

Effect of Comprehensive Nursing Intervention on Postpartum Psychological and Neurological Rehabilitation of Pregnant Patients with Encephalopathy

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To explore the effect of comprehensive nursing intervention on postpartum psychological and neurological rehabilitation of pregnant patients with encephalopathy. 102 patients who were diagnosed as preeclampsia or eclampsia and confirmed as reversible posterior leukoencephalopathy syndrome (RPLS) by brain MRI from January 2015 to September 2019 in our hospital were collected. In research group (RG), patients (n=57) were treated with comprehensive nursing intervention mode, while patients (n=45) were treated with traditional nursing intervention mode in control group (CG). In the two groups, the psychological and neurological rehabilitation were observed before and after intervention. By examining the biochemical indexes in the two groups before and after the treatment, it was found that the biochemical indexes were significantly reduced after the intervention, but there was no significant difference in the indexes of lactate dehydrogenase (LDH) and uric acid (UA) between the two groups before and after the treatment. In the two groups, the psychological mood was compared by the rating scale. After the intervention, the anxiety and depression were relieved in the two groups, and the scores of the self-rating anxiety scale (SAS) and self-rating depression scale (SDS) of RG were lower than those of CG ($P<0.05$). After treatment and nursing, the neurological damage of RPLS in both groups was improved, but the residual rate of headache in RG was lower than that in CG ($P<0.05$). The incidence of maternal and infant adverse outcomes in RG was lower than that in CG ($P<0.05$). According to statistics, the patients' nursing compliance and nursing satisfaction in RG were higher than those in CG ($P<0.05$). Comprehensive nursing intervention can significantly improve the adverse emotions of pregnant patients with encephalopathy and promote the rehabilitation of neurological function, so it has a high degree of nursing satisfaction.

Keywords: comprehensive nursing, preeclampsia, eclampsia, reversible posterior leukoencephalopathy syndrome

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Reversible posterior leukoencephalopathy syndrome (RPLS) is a clinical-imaging syndrome that has been clearly defined in recent years. It is caused by damage of intravascular endothelial cells and blood-brain barrier caused by various etiologies, causing extravasation of intravascular fluid and formation of angiogenic edema. Its etiology is relatively complex¹⁻³. Pregnancy is a common factor leading to RPLS⁴. Pregnancy-related diseases are common in patients with eclampsia and preeclampsia. In recent years, studies have suggested that the incidence rate of complicated RPLS diseases in preeclampsia or eclampsia mothers is very high, and the mortality rate of pregnant women will be high after complicated by RPLS⁴⁻⁶. Due to the reversibility of the disease, the clinical symptoms, signs and imaging of the most patients can be fully recovered after timely detection and treatment. However, if the disease is serious or not properly treated, irreversible cytotoxic cerebral edema, hemorrhage, infarction will be caused, leaving neurological sequelae^{7,8}.

In recent years, nursing intervention mode has been widely used in clinical practice. If the treatment is not sufficient, it may lead to further serious complications in patients with preeclampsia or eclampsia. Under evidence-based practice simulation, improving the level and ability of nursing teams can effectively improve and manage maternal and infant complications⁹. Therefore, adequate measures and nursing intervention for pregnant women with encephalopathy should be paid enough attention. However, with the continuous improvement of living standards in human society, the treatment of diseases is no longer merely superficial, and the conventional nursing intervention mode is no longer sufficient to meet people's needs^{10,11}. Comprehensive nursing mode is a comprehensive and high-quality form.

With

nursing procedures as the core, it better integrates nursing concepts, quality, planning and other measures, and it has high-class and advanced concepts, so it can meet the expected goals of patients to the greatest extent¹²⁻¹³. Since there is no report on the application of comprehensive nursing mode in pregnancy complicated with encephalopathy, this study was designed to explore the application value of comprehensive nursing mode by comparing the application of conventional nursing and comprehensive nursing mode in patients with pregnancy complicated with encephalopathy.

