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Original Article

Application of Orem's self-care theory in the nursing of patients after craniocerebral tumor surgery and its impacts on their self-care ability and mental state

Cuicui Liu[1], Xin Zhang[1], Xianping Liu[1], Xia Li[1], Yan Chen[1], Guihua Xiao[1], Meifang Jiang[2]

Departments of [1]Neurosurgery, [2]Respiratory and Critical Care Medicine, 363 Hospital, Chengdu, Sichuan Province, China

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Abstract: Objective: To apply Orem's self-care theory in the nursing of patients after craniocerebral tumor surgery, and explore its impacts on their self-care ability and mental state. Methods: This prospective study was performed in 108 patients with craniocerebral tumor. According to the random number table, these patients were assigned to the experimental group (n=54) and the control group (n=54). Patients in the experimental group received Orem's self-care theory-based nursing, while patients in the control received routine nursing. Self-care ability, quality of life, sleep and mental state, nutritional indicators, and complications were compared between the two groups. Results: Exercise of self-care agency scores in all aspects in both groups after intervention were significantly higher than those before intervention; Hamilton rating anxiety scale and Hamilton rating depression scale scores in the two groups after intervention were significantly lower than those before intervention, and the changes in the experimental group were more than those in the control group (all P<0.01). World Health Organization quality of life BREF scores, serum total protein, and serum albumin levels in the two groups after intervention were significantly higher than those before intervention; Pittsburgh sleep quality index scores in both groups after intervention were significantly lower than those before intervention, and the decrease in the experimental group was more significant than that in the control group (all P<0.05). Compared with the control group, the incidence of complications in the experimental group was significantly reduced (3.70% vs 16.67%, P<0.05). Conclusion: Orem's self-care theory-based nursing of patients after craniocerebral tumor surgery contributes to the improvement of self-care ability, quality of life, sleep quality, and negative emotions, reduction of complications, and promotion of postoperative nutritional status.

Keywords: Orem's self-care theory, craniocerebral tumor surgery, self-care ability, mental state

Introduction

The brain is the command center of various functions of the human body. Patients' life is seriously endangered by craniocerebral tumor [1, 2]. Surgery is the primary treatment for patients with craniocerebral tumor. However, the therapeutic effect is influenced by psychological stress generated during the perioperative period, resulting in postponed postoperative recovery [3]. The quality of perioperative nursing is positively correlated with postoperative recovery.

In 1971, Orem's self-care theory was firstly proposed by Orem, an American scientist in nursing. It refers to a series of purposeful activities carried out to maintain the integrity of the body and the health of patients. Self-care ability is emphasized in Orem's self-care theory-based nursing, which has become a novel model in clinical nursing practice [4, 5]. Defect in self-care is a common symptom of most craniocerebral tumor patients after surgery. In this study, Orem's self-care theory was used in the nursing of patients after craniocerebral tumor surgery, and its impacts on their self-care ability, mental state, sleep quality, and nutritional status were explored.

Materials and methods

General information

This prospective study was performed in 108 craniocerebral tumor patients receiving surgi-

cal treatment in 363 Hospital from October 2018 to January 2020. These patients were allocated to the experimental group and the control group (54 patients in each group). This study was approved by the Ethics Committee of 363 Hospital. Informed consent was signed by the patients.

Inclusion criteria: Patients aged 35-70 years old; patients met the diagnostic criteria for craniocerebral tumor clarified in Diagnostic Essentials of Various Cerebrovascular Diseases, and would like to receive surgical treatment [6]; patients had clear awareness; informed consent was signed by the patients.

Exclusion criteria: Patients with brain diseases like brain trauma, intracranial infection, and sequelae after cerebral hypoxia; patients had mental illness; patients with contraindications to surgery; patients couldn't complete the questionnaire independently.

Methods

In the control group, patients received routine nursing: keeping the ward clean and tidy; ventilating regularly; avoiding loud noise; maintaining the ward quiet; providing a comfortable environment; ensuring adequate sleep; offering medication guidance during hospitalization; monitoring patients' vital signs closely at 24 h after surgery; dealing with complications immediately.

