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Original Article

Current status and influencing factors of post-traumatic growth in maintenance hemodialysis

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ABSTRACT

Objective: To study the post-traumatic growth level and influencing factors in patients with maintenance hemodialysis.**Methods:** A total of 179 patients receiving maintenance hemodialysis from a third-level grade A hospital in Tianjin, China were investigated using Post-traumatic Growth Inventory (PTGI), Perceived Social Support Scale, and Medical Coping Modes Questionnaire.**Results:** The total score for the PTGI was 53.73 ± 16.45 . Multiple linear regression analysis showed that social support, coping style, marital status, and family income significantly influenced the post-traumatic growth level in patients undergoing maintenance hemodialysis. These factors explained 41.4% of the variance.**Conclusion:** Medical staff should help patients under maintenance hemodialysis to fulfill their potentials by boosting the level of social support and to effectively cope with internal conflicts. In addition, nursing staff should provide relevant psychological health education to patients to improve their post-traumatic growth.© 2017 Chinese Nursing Association. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

For decades, researchers have focused on post-traumatic growth to achieve improvement for individuals and groups [1]. In 1996, Tedeschi and Calhoun [2] first proposed the concept of post-traumatic growth. They found that traumatic events, such as major diseases and disasters, bring a negative psychological experience to the affected person. These experiences render the patient unable to apply positive growth changes. Therefore, post-traumatic growth refers to the positive psychological change that is experienced by individuals after confronting traumatic events or situations in their lives. The occurrence of end-stage renal disease (ESRD), a chronic disease that eventually leads to uremia, has increased gradually [3,4]. As a crucial alternative therapy in ESRD, maintenance hemodialysis is applied to sustain the lives of patients. Long-term hemodialysis is a highly stressful event that brings physiological and social influences to patients with ESRD [5]. Most

studies on patients undergoing maintenance hemodialysis have currently focused on negative emotions, such as anxiety and depression; however, research on the positive psychological effect of maintenance hemodialysis is limited. Some scholars have suggested that increased attention should be given to such positive effect, i.e., post-traumatic growth in chronic diseases with long courses and poor prognoses, such as cancer [6]. Existing literature on post-traumatic growth mostly emphasizes cancer [7,8], acquired immune deficiency syndrome (AIDS) [9], and myocardial infarction [10]. However, few studies were conducted on maintenance hemodialysis. This study investigates the current status of post-traumatic growth in China and explores the related influencing factors. Suggestions are provided for clinical nursing staff in taking appropriate measures to improve the post-traumatic growth level of patients.

2. Methods

2.1. Participants

This study adopted a cross-sectional descriptive design and was

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conducted from November to December in 2016. Through convenience sampling, 179 patients undergoing maintenance hemodialysis were investigated in a third-level grade A hospital in Tianjin, China. The inclusion criteria for patients are as follows: (1) diagnosed with chronic renal failure, (2) hemodialysis time of more than 3 months, (3) stable condition without mental illness or other serious body diseases, (4) alert consciousness, and (5) informed consent for participation in the survey. Patients who had difficulty in communicating were excluded from the study.

2.2. Instrument

The questionnaire used for data collection consisted of the following four parts: (1) socio-demographic characteristics, (2) Post-traumatic Growth Inventory (PTGI), (3) Perceived Social Support Scale (PSSS), and (4) Medical Coping Modes Questionnaire (MCMQ).

2.2.1. Socio-demographic characteristics

The socio-demographic characteristics of the participants included age, gender, marital status, education level, occupation, family income, living companions (alone or not), family relations, and health-payment types. The clinical information of the participants included dialysis age, frequency of dialysis, primary disease, self-care, acceptance of health education on dialysis from medical staff, and commencement of treatment with medicine.