METHODS

Data Collection

In this study, 102 patients who were diagnosed as preeclampsia or eclampsia¹⁴ and confirmed as RPLS by brain MRI from January 2015 to September 2019 in our hospital were collected. According to their different nursing methods, they were divided into RG (n=57) and CG (n=45). Among them, the patients in RG received the comprehensive nursing intervention mode, with the age of (29.81±8.02) years old. The patients in CG received the traditional nursing intervention mode with an age of (28.97±8.16) years old. This research has been approved by the ethics committee of our hospital.

Inclusion criteria: The patient was diagnosed as RPLS by imaging¹⁵; The patient understood the content of the study and signed the informed consent; The patient had complete clinical data; The patient was a single pregnancy; There was no endocrine disease before or during pregnancy.

Exclusion criteria were as follow: comorbid with immune system and blood diseases; specific liver and kidney diseases; previous serious nervous system diseases or internal medicine diseases.

Nursing Intervention

CG: Traditional nursing intervention mode was implemented. Health education was given to pregnant women after admission. The ward environment, facilities and matters needing attention before and after delivery were introduced to them. The medical staff carried out routine examination to the puerpera, inquired about the medical history, understood the patient's physical condition in time, and responded in time in case of any abnormality. According to the blood pressure and edema of the parturients, nurses guided the pregnant women to have a healthy and reasonable diet, encouraged them to take more foods rich in vitamins, calcium and high protein, and controlled the intake of salt. The blood pressure of the patient was measured regularly to instruct the family members to pay attention to the changes of blood pressure. The cause of disease, clinical manifestations and attention points were popularized to the patients and their families. Nursing staff paid close attention to the morbidity of patients and gave corresponding measures to deal with in a timely manner. All patients were treated with relevant treatment, and nursing staff actively cooperated with doctors in this process. In the nursing process, nursing staff kept a positive and gentle tone to talk with patients. A comfortable, quiet ward environment was maintained. The nurses instructed the patients to have a reasonable life schedule. The nursing staff patiently guided the patients to leave the hospital and told them to maintain reasonable and regular living habits and pleasant mood. The patients with high blood pressure still needed to continue to take drugs for control and regular review.

RG: Based on the CG, comprehensive nursing intervention mode was applied. The patients were placed in the intensive care unit for pregnant women and they were cared for by special personnel. A good nurse-patient relationship was established

and the patient's condition was evaluated according to the patient's medical history, lifestyle, clinical examination results, etc. The nurses introduced the treatment and prognosis of the disease to the patients, explained its severity and instructed the importance of cooperation in treatment. The nurses understood and cared about patients, introduced successful cases to them, encouraged patients to express their negative emotions more and conducted counseling according to their own personality characteristics, and cooperated with professional psychologists to intervene when necessary. Nurses regularly detected and recorded blood pressure, and conducted urine test every week, so as to timely understand the condition, and used antihypertensive drugs for treatment according to the doctor's advice. The fetal heart was monitored regularly, and a certain amount of nutrient solution was injected to enhance the tolerance of the fetus to hypoxia. In the event of eclampsia/preeclampsia, the pillow was removed and the patient lay on his back with his head leaning to one side. Then, the airway was cleared, and a mouth-gap with gauze was placed in the mouth to prevent the tongue from being bitten or from drooping to block breathing. A certain amount of sedative drugs could be given when the disease developed and epilepsy continued to develop, and nursing staff paid attention to observe whether there was respiratory depression. Nursing for RPLS: Nursing staff strengthened patrol, closely monitored the changes of the disease, discovered the initial symptoms of RPLS in time, reported to doctors for brain CT or MRI examination as soon as possible, and clearly diagnosed or excluded the possibility of RPLS. According to the diagnosis results, the focus of nursing was shifted to targeted nursing. Generally, RPLS disease is urgent, so emergency medicines, items and equipment should be prepared. Patients with mild headaches could be given psychological comfort. When the patient had a severe headache accompanied by nausea and vomiting, the nurse paid close attention to the