Patients in the experimental group received Orem' self-care theory-based nursing: (1) wholly compensatory nursing. Before recovery from anesthesia, all nursing work was performed by nursing staff. Vital signs were closely monitored, and foreign bodies in the respiratory tract were regularly removed. After recovery from anesthesia, nursing staff helped patients to turn over and maintain another comfortable position, and provided patients with dietary guidance. They tried their best to satisfy patients' requirements in nursing; (2) partially compensatory nursing. After the effects of anesthesia were completely eliminated, nursing work was mainly completed by patients. Assistances from nursing staff were provided, if necessary. Nursing plans, including diet, psychological guidance, and exercise were formulated by both patients and nursing staff. Most nursing work was completed by patients, with assistances from nursing staff. As a result, patients' subjective initiative was fully mobilized; (3) supporting education. Disease-related knowledge, expected therapeutic effect of the surgery, possible postoperative complications, and precautions were patiently introduced by nursing staff. Patients expressed their inner doubts and received strong psychological support. Also, they were instructed to release their negative emotions, and overcome their psychological fear. After surgery, nursing staff helped patients with a lot of oral secretions to clean up their oral secretions, informed them the methods to produce cough and sputum to reduce the risk of choking. Nursing staff were supposed to help hemiplegia patients perform active and passive movements in bed and turn-over training. Aphasia patients were guided to complete phonation training to promote the recovery of their language ability. For patients with obvious postoperative inferiority and anxiety, nursing staff would do psychologically counsel and comfort them.

Outcome measures

Main outcome measures: Exercise of self-care agency (ESCA) scale was used to assess self-care ability. The scale consisted of 4 aspects, including self-concept (44 points), self-care skills (56 points), self-care responsibility (32 points), and self-care knowledge (40 points). The higher the score, the stronger the self-care ability was [7].

Hamilton rating anxiety scale (HAMA) and Hamilton rating depression scale (HAMD) were applied to evaluate anxiety and depression, respectively. The higher the HAMA/HAMD score, the severer the anxiety/depression was.

Secondary outcome measures: World Health Organization quality of life BREF (QOL-BREF) and Pittsburgh sleep quality index (PSQI) were used to evaluate the quality of life and quality of sleep, separately [8, 9]. The total score of QOL-BREF scale was 145 points, and the higher the score, the better the quality of life was. The total score of PSQI scale was 18 points, and the lower the score, the better the quality of sleep was.

A volume of 5 ml of venous blood was collected from patients before surgery and at the time of

Table 1. Baseline data ($\bar{x}$ ± sd)

	Experimental group (n=54)	Control group (n=54)	χ^2/t	P
Gender (n)			0.149	0.700
Male	28	30		
Female	26	24		
Age (years)	55.4±5.7	53.7±6.3	1.470	0.144
BMI (kg/m^2)	22.90±3.29	23.25±3.67	0.522	0.603
Tumor type			0.910	0.634
Pituitary tumor	27	26		
Meningioma	14	18		
Others	13	10		

Note: BMI: body mass index.

discharge, respectively. After centrifuging at 3,000 rpm for 10 min, blood serum was separated from whole blood. Levels of total protein (TP) and albumin (ALB) were measured by immunoturbidimetry. Both kits were procured from Shanghai Qunji Biotechnology Co., Ltd., China, and product numbers were P6586 and P6596, respectively.

Complications, such as incision infection, intracranial infection, lung infection, cerebral hemorrhage, and motor sensory dysfunction were compared between the two groups. Incidence of complications = cases of complications/the total number of patients * 100%.

Statistical methods

All data were analyzed using SPSS statistical software version 20.0. The enumeration data were expressed as number/percentage (n, %); comparison was conducted with chi-square test. The measurement data were expressed as mean ± standard deviation ($\bar{x}$ ± sd). Independent sample t test was used for intergroup comparison, while paired t-test was applied for before-after comparison within the same group. The difference was statistically significant when *P* value was less than 0.05.

