

## Original Article

# Effects of quality nursing care in acute severe pancreatitis with acute renal failure and systemic organ disorders following hemofiltration therapy

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**Abstract:** Objective: To explore the clinical outcomes of acute severe pancreatitis (ASP), acute renal failure (ARF) and systemic organ disorders under quality nursing care and hemofiltration therapy. Methods: A total of 102 patients with ASP, ARF, and systemic organ disorders and treated by hemofiltration were retrospectively analyzed. Among them, 51 patients received routine nursing intervention from February-June 2018 were included in the control group, and 51 patients received quality nursing care from July-November 2018 were included in the research group. The renal function indicators [blood urea nitrogen (BUN) and serum creatinine (Scr)], nursing compliance, quality of life, psychological status, neurological function, self-care capacity, and nursing satisfaction before and after intervention were compared between the two groups. Results: Total nursing compliance (98.04%) in the research group was higher than that in the control group (82.35%) ( $P < 0.05$ ). After intervention, the quality of life score and self-care ability score in the research group were higher than those in the control group ( $P < 0.05$ ). The levels of BUN and Scr, negative emotion score and NIHSS score in the research group were lower than those in the control group ( $P < 0.05$ ). The total nursing satisfaction in the research group (98.04%) was higher than that in the control group (78.43%) ( $P < 0.05$ ). Conclusion: The quality nursing care can improve the psychological status of patients after acute severe pancreatitis with acute renal failure and systemic organ disorders treated by hemofiltration, improve their nursing compliance, improve renal function, promote neurological recovery, contribute to the improvement of self-care ability, so as to improve the quality of life and achieve higher satisfaction.

**Keywords:** Acute severe pancreatitis, acute renal failure, systemic organ disorders, hemofiltration, quality nursing care

## Introduction

Acute severe pancreatitis (ASP) is an inflammatory response to the activation of pancreatic enzymes in the pancreas, resulting in edema, hemorrhage, or necrosis of pancreatic tissues. It has a prolonged course and a poor prognosis and tends to lead to recurrent episodes of pancreatitis due to poor living habits [1]. The clinical manifestations are an elevation of pancreatic enzymes, abdominal pain, and vomiting. In contrast, acute pancreatitis is prone to a multi-organ dysfunction syndrome, among which the incidence rate of acute renal failure can be as high as 78% and organ function is inevitably impaired [2, 3]. It has previously been reported that the mortality rate of acute severe pancre-

atitis combined with acute renal failure is as high as 60%-100% [4]. For this reason, hemofiltration therapy is often used clinically, which has little influence on hemodynamics but leads to poor prognosis due to incomplete removal of medium molecules [5]. Therefore, the quality of care after hemofiltration therapy determines the prognosis of patients.

Quality nursing care is a psychosocial intervention that can be performed prior to hemofiltration therapy in patients with acute severe pancreatitis (ASP), acute renal failure (ARF) and systemic organ disorders, which greatly reduces the occurrence of complications through professional nursing skills and a thorough examination of the patient's vital signs after

treatment. It is implemented in a stepwise fashion and is more acceptable to patients [6, 7]. In this regard, this study aimed to investigate the clinical effects of a systematic quality nursing care for patients with ASP, ARF and systemic organ disorders after hemofiltration therapy.

### Materials and methods

#### *Baseline data*

A total of 102 ASP patients with ARF and systemic organ disorders treated by hemofiltration were retrospectively analyzed. Among them, 51 patients received routine interventions from February-June 2018 were included in the control group and 51 patients underwent systematic quality nursing care from July-November 2018 were enrolled in the research group. Control group included 28 males and 23 females; age 46-84 years, mean ( $65.29 \pm 5.58$ ) years; disease duration 2-9 years, mean ( $5.82 \pm 3.09$ ) years. Research group included 27 males and 24 females; age 45-83 years, mean ( $65.23 \pm 5.47$ ) years; disease duration 3-8 years, mean ( $5.90 \pm 3.11$ ) years. The baseline data of two groups were comparable ( $P > 0.05$ ).