pupil. When the patient's consciousness changed, the nursing staff gave pain relief, depressurization, dehydration and other symptomatic treatment. Most visual disorders could be recovered within 48 hours. It was necessary to cooperate with family members to actively eliminate the patients' fear, explain the reversibility of the disease and do a good job in visual field and vision examination. When the patient had epileptic seizure, the treatment method was the same as eclampsia/preeclampsia. When the patient's consciousness changed, the patient was awakened regularly. If there was no response, further pain stimulation was used to check for swallowing reflex, corneal reflex, gagism and other changes in the nervous system, so as to evaluate the state of consciousness. Safety protection, limb restraint and other measures were conducted to the patient until the consciousness turned clear.

Outcome Measures

The biochemical indexes, lactate dehydrogenase (LDH) and uric acid (UA) were observed in the two groups before and after treatment. The SAS and SDS¹⁶ were used to observe the emotional changes in the two groups before and after the intervention of nursing mode. The incidence of neurological damage and maternal and infant complications before and after intervention were compared between the two groups. According to

the questionnaire survey, the compliance and satisfaction on nursing were observed and compared in the two groups.

Statistical Processing

In this study, GraphPad Prism 7 (San Diego Graphpad Software Co., Ltd., USA) was used to statistically analyze the collected data and draw pictures. The counting data in this article were expressed by the number of cases/percentage [n(%)], and the comparison between the two groups was conducted by chi-square test. The measurement data were expressed by mean number \pm standard deviation ($\bar{x} \pm sd$). The comparison between the two groups was conducted by t test. The comparison between the two groups before and after intervention was conducted by repetitive measurement and analysis of variance. LSD-t test was used for post-mortem analysis. The difference was statistically significant with $P < 0.05$.

RESULTS

Comparison of Data between the Two Groups

The clinical data were counted in the two groups (Table 1). By counting and comparing, there was no significant difference between RG and CG in terms of age, whether it was primary delivery, advanced age, abortion history and regularity of prenatal examination ($P > 0.05$).

Table 1. Comparison of clinical data between the two groups ($\bar{x} \pm sd$)/n [%]

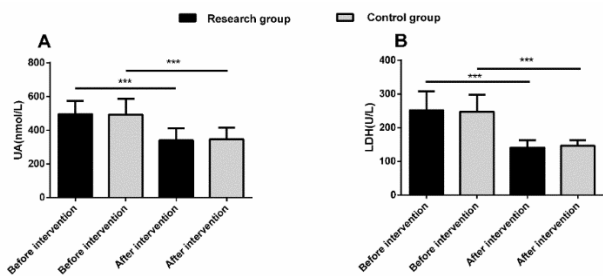
	RG (n=57)	CG (n=45)	X ² /t	P
Age/years old	29.81 \pm 8.02	28.97 \pm 8.16	0.521	0.603
Primipara or not			0.072	0.789
Yes	9 (15.79)	8 (17.78)		
No	48 (84.21)	37 (82.22)		
Elderly pregnant women or not			0.057	0.812
Yes	19 (33.33)	14 (31.11)		
No	38 (66.67)	31 (68.89)		

Abortion history or not			0.023	0.879
Yes	30 (52.63)	23 (51.11)		
No	27 (47.37)	22 (48.89)		
Regular prenatal examination or not			0.136	0.711
Yes	35 (61.40)	26 (57.78)		
No	22 (38.60)	19 (42.22)		

Comparison of Biochemical Indexes between the Two Groups

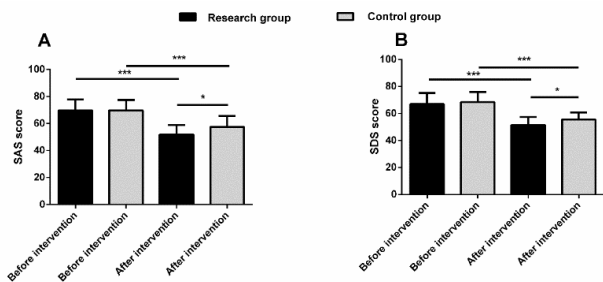
In the two groups, the biochemical indexes were detected before and after treatment intervention (Figure 1). There was no significant difference in LDH and UA indexes between the two groups

Figure 1.Comparison of biochemical indexes between the two groups.