Results

Baseline data

There were no significant differences concerning gender, age, body mass index (BMI), and tumor type between the two groups (**Table 1**, all P>0.05).

ESCA score

As shown in **Table 2**, there were no significant differences on ESCA scores in all aspects between both groups before intervention (all P>0.05); ESCA scores in self-concept, self-care skills, self-care responsibility, and self-care knowledge in both groups after intervention were significantly higher than those before intervention, and the improvements in the experimental group were more significant than those in the control group (all P<0.01).

HAMA and HAMD score

As displayed in **Table 3** and **Figure 1**, there were no significant differences on HAMA and HAMD score between the two groups before intervention (both P>0.05); HAMA and HAMD scores in both groups after intervention were significantly lower than those before intervention, and the changes in the experimental group were more than those in the control group (all P<0.001).

QOL-BREF and PSQI score

As shown in **Table 4**, there were no significant differences on QOL-BREF and PSQI score between the two groups before intervention (both P>0.05); QOL-BREF scores in both groups after intervention were significantly higher than those before intervention, while PSQI scores were significantly lower; additionally, the changes in the experimental group were more than those in the control group (all P<0.05).

Nutritional indicators

As displayed in **Table 5**, there were no significant differences on serum TP and ALB level between the two groups (both P>0.05); serum TP and ALB levels in both groups after intervention were significantly higher than those before intervention, and the improvements in the experimental group were more significant than those in the control group (all P<0.05).

Complications

The incidence of complications in the experimental group, which consisted of intracranial infection (1 case) and motor sensory dysfunction (1 case), was significantly lower than that in

Table 2. ESCA score ($\bar{x}$ ± sd)

Group	Time	Experimental group (n=54)	Control group (n=54)	t	P
Self-concept	Before intervention	28.58±4.39	29.03±5.22	0.485	0.629
	After intervention	38.97±5.48***	35.18±6.59***	3.249	0.002
Self-care skill	Before intervention	39.30±5.40	39.13±5.49	0.162	0.871
	After intervention	48.98±6.15***	43.30±5.14***	5.208	<0.001
Self-care responsibility	Before intervention	23.30±4.33	23.75±4.20	0.548	0.585
	After intervention	29.37±4.50***	26.68±4.77***	3.014	0.003
Self-care knowledge	Before intervention	23.89±3.88	24.26±4.30	0.469	0.640
	After intervention	32.93±5.20***	27.40±4.57***	5.870	<0.001

Note: ESCA: exercise of self-care agency. Compared with before intervention, ***P<0.001.

Table 3. HAMA and HAMD score ($\bar{x}$ ± sd)

Group	HAMA score		HAMD score	
	Before intervention	After intervention	Before intervention	After intervention
Experimental group (n=54)	13.46±2.66	9.10±1.89***	6.94±1.80	4.77±1.49***
Control group (n=54)	13.85±3.10	11.28±2.60***	7.13±1.64	6.02±1.50***
t	0.702	4.984	0.573	4.345
P	0.484	<0.001	0.568	<0.001

Note: Compared with before intervention, ***P<0.001. HAMA: Hamilton rating anxiety scale; HAMD: Hamilton rating depression scale.