Inclusion criteria: patients who met the diagnostic criteria in the Chinese Acute Pancreatitis Diagnosis and Treatment Guidelines (Draft) [8], Chinese Expert Consensus on Surgical Clinical Practice of Chronic Renal Failure Secondary to Hyperparathyroidism [9], Chinese Expert Consensus on Diagnosis and Treatment of Infection-Induced Multiple Organ Dysfunction Syndrome in the Elderly [10]; who were accompanied by family members; those with the glomerular filtration rate  $< 30$  ml/min; and those who did not undergo dialysis were included. Exclusion criteria: patients with history of associated pancreatitis; those with malignant neoplasms; pregnant or lactating women; those with cardiac, hepatic or renal insufficiency; and those who were unable to communicate were excluded. This study was approved by the Ethics Committee of our hospital. The research objects and their families were informed and they signed a fully-informed consent form.

#### *Methodology*

The control group was intervened with routine nursing care including psychological guidance

for patients, ensuring balanced nutrition, medication guidance and discharge instructions, and monitoring of patients' vital signs during the nursing process.

The research group was under systemic quality nursing care, including (1) Psychological care. Patients were prone to anxiety, panic, and pessimism due to uncomfortable feelings, and some even had low confidence in the treatment and did not actively cooperate with health care providers. Health care workers needed to communicate closely with patients and could play soothing music at the appropriate time to relax their moods. At the same time, successful cases with full recovery should be set as models to improve the patient's confidence in treatment, and to improve their compliance with the treatment. Patients with similar conditions should be cared in the same room, so that patients could open their hearts and mutual communication was encouraged to reduce the psychological burden while accelerate the rehabilitation. (2) Vital signs of patients were closely monitored for respiration, temperature and blood pressure through intensive rounds, and if any abnormality occurred, the doctor should be informed immediately so that timely and targeted interventions could be taken. If the patient's body temperature was too high, physical cooling was required as directed by the physician. The renal function of patients was monitored regularly, and the formula of replacement solution was adjusted timely according to the monitoring results to ensure the stability of the patient's internal environment. (3) Dietary intervention. When patients underwent gastrointestinal decompression, they needed to be instructed to fasting, during which time their nutritional intake should be enhanced by IV fluids and tube feedings. If the patient's condition became stable, normal diet could be gradually resumed, but it was necessary to eat less with more frequent meals, and at the same time, the patient was strictly prohibited to eat spicy and irritating food, preferring easily digestible and light food. (4) Infection prevention. The hospital wards were well ventilated and that the floor and air were regularly disinfected. All nursing staff followed strict aseptic procedures. Patients should be properly turned and patted on the back to avoid falling pneumonia or bedsores, and their bed linen should be changed regularly to maintain personal hygiene.

Antibiotic use needed to be adjusted as directed by the physician to control the interval between antibiotic uses to avoid adverse reaction. (5) Plasma care. When a patient received a blood transfusion, the nursing staff should closely observe the adverse reactions of the patient and stop it immediately if abnormalities existed. (6) Discharge instructions. When the patient was discharged from the hospital, the caregiver needed to instruct the patient to refuse spicy and irritating foods and refrained them from smoking and drinking. Patients were also instructed to visit the hospital once a month to check liver and renal function, and at the same time, follow-up visits needed to be intensified so that patients could continue to experience quality nursing care after discharge.

### *Observational indicators*

*Main outcomes:* (1) Fasting venous blood was collected from the patients in the morning before nursing and at 7 d after nursing, and the levels of blood urea nitrogen (BUN) and serum creatinine (Scr) were determined by automatic biochemical analyzer. The kit was provided by Shanghai Westang Bio-tech Co., Ltd., and the operation was carried out in strict accordance with the kit instructions.

(2) Before and 3 months after nursing care, the Self-rating Anxiety Scale (SAS) and Self-rating Depression Scale (SDS) [11] were used to evaluate the anxiety and depression of the two groups of patients. Each scale contains 20 items on a 0-4 Likert scale. The critical values are 50 points and 53 points respectively. The higher score indicates the more severe anxiety and depression.