A: Comparison of UA levels before and after intervention between the two groups. B: Comparison of LDH levels before and after intervention between the two groups.

Figure 2.Psychological changes of patients in the two groups.



A: Comparison of SAS scores between the two groups before and after intervention. B: Comparison of SDS scores between the two groups before and after intervention.

before the intervention, and the P value was greater than 0.05. However, after the intervention, the LDH and UA values in the two groups were significantly reduced, while the LDH and UA values of RG were slightly lower than those of CG, but the difference P value was greater than 0.05, which had no statistical significance.

Note: *** indicates a comparison between the two groups, ***P<0.001.

Psychological Changes of Patients in the Two Groups

In the two groups, the psychological emotions of patients were compared through the scoring table (Figure 2). There was no difference in SAS and SDS scores between the two groups before the intervention, and the P value was greater than 0.05. After the intervention, the anxiety and depression in the two groups were relieved, and the SAS and SDS scores of RG were lower than those of CG, and the P value was less than 0.05.

Comparison of SDS scores between the two groups before and after intervention.

Note: *** indicates a comparison between the two groups, ***P<0.001. * indicates the comparison between the two groups, *P<0.05.

Neurological Rehabilitation of Patients in the Two Groups after Treatment

According to statistics of neurological damage in the two groups, the compliance with high incidence rate was headache, epileptic seizure, visual change and consciousness disorder, while

there was no significant difference between the two groups ($P>0.05$). After treatment and nursing, the neurological damage of RPLS in both groups was improved. However, 6 patients in RG had residual nerve damage of varying degrees, while 12 cases in CG had residual nerve damage of varying degrees, while the residual rate of headache in RG was lower than that in CG, and the difference was statistically significant. More details are shown in Table 2.

Table 2.Comparison of neurological rehabilitation between the two groups n[%]

	Headache		Epileptic seizure		Visual changes		Consciousness disorder	
	Before intervention	After intervention	Before intervention	After intervention	Before intervention	After intervention	Before intervention	After intervention
RG (n=57)	32(56.14)	3(5.26)	23(40.35)	0(0.00)	20(35.09)	3(5.26)	16(28.07)	0(0.00)
CG (n=45)	30(66.67)	9(20.00)	19(42.22)	1(2.22)	16(35.56)	2(4.44)	13(28.89)	0(0.00)
X ²	1.169	5.261	0.036	1.279	0.002	0.036	0.008	-
P	0.280	0.022	0.849	0.258	0.961	0.849	0.928	-

Complications in the Two Groups

The complications of patients were counted in the two groups (Table 3). The incidence rate of complications in RG was 19.30%, while that in CG was 44.45%. The incidence rate in RG was lower than that in CG ($P<0.05$).

Table 3.Comparison of complications in the two groups n[%]

	Placental abruption	Postpartum hemorrhage	Cesarean section	Intrauterine growth restriction	Death	Incidence
RG (n=57)	2 (3.51)	1 (1.75)	6 (10.53)	2 (3.51)	0 (0.00)	19.30%
CG (n=45)	4 (8.89)	3 (6.67)	8 (17.78)	4 (8.89)	1 (2.22)	44.45%
X ²						7.516
P						0.006

Comparison of Neonatal Outcomes between the Two Groups

The neonatal outcomes were counted in the two groups (Table 4). It could be seen that the total incidence of premature delivery, fetal asphyxia, fetal death, neonatal respiratory distress syndrome and hypoxic-ischemic encephalopathy in RG was lower than that in CG, and the P value was less than 0.05.