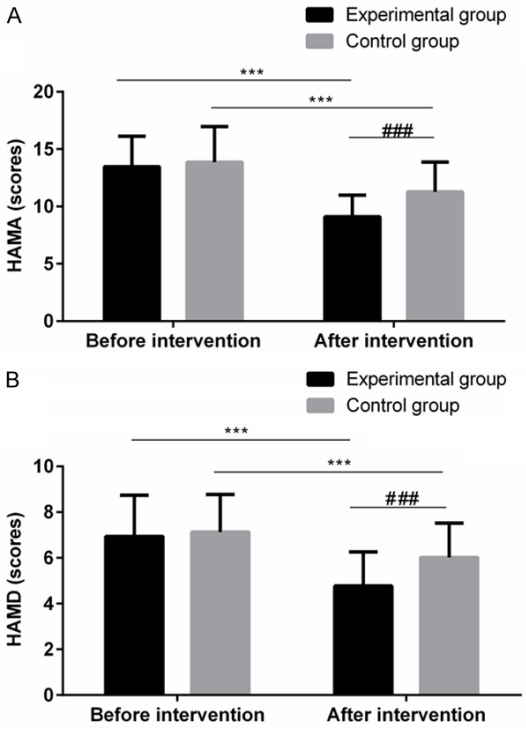

Figure 1. Comparison of HAMA and HAMD score. A: Comparison of HAMA score; B: Comparison of HAMD score. Compared with before intervention, ***P<0.001; compared with control group after intervention, ###P<0.001. HAMA: Hamilton rating anxiety scale; HAMD: Hamilton rating depression scale.

the control group (3.70% vs 16.67%, χ^2=4.960, P=0.026), which was composed of incision infection (2 cases), intracranial infection (2 cases), lung infection (1 case), cerebral hemorrhage (3 cases), and motor sensory dysfunction (1 case).

Discussion

After craniocerebral tumor surgery, most patients suffered from different degrees of physiological defect, high incidence of depression, and low self-care ability and quality of life [10, 11]. Orem's self-care theory-based nursing refers to the actions taken by patients to ensure their health and maintain their life. It is beneficial for the improvement of self-care ability, reduction of body damage, and promotion of recovery. Ultimately, patients' quality of life is improved [12].

In Orem's self-care theory-based nursing, different intervention measures are carried out for patients at different stages of the disease. Before recovery from anesthesia, wholly compensatory nursing, which means all nursing work is completed by nursing staff, is carried out. After recovery from anesthesia, partially compensatory nursing is taken. At this stage,

Table 4. QOL-BREF and PSQI score ($\bar{x}$ ± sd)

Group	QOL-BREF score		PSQI score	
	Before intervention	After intervention	Before intervention	After intervention
Experimental group (n=54)	78.89±10.50	104.40±14.97***	14.49±3.20	11.65±2.17***
Control group (n=54)	79.50±9.46	91.60±12.19***	14.10±3.55	12.68±2.22*
t	0.317	4.872	0.600	2.438
P	0.752	<0.001	0.550	0.016

Note: Compared with before intervention, *P<0.05, ***P<0.001. QOL-BREF: World Health Organization quality of life BREF; PSQI: Pittsburgh sleep quality index.

Table 5. Nutritional indicators ($\bar{x}$ ± sd)

Group	TP level		ALB level	
	Before intervention	After intervention	Before intervention	After intervention
Experimental group (n=54)	59.10±6.50	66.19±4.97***	33.07±4.30	40.70±4.39***
Control group (n=54)	60.89±5.78	63.59±5.44*	33.96±4.85	36.05±5.55*
t	1.512	2.593	1.009	4.829
P	0.133	0.011	0.315	<0.001

Note: Compared with before intervention, *P<0.05, ***P<0.001. TP: total protein; ALB: albumin.

most nursing work is performed by patients, while assistances from nursing staff are provided, if necessary. Additionally, support education is provided to instruct and assist patients to perform their nursing work. In this way, patients' self-care ability can be continuously improved [13]. Mohammadpour et al. reported that Orem's self-care theory-based nursing could significantly improve the self-care ability of patients after myocardial infarction surgery [14]. In our study, we found that ESCA scores in all aspects in the experimental group after intervention were higher than those in the control group, denoting that Orem's self-care theory-based nursing of patients after craniocerebral tumor surgery can significantly improve their self-care ability.