2.2.2. PTGI

Using PGTI, we assessed the perceived positive changes of participants that resulted from chronic kidney failure [2]. The scale included 21 items that were grouped into five dimensions, i.e., relating to others (7 items), new possibilities (5 items), personal strength (4 items), spiritual change (2 items), and appreciation of life (3 items). Each item was assessed by a six-point Likert scale that ranged from 0 (“no change”) to 5 (“a great deal of change”). High scores reflected great perceived post-traumatic growth. This inventory was translated into Chinese by Wang et al. [11] and was validated with satisfactory reliability and validity. The Cronbach's α of the total inventory and the five dimensions ranged from 0.611 to 0.874. In the present study, the Cronbach's α coefficient of 20 maintenance hemodialysis cases in the pre-experimental stage was 0.852. This value indicated the reliability and validity of this inventory for application to maintenance hemodialysis patients. In this study, the Cronbach's α coefficient was 0.848.

2.2.3. PSSS

The PSSS was developed by Zimet and his friends in 1988 [12]. The Chinese version was eventually introduced and revised by Jiang Qianjin [13]. The revised scale contains three subscales with 12 items, including “support from the friends” (4 items), “support from the family” (4 items), and “support from the significant other” (4 items). Each item was assessed using a seven-point Likert scale ranging from 0 (“strongly disagree”) to 6 (“strongly agree”). The total scores range from 0 to 72, where a high score indicates a high degree of support. In the present study, the Cronbach's α coefficient in the total scale was 0.848. The Cronbach's α coefficients for “support from the friends,” “support from the family,” and “support from the significant other” were 0.898, 0.763, and 0.742, respectively.

2.2.4. MCMQ

H. Feifel [14] developed the MCMQ. The revised MCMQ [15] contained three dimensions, including confrontation (8 items), avoidance (7 items), and acceptance resignation (5 items). These three dimensions can represent the basic behavior of individuals threatened by a disease. Each item in the three dimensions was

assessed using a four-point Likert scale. In particular, 8 items entailed reverse scoring. The score of each dimension directly reflects the coping style of patients. A high score indicates a high degree of using such coping strategy. In the present study, the Cronbach's α coefficients for confrontation, avoidance, and acceptance resignation were 0.814, 0.742, and 0.730, respectively.

2.3. Data collection

Data were collected through face-to-face questionnaire survey, which was conducted by researchers in a hospital hemodialysis clinic. The patients were informed of the study purpose beforehand. After acquiring informed consent, the researchers used unified instruction to guide the patients in answering the questionnaires. Any confusion or questions from the patients were addressed by researchers. Our study disseminated 183 questionnaires, and 179 replies were valid, giving a valid response rate of 98%.

2.4. Ethical consideration

Ethical approval was received from the ethics committee of the Tianjin First Center Hospital and the Tianjin University of Traditional Chinese Medicine.

2.5. Statistical analysis

Data were analyzed using SPSS Version 17.0 (Chicago, IL, USA). The statistical methods applied included descriptive statistics, *t*-test, one-way ANOVA, Pearson or Spearman correlational analysis, and multiple linear regression analysis. Data were presented as means \pm standard deviations (SDs), and $P < 0.05$ was considered statistically significant.

3. Results

3.1. Characteristics of the participants

The questionnaires were answered by 179 participants aged 17–78 years (73.76 ± 8.212). The dialysis age ranged from 3 months to 218 months (45.18 ± 38.70), and the dialysis frequency was 2–4 times per week (2.99 ± 0.20). Additional details on the socio-demographic characteristics of the participants are listed in Table 1.

3.2. Level of post-traumatic growth, social support, and coping style among the hemodialysis patients

The overall post-traumatic growth level score was 53.73 ± 16.45 . After dividing each dimension score by the corresponding number of items, the mean score of each dimension is calculated and shown in Table 2. The total PSSS and MQMS scores for the three different dimensions are also presented in Table 2.