(3) The Self-Care Competence Scale (ESCA) [12] was used to assess the self-care abilities. The scale consists of 4 aspects, including [self-care responsibility (6 items), self-concept (8 items), health knowledge (17 items), and self-care skills (12 items)], 43 items, each of which is scored 0-4 over a total score of 172. The higher score indicates the greater self-care abilities.

(4) The neurological function was assessed with National Institutes of Health Stroke Scale (NIHSS) [13] before and 3 d after nursing care, which contains 15 items, with a total score of

42. Normal: 0-1, mild impairment: 1-4, moderate impairment: 5-15, moderate-severe impairment: 15-20, and severe impairment: 20-42.

*Secondary outcomes:* (1) Nursing compliance was compared in terms of dietary habits, medication, lifestyle, social activities, psycho-emotional fluctuation. Each item contains 10 questions, with question divided scored on 0-2 points. Out of 100 points,  $\geq 90$  is compliance, 60-89 is partial compliance,  $< 60$  is non-compliance. Total compliance rate = (compliance + partial compliance)/51  $\times$  100%.

(2) Quality of life (GQOL-74) [14] concise scale was scored before and 3 months after nursing. The scale covers 4 dimensions (physical function, psychological function, material life, and social function), 74 items, with each dimension score ranging 20-100 points. The higher score indicates the better quality of life.

(3) The nursing satisfaction survey form made by the hospital was employed, which contains 20 questions, and each question scored 1-5 points. The higher score indicates the higher satisfaction rate. 90-100 is very satisfied, 70-89 is satisfied, and less than 70 is unsatisfied. Total satisfaction rate = satisfied rate + very satisfied rate.

### *Statistical analysis*

SPSS23.0 software was used for analysis. The measurement data were expressed as ( $\bar{X} \pm S$ ) and compared between the two groups using the independent samples *t* test; while comparisons within groups were made using the paired *t* test. Count data were expressed as percentages and compared using  $\chi^2$  test.  $P < 0.05$  indicated significant difference.

## **Results**

### *Renal function*

Before intervention, the levels of BUN and Scr showed no significant difference between the two groups ( $P > 0.05$ ). After intervention, the levels of BUN and Scr were decreased in both groups, and were lower in the experimental group than those in the control group ( $P < 0.05$ ), indicating that compared with routine nursing care, systemic quality nursing care was more helpful to improve the renal function of SAP

**Table 1.** Comparison of renal function between the two groups before and at 7 d after nursing ( $\bar{X} \pm S$ )

Time	Group	BUN (mmol/L)	Scr ( $\mu\text{mol/L}$ )
Before nursing	Control group (n=51)	32.85 $\pm$ 4.74	324.02 $\pm$ 114.25
	Research group (n=51)	33.41 $\pm$ 5.12	321.14 $\pm$ 124.05
	<i>t</i>	0.573	0.122
	<i>P</i>	0.568	0.903
After nursing	Control group (n=51)	21.36 $\pm$ 3.81 <sup>a</sup>	204.89 $\pm$ 31.47 <sup>a</sup>
	Research group (n=51)	15.25 $\pm$ 4.04 <sup>a</sup>	169.52 $\pm$ 28.41 <sup>a</sup>
	<i>t</i>	7.858	5.958
	<i>P</i>	< 0.001	< 0.001

Note: Compared with the group before nursing, <sup>a</sup>*P* < 0.05.

**Table 2.** Comparison of nursing adherence between the two groups n (%)

Grouping	Compliance	Partial compliance	Non-compliance	Compliance rate
Control group (n=51)	16 (31.37)	26 (50.98)	9 (17.65)	42 (82.35)
Research group (n=51)	23 (45.10)	27 (52.94)	1 (1.96)	50 (98.04)
<i>Z</i> / $\chi^2$		<i>Z</i> =2.144		7.096
<i>P</i>		0.032		0.008

patients with ARF and systemic organ disorders treated by hemofiltration (**Table 1**).

#### Nursing compliance

Total nursing compliance in the research group (98.04%) was higher than that in the control group (82.35%) (*P* < 0.05), suggesting that compared with routine nursing care, the systemic quality nursing care was more helpful to improve the nursing compliance of SAP patients with ARF and systemic organ disorders treated by hemofiltration (**Table 2**).