Patients are worried about whether their postoperative physical function can be fully recovered or not. Consequently, most patients are accompanied by obvious negative emotions, reduced sleep quality, and decreased quality of life [15]. Health education and emotional support are emphasized in Orem's self-care theory-based nursing. To be specific, patients' knowledge on the disease is enriched; patients are informed of methods to release their negative emotions; emotional support is provided to make patients spiritually comforted; assistances are offered to help patients conquer their psychological fear [16]. Partially compensatory nursing is an important part of Orem's self-care theory-based nursing. At this stage, patients are involved in the nursing work. With the improvement of self-care ability, patients are aware of their self-worth, which helps to alleviate their psychological pressure [17, 18]. Didisen et al. reported that Orem's self-care theory-based nursing could significantly improve the negative emotions of patients with pneumonia [19]. It was consistent with our results. Specifically, we found that HAMA, HAMD, and PSQI scores in the two groups after intervention were lower than those before intervention; the changes in the experimental group were more than those in the control group. Meanwhile, QOL-BREF scores in both groups after intervention were higher than those before intervention; the improvement in the experimental group was more significant than that in the control group. These results indicate that Orem's self-care theory-based nursing helps to reduce anxiety and depression, and improve postoperative sleep and life quality.

About half of the patients with malignant tumor are accompanied by various degrees of malnutrition [20], and that about 40% of malignant tumor patients died of malnutrition-related complications [21]. Dietary guidance is included in the three modules of Orem's self-care theory-based nursing. In this model, pati-

ents' diet is controled; a scientific and reasonable diet plan is formulated; patients are assisted to practice the plan. Therefore, patients' postoperative malnutrition status is significantly improved. In this study, serum TP and ALB level in the experimental group after intervention were significantly higher than those in the control group; compared with the control group, the incidence of complications in the experimental group was decreased. These results suggest that Orem's self-care theory-based nursing of patients after craniocerebral tumor surgery helps to improve nutritional status and reduce the incidence of complications.

However, there are some shortcomings in this study. Firstly, the data are single-centered. Secondly, the number of cases is small. Thirdly, the mechanism is not explored. Lastly, there is no long-term follow-up, and the long-term impact is thus not determined. Subsequent long-term follow-up study will be carried out.

In summary, Orem's self-care theory-based nursing of patients after craniocerebral tumor surgery contributes to the significant improvement of self-care ability, quality of life, sleep quality, and negative emotions, reduction of complications, and promotion of postoperative nutritional status, which is worthy of clinical application.

Disclosure of conflict of interest

None.

Address correspondence to: Meifang Jiang, Department of Respiratory and Critical Care Medicine, 363 Hospital, No. 108 Daosangshu Street, Wuhou District, Chengdu, Sichuan Province, China. Tel: +86-028-63800020; E-mail: jiangmeifang36sh@163.com

References

[1] Du X, Dong B, Li C, Zhang F, Ji Y, Zhang J and Yin C. Dynamic changes of α-melanocyte-stimulating hormone levels in the serum of patients with craniocerebral trauma. Exp Ther Med 2017; 14: 2511-2516.

[2] Deatrick JA, Barakat LP, Knafl GJ, Hobbie W, Ogle S, Ginsberg JP, Fisher MJ, Hardie T, Reilly M, Broden E, Toth J, SanGiacomo N and Knafl KA. Patterns of family management for adolescent and young adult brain tumor survivors. J Fam Psychol 2018; 32: 321-332.

[3] Cousino MK, Hazen R, Josie KL, Laschinger K, de Blank P and Taylor HG. Childhood cancer and brain tumor late effects: relationships with family burden and survivor psychological outcomes. J Clin Psychol Med Settings 2017; 24: 279-288.

[4] Wong CL, Ip WY, Choi KC and Lam LW. Examining self-care behaviors and their associated factors among adolescent girls with dysmenorrhea: an application of Orem's self-care deficit nursing theory. J Nurs Scholarsh 2015; 47: 219-227.

[5] Demoro CCDS, Fontes CMB, Trettene ADS, Cianciarullo TI and Lazarini IM. Applicability of Orem: training of caregiver of infant with Robin Sequence. Rev Bras Enferm 2018; 71: 1469-1473.

[6] Chinese Society of Neurology and Chinese Stroke Society. Diagnostic criteria of cerebrovascular diseases in China (version 2019). Chin J Neurol 2019; 52: 710-715.

[7] Gao H, Söderhamn U, Cliffordson C, Guo L, Guo Q and Liu K. Reliability and validity of the Chinese version of the self-care ability scale for the elderly. J Clin Nurs 2017; 26: 4489-4497.