Table 4.Neonatal outcomes in the two groups n[%]

	Premature delivery	Fetal asphyxia	Fetal death	Respiratory distress syndrome	Hypoxic-ischemic encephalopathy	Incidence rate
RG (n=57)	17 (29.82)	2 (3.51)	0 (0.00)	1 (1.75)	1 (1.75)	36.83%
CG (n=45)	20 (44.44)	2 (4.44)	1 (2.22)	2 (4.44)	1 (2.22)	57.76%
X ²						4.436
P						0.035

Survey of Compliance

The compliance was counted and analyzed between the two groups (Table 5). There were 2 non-compliance cases in RG and 9 non-compliance cases in CG. The compliance rate in RG was significantly higher than that in CG (P<0.05).

Table 5.Survey of compliance in the two groups n[%]

	Full compliance	Partial compliance	Non compliance	Compliance rate
RG (n=57)	37(64.91)	18 (31.58)	2 (3.51)	96.49%
CG (n=45)	17(37.78)	19 (42.22)	9 (20.00)	80.00%
X ²				2.666
P				0.007

Survey of Nursing Satisfaction in the Two Groups

The nursing satisfaction of patients was counted through questionnaire survey (Table 6). Among them, the nursing satisfaction of RG was 94.74%, while that of CG was 82.22%. The nursing satisfaction of RG was significantly higher than that of CG, and P value in statistics was less than 0.05.

Table 6.Statistical table of nursing satisfaction n[%]

	Great satisfaction	Satisfactory	Dissatisfaction	Satisfaction
RG (n=57)	34(59.65)	20(35.09)	3(5.26)	94.74%
CG (n=45)	15(33.33)	22(48.89)	8(17.78)	82.22%
X ²				4.093
P				0.043

DISCUSSION

There are many etiologies that induce RPLS, including hypertension, endocrine diseases, acute

and chronic renal dysfunction, etc.¹⁷. Hypertensive disorder complicating pregnancy is a high-risk group. Recent studies have shown that almost all eclampsia pregnant women will be complicated by

RPLS¹⁸. RPLS is usually characterized by acute onset and rapid progress, which is extremely easy to endanger the life safety of mothers and infants. However, the course of disease is reversible and the prognosis is generally better^{19,20}. Imaging features of RPLS are common in symmetrical white matter edema at the posterior part of the brain²¹. The clinical symptoms of RPLS are mainly manifested as headache, abnormal consciousness or mental state, epileptic seizure and vision disorder²². This study was mainly designed to analyze the maternal and infant outcomes of pregnant women with encephalopathy and the effect of nursing intervention.

Studies by Lu²² et al have found that UA level in preeclampsia/eclampsia patients complicated with RPLS was significantly higher than that in patients without RPLS, suggesting that monitoring UA level was helpful to find early RPLS in preeclampsia/eclampsia patients. At the same time, studies by Fang⁵ et al have proposed that LDH levels of patients with preeclampsia/eclampsia combined with RPLS were higher than those in patients without RPLS. Therefore, we detected UA and LDH levels before and after treatment and intervention in the two groups. The results showed that the LDH and UA values in the two groups were significantly reduced after treatment and intervention, while the LDH and UA values of RG were slightly lower than those of CG, but the difference was not statistically significant. It was suggested that RPLS in both groups could achieve better results after appropriate treatment and nursing intervention, which might be due to the urgency of RPLS disease. After symptomatic treatment, the clinical symptoms and imaging of most patients could be completely recovered. Previous research statistics show that in patients with preeclampsia/eclampsia complicated by RPLS, the most common symptoms are headache (53.62%), visual impairment (33.33%), epileptic seizure (42.03%), consciousness damage (30.43%)

