*	-0.092	-0.000	-0.199*
3. Social support			1.00	-0.164 <sup>§</sup>	-0.025	-0.264*
4. Anxiety				1.00	0.002	0.344*
5. Severity of infants' illness					1.00	0.029
6. Parenting stress						1.00

<sup>§</sup> Pearson's product moment correlation coefficient. \* P-value < 0.01; <sup>§</sup> P-value < 0.05.

To examine the influence of factors on parenting stress, all assumptions for multiple linear regression analysis were met. Regression residuals, P-P plots and scatter plots indicated normally distributed data. The variance inflation factors (VIF) of severity of infants' illness, anxiety, social support, parenting self-efficacy, and parental health literacy (1.005, 1.042, 1.174, 1.202, and 1.071, respectively) were all around 1.100 without severe multicollinearity and no outliers. Homoscedasticity test was significant (P-value < 0.001). The Durbin-Watson statistic was 1.890 which was acceptable. The standardized residual maximum was 3.546 meaning residuals were uncorrelated.

It was found that 18.8% of variance of parenting stress could be explained by parental health literacy, parenting self-efficacy, social support, anxiety, and severity of infants' illness together (P-value < 0.05). Anxiety had the most significant, positive influence on parenting stress ( $\beta = 0.284$ , P-value < 0.001). Parental health literacy and social support had a significantly negative influence on parenting stress ( $\beta = -0.175$  and  $-0.174$ , respectively, P-value < 0.05 for both). However, parenting self-efficacy and severity of infants' illness had no significant influence on parenting stress (Table 6).

**Table 6** Factors influencing parenting stress (N = 200).

Predicting variables	B	SE	$\beta$	T	P-value
Parental health literacy	-0.197	0.068	-0.192	-2.905	0.004
Parenting self-efficacy	-0.010	0.010	-0.066	-0.937	0.350
Social support	-0.311	0.123	-0.175	-2.532	0.012
Anxiety	0.259	0.059	0.284	4.354	< 0.001
Severity of infants' illness	0.171	0.449	0.024	0.380	0.704

R<sup>2</sup> = 0.208, adj. R<sup>2</sup> = 0.188, F<sub>5, 194</sub> = 10.207, PL-value < 0.05.

## Discussions and Conclusion

The results showed that the average stress score of mothers of infants with pneumonia was 34.94 points indicating that the parenting stress of mothers of infants with pneumonia in Wenzhou was relatively low. All the children

with pneumonia included in this study were hospitalized for the first time and had no underlying diseases, with mild disease accounting for 39%, and most of the children with severe pneumonia only showed respiratory symptoms without involving other systems. When the investigation was conducted on the second to third day after admission, mothers had understood the related treatment and effect, prognosis, nursing measures, and preventive measures, so the pressure of raising children was low.

Most of the family relationships in this study were in harmony. Good marital relationships will help mother to cope with the heightened parenting stress.<sup>31</sup> The results showed that although the stress of mothers with pneumonia was lower than that of mothers with chronic diseases, diseases such as allergic rhinitis<sup>28</sup>, congenital heart disease<sup>32,33</sup>, cerebral palsy<sup>34</sup>, children with cancer<sup>35</sup> and developmental disorders.<sup>36,37</sup>

The study showed that health literacy had a significantly negative correlation ( $r = -0.263$ ,  $P\text{-value} < 0.01$ ), and predicted parenting stress among mothers of infants with pneumonia ( $\beta = -0.192$ ,  $P\text{-value} < 0.05$ ). In this study, health literacy was a negative variable and had effect on parenting stress among mothers of infants with pneumonia. When parents' health literacy was low, children's health was prone to problems. Parenting Stress Model<sup>13</sup> pointed out that the factors affecting parenting stress include environment, children's development and characteristics, parenting ability and parental psychological structure. Parents and caregivers may not be able to provide or seek preventive health care for their children because of lack of knowledge and skills to do so effectively.<sup>38</sup>

The results indicated that parenting self-efficacy had a significant negative correlation ( $r = -0.199$ ,  $P\text{-value} < 0.05$ ), but no predicted parenting stress among mothers of infants with pneumonia. In this study, all children with pneumonia were younger than 1 year old, with obvious care needs, high demand for knowledge and skills needed for parenting. A significant increase in parenting difficulty and decrease in parenting self-efficacy could lead to increased parenting stress. Experiences and more opportunities for specific behaviors of parents may improve as they age and have more children. This is consistent with Bandura's theory that mastering experience contributes to overall self-efficacy.<sup>39</sup> In this study, the proportion of the second and third children is

57%. These mothers could have more knowledge and skills to take care of children. Due to China's national conditions, mothers feel less pressure in the process of raising the second and third children. With 98% of mothers under the age of 40, 75% of those with high school education or above, young mothers with high education level have new views on parenting, so the parenting efficiency could be above the average level.