[8] Ranawaka CK, Miththinda JK, Senanayake SM, de Alwis WR, Mufeena MN, Niriella MA, Dassanayake AS, de Silva AP, Pathmeswaran A and de Silva HJ. Validation of the Sinhala version of the chronic liver disease questionnaire (CLDQ) for assessment of health related quality of life among Sri Lankan cirrhotics. Ceylon Med J 2013; 58: 156-162.

[9] Del Rio João KA, Becker NB, de Neves Jesus S and Isabel Santos Martins R. Validation of the portuguese version of the pittsburgh sleep quality index (PSQI-PT). Psychiatry Res 2017; 247: 225-229.

[10] Rahn JJ, Lun X, Jorch SK, Hao X, Venugopal C, Vora P, Ahn BY, Babes L, Alshehri MM, Cairncross JG, Singh SK, Kubes P, Senger DL and Robbins SM. Development of a peptide-based delivery platform for targeting malignant brain tumors. Biomaterials 2020; 252: 120105.

[11] Mohan G and Subashini MM. MRI based medical image analysis: survey on brain tumor grade classification. Biomed Signal Proces 2018; 39: 139-161.

[12] Khatiban M, Shirani F, Oshvandi K, Soltanian AR and Ebrahimian R. Orem's self-care model with trauma patients: a quasi-experimental study. Nurs Sci Q 2018; 31: 272-278.

[13] Hasanpour-Dehkordi A, Mohammadi N and Nikbakht-Nasrabadi A. Re-designing Orem's self-care theory for patients with chronic hepatitis. Indian J Palliat Care 2016; 22: 395-401.

[14] Mohammadpour A, Rahmati Sharghi N, Khosravan S, Alami A and Akhond M. The effect of a

supportive educational intervention developed based on the Orem's self-care theory on the self-care ability of patients with myocardial infarction: a randomised controlled trial. J Clin Nurs 2015; 24: 1686-1692.

[15] Ruis C, Wajer IH, Robe P and van Zandvoort M. Anxiety in the preoperative phase of awake brain tumor surgery. Clin Neurol Neurosurg 2017; 157: 7-10.

[16] Nelson SK, Fuller JA, Choi I and Lyubomirsky S. Beyond self-protection: self-affirmation benefits hedonic and eudaimonic well-being. Pers Soc Psychol Bull 2014; 40: 998-1011.

[17] Mahmoudzadeh Zarandi F, Raiesifar A and Ebadi A. The effect of Orem's self-care model on quality of life in patients with migraine: a randomized clinical trial. Acta Med Iran 2016; 54: 159-164.

[18] Hasanpour-Dehkordi A. Self-care concept analysis in cancer patients: an evolutionary concept analysis. Indian J Palliat Care 2016; 22: 388-394.

[19] Didisen NA, Binay S and Yardimci F. Orem's self-care deficit theory and nursing care in relation to pneumonia: a case report. Stud Ethno Med 2017; 11: 311-317.

[20] Lauk O, Hashimoto M, Held U, Friess M and Opitz I. Poor nutritional status negatively influences prognosis of malignant pleural mesothelioma patients undergoing multimodal therapy. Zentralbl Chir 2019; 144: S62-S63.

[21] Zhu MW, Wei JM, Chen W, Yang X, Cui HY, Zhu SN, Zhang PP, Xiong J, Zheng DF, Song HJ, Liang XY, Zhang L, Xu WY, Wang HB, Su GQ, Feng LJ, Chen T, Wu YD, Li H, Sun JQ, Shi Y, Tong BD, Zhou SM, Wang XY, Huang YH, Zhang BM, Xu J, Zhang HY, Chang GL, Jia ZY, Chen SF, Hu J, Zhang XW, Wang H, Li ZD, Gao YY and Gui B. Dynamic investigation of nutritional risk in patients with malignant tumor during hospitalization. Zhonghua Yi Xue Za Zhi 2018; 98: 1093-1098.