and dizziness (31.88%)²³. However, another study shows that epilepsy is the most common symptom in patients with preeclampsia/eclampsia complicated by RPLS²⁴. However, the statistical results in this study were similar to those reported in literature²⁰. It was found that the compliance with higher incidence of neurological damage symptoms in patients with preeclampsia/eclampsia complicated by RPLS was headache, epileptic seizure, visual change and consciousness disorder. After treatment and nursing, the neurological damage of RPLS in both groups was improved, but the residual rate of headache in RG was lower than that in CG. Through analysis, it might be because there were a small number of elderly pregnant women in the population included in this study, and the proportion of patients without prenatal examination was relatively high, so there was some residual neurologic sequelae after statistics. The comprehensive nursing mode requires that nursing staff should not only master the knowledge related to the disease skillfully, but also timely answer the questions related to the disease raised by the patients. In case of emergencies, they can calmly solve problems and appease the patients' emotions. It is able to better respond to emergencies in the treatment process in a comprehensive and systematic way and reduce the damage to a minimum.

As the onset of preeclampsia/eclampsia complicated by RPLS is more serious and it is in pregnancy, patients are prone to anxiety and depression, and the negative emotions often affects the recovery of the disease²⁵. Some studies have reported that comprehensive nursing intervention can significantly relieve anxiety and depression in patients with femoral intertrochanteric fracture²⁶. Therefore, we compared the psychological emotions in the two groups through SAS and SDS scores. The results showed that anxiety and depression in the two groups were relieved after intervention, while SAS and SDS scores of RG

were lower than those of CG, suggesting that comprehensive nursing was more effective in alleviating the negative emotion of patients. It might be that the a good nurse-patient relationship was established in comprehensive nursing, and it greatly reduced the fear of the hospital. In addition, the nursing staff conducted counseling according to the patient's own characteristics, grasped the patient's psychological state in a timely manner, and cooperated with the relevant psychologists for intervention, which eliminated the negative emotions to a great extent in the comprehensive nursing. Preeclampsia/eclampsia patients complicated with RPLS are easy to lead to adverse outcomes of mother and infant ²⁷. Then, we compared the maternal and infant outcomes in the two groups. The results showed that the incidence of maternal and infant complications after comprehensive nursing intervention was significantly lower than that of CG. Through analysis, it might be due to the predictability of comprehensive nursing. Postpartum adverse outcomes might develop through evaluation of the patient's medical history, lifestyle, and clinical examination results. By paying close attention to the indicators and reactions of patients, positive measures were taken to cope with the situation. Through real-time information feedback and timely treatment, the prognosis of patients was improved. Previous studies have reported that comprehensive nursing can help children with severe burns integrate into society better and improve their satisfaction with nursing service personnel ²⁸. By counting the nursing compliance and satisfaction in the two groups, the results showed that the comprehensive nursing could significantly improve the patient's nursing compliance and satisfaction. It may be that comprehensive nursing makes up for the disadvantages of conventional nursing intervention mode. Through continuous improvement, the nursing work is promoted to be more standardized and the

nursing quality is greatly improved ²⁹. Through the power of words and actions, the patient's trust in the nursing staff is deepened, providing a better medical experience for the patient. At the same time, the results also reflected the status and recognition of comprehensive nursing in patients' minds, which is conducive to the wide promotion of clinical practice in the future.

In a word, comprehensive nursing can significantly improve the adverse emotions of pregnant patients with encephalopathy and promote the rehabilitation of neurological function, so it has a high degree of nursing satisfaction, which is worthy of clinical promotion. However, the study on long-term prognosis was limited because the reexamination of prognosis after discharge was not statistically analyzed in this study. In the future research, we can supplement the in-depth research in this direction, so as to better study the relapse of patients.