The parenting self-efficacy of the mothers partially mediated the effect of parenting stress and lower quality of life.<sup>40</sup> In this study, according to the correlation analysis between parenting self-efficacy, health literacy and social support were positively correlated which means people with high parenting self-efficacy often also had high health literacy and good social support. When both of them were included in the multivariate regression analysis model, the decreasing effect of parenting self-efficacy on stress did not show statistical significance, which indicates that the decreasing effect of parenting self-efficacy on stress may actually be caused by the better social support and higher health literacy of individuals.

The results indicated that anxiety has a significant positive correlation ( $r = 0.344$ ,  $P\text{-value} < 0.01$ ), and predicted parenting stress among mothers of infants with pneumonia ( $\beta = 0.284$ ,  $P\text{-value} < 0.01$ ). This study found that the anxiety was more from the illness of the infants. Mothers were anxious because they didn't know how to take care of their infants with illness and diminished appetite. Therefore, their parenting stress increased. Many studies confirm that maternal anxiety is related to parenting stress.<sup>41,42</sup> Because of the increase of anxiety, mothers lost their usual parenting state.

The results indicated that social support has a significant negative ( $r = -0.264$ ,  $P\text{-value} < 0.01$ ), and predicted parenting stress among mothers of infants with pneumonia ( $\beta = -0.175$ ,  $P\text{-value} < 0.05$ ). In this study, social support was a negative variable and negative effect on parenting stress among mothers of infants with pneumonia. The results conformed to the Parenting Stress Model<sup>43</sup>, and is consistent with a number of studies.<sup>22,35,44</sup> Multiple studies also found that the more social support a mother felt, the less stress she felt in her role as a mother. When they received the more social support, the more information the mothers were supported by, including the knowledge about

some diseases, the treatment process and the prognosis. In terms of support from family and friends, higher support can relieve the mother's personal pressure, which could be shared by other family members. In terms of financial support, in China, many mothers were in the first year after childbirth with no economic sources, and the families in the economic support for them were also very important. In hospital where they need bigger expenses, financial support could relieve stress for hospitalization expenses. The score of social support of mothers with pneumonia was 39.79 points which was at a medium level, but higher than the norm 34.56 ( $SD = 3.73$ ).<sup>28</sup>

Social support was divided into three parts namely objective support, subjective support and social utilization, among which subjective support was closely related to individual subjective feelings. In this study, 99.5% of households were married, and 91% had harmonious family relationship. Married people were likely to get better social support from spouses and children. Their household income was more than 3000 yuan accounted for 70.5%, and more than 5,000 yuan accounted for 45%. In addition, only 2% of families relied on their mothers for income, and 68% had medical insurance. This suggests that having stable economic income was beneficial to reducing the financial burden of caregivers; while the financial burden of caregivers is negatively correlated with their social support level.<sup>20</sup> Therefore, objective support from mothers is relatively stable, and there is no need to worry about financial and other material things. In this study, mothers with pneumonia scored the highest in subjective support, so they had a higher sense of social support.

The results indicated that Severity of infants' illness had a significant negative correlation ( $r = 0.029$ ,  $P\text{-value} > 0.05$ ), and predicted parenting stress among mothers of infants with pneumonia ( $\beta = 0.704$ ,  $P\text{-value} > 0.05$ ).<sup>28</sup> When the infant had severe pneumonia, they need oxygen, aerosol inhalation, sputum aspiration and other treatment. While severe pneumonia affects the mood of children, it is a great challenge for the mother. Among parents of children with severe pneumonia, the primary cause of anxiety is the severity of the disease.<sup>6</sup> Increased face-to-face time and communication with medical providers during hospitalization helped reduce stress by promoting ongoing support.<sup>42</sup> In this study, 61% of the children with severe pneumonia were

surveyed on the 2<sup>nd</sup> or 3<sup>rd</sup> day after admission. After oxygen inhalation and sputum aspiration, the condition of the children was significantly improved, indicating that the treatment was effective, and the family members had more confidence in curing the disease. As the need for emotional improvement of children after disease improvement is reduced, the knowledge and skills of family members to take care of children with pneumonia are increased. In addition, the need for additional care caused by the severity of pneumonia is reduced, so the parenting stress is relatively small ( $\beta = 0.024$ ,  $P\text{-value} > 0.05$ ).

The present study has certain limitations. With a lot of questions in this questionnaire, the participants would be impatient and wanted to complete the answers quickly. Some might not pay much attention to the question, and some might drop out of the study. This could lead to bias in the results of the study. To solve this problem, we allowed mothers to stop when they start to get upset and take a 5-10 minutes break before continuing. When their mother is the primary caregiver, whether there are other caregivers, such as grandmother or grandmother in law, whose parental stress is different, should be distinguished.

In conclusion, this present study is the first to investigate the influencing factors of parental stress among mothers of infants with pneumonia in Wenzhou. The results showed that the parental stress of mothers in this study was lower than the median. It was higher than that of mothers of healthy children and lower than that of mothers of children with chronic diseases. Parental pressure mainly comes in the two areas of distress and difficulty child. Parental health literacy and social support are important factors for reducing parenting stress, while anxiety is a risk factor for increasing parenting stress. Clinical medical staff can help mothers of children with pneumonia reduce stress by intervening in these factors.

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