3.3. Univariate analysis of the impact on post-traumatic growth among the hemodialysis patients

The socio-demographic characteristics, social support, and coping style with maintenance hemodialysis were considered as independent variables, whereas the total score of post-traumatic growth was regarded as the dependent variable. We used an independent samples *t*-test, one-way ANOVA, and Spearman correlational analysis to perform a univariate analysis. Results showed that the post-traumatic growth level was not significantly affected by age ($r = -0.030$, $P = 0.685$), dialysis age ($r = -0.055$, $P = 0.464$), and dialysis frequency ($r = 0.005$, $P = 0.943$). By contrast, post-

Table 1
Demographic and clinical characteristic of the participants.

Variable	n (%)
Gender	
Male	96 (53.6)
Female	83 (46.4)
Marital status	
Unmarried	19 (10.6)
Married	147 (82.10)
Divorced/Widowed	13 (7.3)
Educational level	
Primary school or under	19 (10.6)
Junior middle school	68 (38.0)
Senior middle school	61 (34.1)
Junior college or above	31 (17.3)
Occupation	
Stable work	30 (16.8)
Unstable work	26 (14.5)
No work	49 (27.4)
Retirement	74 (41.3)
Family income (RMB/month)	
<1000	37 (20.7)
1000–2500	72 (40.2)
2501–5000	44 (24.6)
>5000	26 (14.5)
Living companions	
Living with family members	170 (95.0)
Living alone	9 (5.0)
Family relations	
Well	170 (95.0)
General	5 (2.8)
Poor	4 (2.2)
Health-payment types	
Self-funded	13 (7.3)
Medical insurance	158 (88.3)
Other	8 (4.5)
Primary disease	
Chronic glomerulonephritis	118 (65.9)
Nephrotic syndrome	3 (1.7)
Hypertensive nephropathy	13 (7.3)
Diabetic nephropathy	29 (16.2)
Polycystic kidney	8 (4.5)
Other	8 (4.5)
Received health education	
Yes	170 (95.0)
No	9 (5.0)
Self-care	
Complete self-help	162 (90.5)
Partial self-help	11 (6.1)
Totally dependent on others	6 (3.4)
Treatment type	
Medicine	134 (74.9)
Dialysis	45 (25.1)

Table 3
Comparison of level of post-traumatic growth for different variables.

Item	Mean ± SD	F/t	P value
Gender		0.139	0.890
Male	53.90 ± 13.26		
Female	53.54 ± 19.59		
Marital status		3.066	0.049
Unmarried	61.21 ± 13.58		
Married	53.33 ± 16.47		
Divorced/Widowed	47.31 ± 17.40		
Educational level		10.376	<0.001
Primary school or under	36.16 ± 17.39		
Junior middle school	55.26 ± 14.56		
Senior middle school	54.30 ± 14.65		
Junior college or above	60.03 ± 16.73		
Occupation		7.173	<0.001
Stable work	59.13 ± 14.92		
Unstable work	59.81 ± 15.42		
No work	45.47 ± 16.69		
Retirement	54.88 ± 15.33		
Family income (RMB/month)		13.869	<0.001
<1000	40.27 ± 14.79		
1000–2500	57.76 ± 14.85		
2501–5000	54.16 ± 14.88		
>5000	61.00 ± 15.33		
Living companions		1.811	0.072
Living with family members	54.24 ± 16.08		
Living alone	44.11 ± 21.34		
Family relations		0.258	0.773
Well	53.94 ± 16.58		
General	49.60 ± 16.44		
Bad	50.25 ± 13.20		
Health-payment types		1.059	0.349
Self-funded	47.69 ± 17.23		
Medical insurance	54.34 ± 16.35		
Other	51.50 ± 17.25		
Primary disease		0.389	0.856
Chronic glomerulonephritis	53.68 ± 16.29		
Nephrotic syndrome	50.67 ± 17.39		
Hypertensive nephropathy	50.31 ± 15.93		
Diabetic nephropathy	56.24 ± 14.77		
Polycystic kidney	49.75 ± 26.80		
Other	56.13 ± 16.09		
Received health education		1.769	0.079
Yes	54.23 ± 16.13		
No	44.33 ± 20.54		
Self-care		13.601	<0.001
Complete self-help	54.88 ± 15.43		
Partial self-help	54.45 ± 18.29		
Totally dependent on others	21.50 ± 3.83		
Treatment type		0.784	0.434
Medicine	54.29 ± 16.28		
Dialysis	52.07 ± 17.04		

Table 2
Scores of post-traumatic growth, social support, and coping styles.