DECLARATION OF CONFLICTING INTERESTS

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REFERENCES

1. Moon JM and Chun BJ. Reversible posterior leukoencephalopathy syndrome. *J Emerg Med* 2010; 38: e1-4.
2. Lee VH, Temes RE, John S, Connors JJ, Bleck T and Prabhakaran S. Posterior reversible leukoencephalopathy syndrome presenting with global cerebral edema and herniation. *Neurocrit Care* 2013; 18: 81-83.
3. Doelken M, Lanz S, Rennert J, Alibek S, Richter G and Doerfler A. Differentiation of cytotoxic and vasogenic edema in a patient with reversible posterior leukoencephalopathy syndrome using

- diffusion-weighted MRI. *Diagn Interv Radiol* 2007; 13: 125-128.
4. Garg RK, Kumar N and Malhotra HS. Posterior reversible encephalopathy syndrome in eclampsia. *Neurol India* 2018; 66: 1316-1323.
5. Fang XB, Chen DJ, He F, Su CH, Ren LW, Chen J and Liang YL. [Risk factors analysis of reversible posterior leukoencephalopathy syndrome in pre-eclampsia or eclampsia grvida]. *Zhonghua Fu Chan Ke Za Zhi* 2017; 52: 40-46.
6. Golombeck SK, Wessig C, Monoranu CM, Schütz A, Solymosi L, Melzer N and Kleinschnitz C. Fatal atypical reversible posterior leukoencephalopathy syndrome: a case report. *J Med Case Rep* 2013; 7: 14.
7. Fang X, Liang Y, Chen D, He F, Chen J and Huang F. A study on clinicoradiological characteristics and pregnancy outcomes of reversible posterior leukoencephalopathy syndrome in preeclampsia or eclampsia. *Hypertens Res* 2017; 40: 982-987.
8. Noda K, Fukae J, Fujishima K, Mori K, Urabe T, Hattori N and Okuma Y. Reversible cerebral vasoconstriction syndrome presenting as subarachnoid hemorrhage, reversible posterior leukoencephalopathy, and cerebral infarction. *Intern Med* 2011; 50: 1227-1233.
9. Raney JH, Morgan MC, Christmas A, Sterling M, Spindler H, Ghosh R, Gore A, Mahapatra T and Walker DM. Simulation-enhanced nurse mentoring to improve preeclampsia and eclampsia care: an education intervention study in Bihar, India. *BMC Pregnancy Childbirth* 2019; 19: 41.
10. Luan RL, Zhu MX and Sun HY. Effect of comprehensive nursing intervention in preventing postoperative pain, complications, and psychological pressure in the otolaryngology department. *Medicine (Baltimore)* 2019; 98: e15923.
11. Shi RC, Meng AF, Zhou WL, Yu XY, Huang XE, Ji AJ and Chen L. Effects of Home Nursing Intervention on the Quality of Life of Patients with Nasopharyngeal Carcinoma after Radiotherapy and Chemotherapy. *Asian Pac J Cancer Prev* 2015; 16: 7117-7121.
12. Armstrong J and Mitchell E. Comprehensive nursing assessment in the care of older people. *Nurs Older People* 2008; 20: 36-40.
13. Ding Y and Lu YW. [Comprehensive nursing intervention helps improve medication compliance of prostate cancer patients undergoing endocrine therapy]. *Zhonghua Nan Ke Xue* 2019; 25: 434-436.
14. Mayama M, Uno K, Tano S, Yoshihara M, Ukai M, Kishigami Y, Ito Y and Oguchi H. Incidence of posterior reversible encephalopathy syndrome in eclamptic and patients with preeclampsia with neurologic symptoms. *Am J Obstet Gynecol* 2016; 215: 239.e231-235.
15. Kinoshita T, Moritani T, Shrier DA, Hiwatashi A, Wang HZ, Numaguchi Y and Westesson PL. Diffusion-weighted MR imaging of posterior reversible leukoencephalopathy syndrome: a pictorial essay. *Clin Imaging* 2003; 27: 307-315.
16. Yue T, Li Q, Wang R, Liu Z, Guo M, Bai F, Zhang Z, Wang W, Cheng Y and Wang H. Comparison of Hospital Anxiety and Depression Scale (HADS) and Zung Self-Rating Anxiety/Depression Scale (SAS/SDS) in Evaluating Anxiety and Depression in Patients with Psoriatic Arthritis. *Dermatology* 2020; 236: 170-178.
17. Onozawa R, Tsuboi Y, Obata T, Inoue H, Yamada T and Miyake K. [Reversible posterior leukoencephalopathy syndrome (RPLS) associated with Wegener's granulomatosis: a case report and review of the literature]. *Rinsho Shinkeigaku* 2012; 52: 567-570.
18. Brewer J, Owens MY, Wallace K, Reeves AA, Morris R, Khan M, LaMarca B and Martin JN, Jr. Posterior reversible encephalopathy syndrome in 46 of 47 patients with eclampsia. *Am J Obstet Gynecol* 2013; 208: 468.e461-466.
19. Shen T, Chen H, Jing J, Raza HK, Zhang Z, Bao L, Zhou S, Zhang S and Cui G. A study on clinical characteristics and the causes of missed diagnosis of reversible posterior leukoencephalopathy syndrome in eclampsia. *Neurol Sci* 2019; 40: 1873-1876.
20. Igel C, Garretto D, Robbins MS, Swerdlow M, Judge N and Dayal A. Neuromyelitis optica in pregnancy complicated by posterior reversible encephalopathy syndrome, eclampsia and fetal death. *J Clin Med Res* 2015; 7: 193-195.
21. Raman R, Devaramane R, Jagadish GM and Chowdaiah S. Various Imaging Manifestations of Posterior Reversible Encephalopathy Syndrome (PRES) on Magnetic Resonance Imaging (MRI). *Pol J Radiol* 2017; 82: 64-70.
22. Lu HY, Xie BD, Cheng Y and Niu XM. [Clinical features of preeclampsia-eclampsia patients with reversible posterior leukoencephalopathy syndrome]. *Zhonghua Yi Xue Za Zhi* 2010; 90: 178-181.
23. Xiaobo F, Yanling L, Dunjin C, Fang H, Jia C, Yuhua Z and Weixi Z. Effect of blood pressure on reversible posterior leukoencephalopathy syndrome in pre-eclampsia or eclampsia. *Hypertens Res* 2018; 41: 112-117.
24. Wen Y, Yang B, Huang Q and Liu Y. Posterior reversible encephalopathy syndrome in pregnancy: a retrospective series of 36 patients from mainland

25. Mbarak B, Kilewo C, Kuganda S and Sunguya BF. Postpartum depression among women with pre-eclampsia and eclampsia in Tanzania; a call for integrative intervention. BMC Pregnancy Childbirth 2019; 19: 270.
26. Fan D, Han L, Qu W, Tian S, Li Z, Zhang W, Xu L, Gao H and Zhang N. Comprehensive nursing based on feedforward control and postoperative FMA and SF-36 levels in femoral intertrochanteric fracture. J Musculoskelet Neuronal Interact 2019; 19: 516-520.
27. Dias G, Caeiro F, Santos AV, Landim E, Santos I, Matos T and Nazaré A. PP151. Hypertensive complications in pregnancy - Two year study (2008-2009). Pregnancy Hypertens 2012; 2: 321.
28. Luo XF, Zhang M, Zhao DJ, Lei Y, Liu J, Bai C, Zhou Q and Hu XH. [Influences of comprehensive nursing intervention on the caregivers of severely burned children]. Zhonghua Shao Shang Za Zhi 2018; 34: 648-652.
29. Jiafeng Yao, Masahiro Takei, Application of Process Tomography to Multiphase Flow Measurement in Industrial and Biomedical Fields – A Review, IEEE Sensors Journal, 17(24), 8196-8205, 2017, DOI: 10.1109/JSEN.2017.2682929.