Item	Dimension	Mean ± SD
Post-traumatic Growth Inventory	Post-traumatic growth	53.73 ± 16.45
	Personal strength	3.53 ± 0.84
	Appreciation of life	2.91 ± 1.03
	Relating to others	2.79 ± 0.99
	Spiritual change	2.71 ± 1.48
	New possibilities	1.16 ± 1.14
	Social support	66.10 ± 14.05
Perceived Social Support Scale	Social support	66.10 ± 14.05
	Confronting	20.12 ± 4.94
Medical Coping Modes Questionnaire	Avoidance	13.75 ± 4.54
	Acceptance—resignation	9.39 ± 3.57

traumatic growth level was significantly changed by marital status, education level, occupation, family income, self-care, social support, and coping style ($P < 0.05$). These results are shown in Tables 3 and 4.

3.4. Multiple linear regression analysis of patient post-traumatic growth level

A multiple linear stepwise regression model was used to

Table 4

Analysis of the correlation among post-traumatic growth, social support, and coping style in patients under maintenance hemodialysis.

Item	r value	P value
Social support	0.566	<0.001
Confronting	0.555	<0.001
Avoidance	−0.307	<0.001
Acceptance–resignation	−0.394	<0.001

determine the relationship between patient characteristics and post-traumatic growth level. Statistically significant variables were considered as independent variables, whereas the total score for post-traumatic growth was regarded as the dependent variable. The level of the variable in the equation was an alpha of 0.05, and the elimination level was 0.10. Based on the requirement of independent variable in multiple linear regression analysis, the ordered categorical variables were transformed into numerical data. The detailed method is shown in Table 5. Regression analysis revealed that factors, such as marital status, family income, social support, and confronting strategy, were included in the regression equation and accounted for 41.4% of the variance. The results are listed in Table 6.

4. Discussion

4.1. Post-traumatic growth status in patients undergoing maintenance hemodialysis

The mean post-traumatic growth level score was 53.73 ± 16.45 , which indicated the following points. First, in addition to negative emotions, patients undergoing maintenance hemodialysis attained a positive psychological change, such as post-traumatic growth. This result was consistent with Yorulmaz's study [16]. Second, the post-traumatic growth status in patients undergoing maintenance hemodialysis was at the lower–middle level, which urgently requires further improvement. Analysis of the five dimensions of post-traumatic growth showed that the score for personal strength was the highest, whereas that of new possibilities was the lowest. Considering individual differences, the post-traumatic growth levels may have slightly differed for the patients. Clinical staff should guide patients toward positive emotions to promote the latter's physical and mental health and post-traumatic growth.

4.2. Factors influencing post-traumatic growth in patients under maintenance hemodialysis

This study explored that marital status was one of the factors contributing to post-traumatic growth in patients under maintenance hemodialysis. Unmarried patients had higher level of post-traumatic growth than those who were married, divorced and widowed. Unmarried patients were generally young, with less

Table 6

Multiple linear regression analysis of post-traumatic growth level.

Variable	B	SE	b	t	P
Model 1 constant	−0.176	4.976	–	−0.035	0.972
Confronting	1.169	0.232	0.351	5.044	<0.001
Social support	0.337	0.081	0.287	4.180	<0.001
Marital status	10.630	3.096	0.200	3.434	0.001
Family income	3.012	1.035	0.177	2.910	0.004

Note: $R^2 = 0.427$, Adj. $R^2 = 0.414$, $F = 32.474$, $P < 0.001$.

burden of life, less social experience, and higher education level; hence, they had strong confidence to fight against their disease. This finding explains their positive and high post-traumatic growth level. However, due to some differences in subjects, gender, and other demographic characteristics, the result was inconsistent with previous study on breast cancer [17].

In the present work, high family income led to high post-traumatic growth level, which was consistent with Wang and Wu's study [18,19]. In China, patients with end-stage renal disease (ESRD) must pay expensive bills for dialysis, which must be conducted frequently for up to 2 to 4 times a week. Although the government could reimburse a portion of the medical expenses, the huge dialysis cost still puts a heavy economic burden for a normal family. In this case, patients have difficulty experiencing positive change. Therefore, medical staff should focus on the psychological state of patients who are in poor economic condition and should conduct positive psychological intervention to promote their post-traumatic growth.

Social support is the spiritual and material support patients gain from their social circles by contacting with their family, relatives, and friends. The mean social support score was 66.10 ± 14.05 , which revealed that patients with maintenance hemodialysis received middle-level social support. Multiple linear regression analysis showed that social support was an important influencing factor for post-traumatic growth, which is consistent with Hassonohayon's study [20]. Good social support contributes to the physical and mental growth of an individual and improves the living quality of hemodialysis patients [21]. Support, either economic or spiritual, from family, friends, relatives, and others will give patients huge psychological comfort, thereby positively promoting their post-traumatic growth. Medical staff should evaluate the social support system of patients, help them actively seek social resources, and make full use of their social support to promote the level of post-traumatic growth.

Lastly, coping style refers to different strategies that individuals decide to adopt when facing various dreadful life events. Different coping strategies have different effects on disease development. The three main coping styles are confronting, avoidance, and acceptance–resignation. Confronting strategy is positive, whereas the other two strategies are negative [22]. Correlation analysis revealed that post-traumatic growth level was positively related to

Table 5

Independent variable assignment styles.

Independent variable	Assignment
Marital status	Married ($Z_1 = 0, Z_2 = 0$); Unmarried ($Z_1 = 1, Z_2 = 0$); Divorced/Widowed ($Z_1 = 0, Z_2 = 1$)
Educational level	Primary school or under = 1; Junior middle school = 2; Senior middle school = 3; Junior college or above = 4
Occupation	No work/Retirement = 0; Stable work/Unstable work = 1
Family income	<1000 = 1; 1000 to 2500 = 2; 2501 to 5000 = 3; >5000 = 4
Self-care	Totally dependent on others = 1; Partial self-help = 2; Complete self-help = 3
Social support	Input the original value
Confronting	Input the original value
Avoidance	Input the original value
Acceptance–resignation	Input the original value

the confronting coping mode and negatively correlated to the avoidance and acceptance–resignation coping modes. In the present study, multiple linear regression analysis also showed that the confronting coping mode significantly influenced the post-traumatic growth. The confronting coping mode indicates that patients pay close attention to disease, seek help, and support in a positive way [23]. This coping mode relieves anxiety, depression, and other negative emotions and promotes individual growth and physical and mental health development. Medical staff should observe psychological changes in patients and provide them with suitable psychological counseling to introduce a positive approach of coping with disease.

5. Conclusions

The results of multiple regression analysis showed that confronting, social support, marital status, and family income should be entered into the regression equation. The findings indicated the importance of these factors in promoting post-traumatic growth. The status of post-traumatic growth of patients with maintenance hemodialysis was at the lower–middle level, suggesting a large room for improvement. This conclusion on the post-traumatic growth and its relative influencing factors for patients under maintenance hemodialysis provides reasonable and practical psychological intervention measures for medical staff to promote physical and mental health development and improve the post-traumatic growth level of the patients.

6. Study limitation

The major study limitation was that the evaluated factors only accounted for 41.4% of the total number of factors influencing post-traumatic growth. Another limitation was that the cross-sectional design of this study limited the prediction of a causal relationship among variables. Future studies with large sample sizes can focus on exploring other possible underlying factors that can affect the post-traumatic growth level in patients under maintenance hemodialysis.

Conflict of interest

The authors declare no conflict of interest.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.ijnss.2017.09.008>.

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