#### Quality of life

Before intervention, there was no significant difference in psychological function, physical function, material life, and social function (*P* > 0.05). After intervention, the above indicators were all improved, and those in the research group were higher than those in control group (*P* < 0.05), suggesting that compared with routine nursing care, the systemic quality nursing care was more helpful to improve the quality of life of SAP patients with ARF and systemic organ disorders treated by hemofiltration (**Figure 1**).

#### Psychological status

Before intervention, SAS and SDS scores showed no significant difference between the

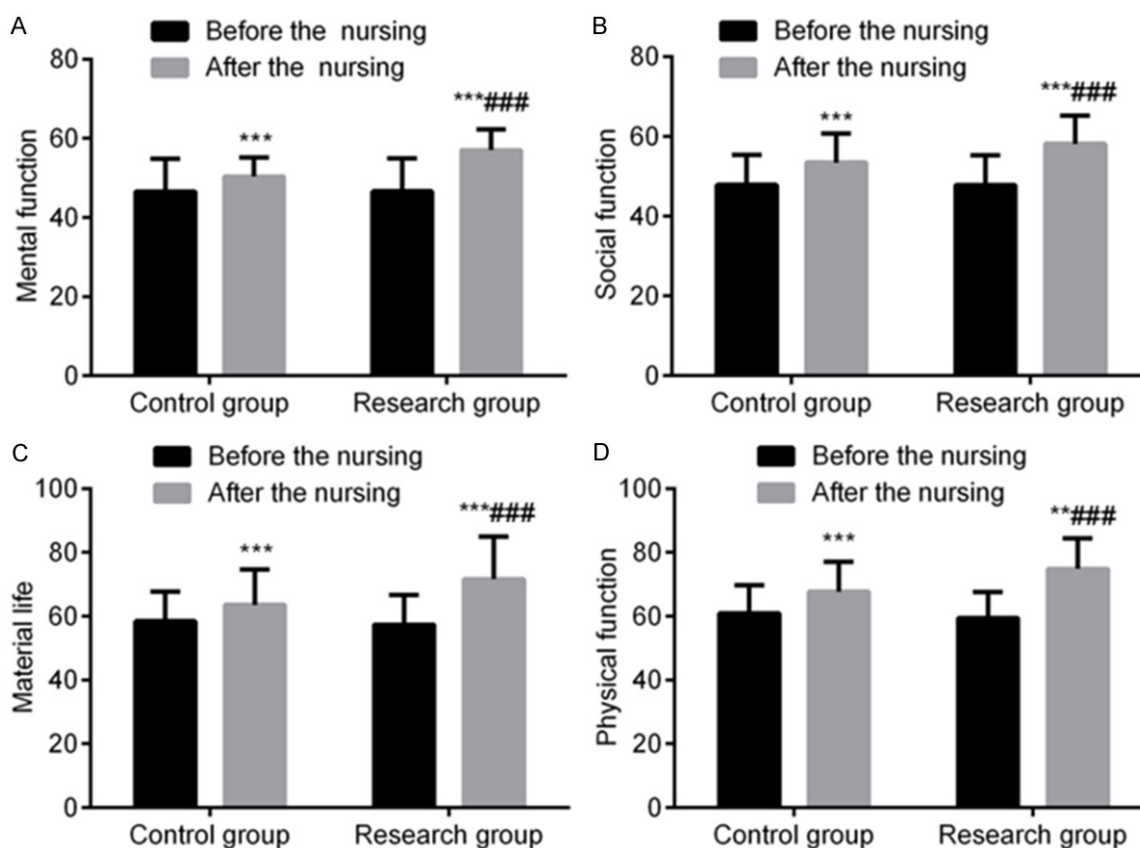
two groups (*P* > 0.05). After intervention, SAS and SDS scores were decreased in both groups, and the scores in the research group were lower than those in the control group (*P* < 0.05), indicating that compared with routine nursing care, the systemic quality nursing care was more helpful to improve the psychological status of SAP patients with ARF and systemic organ disorders treated by hemofiltration (**Figure 2**).

#### Neurological function

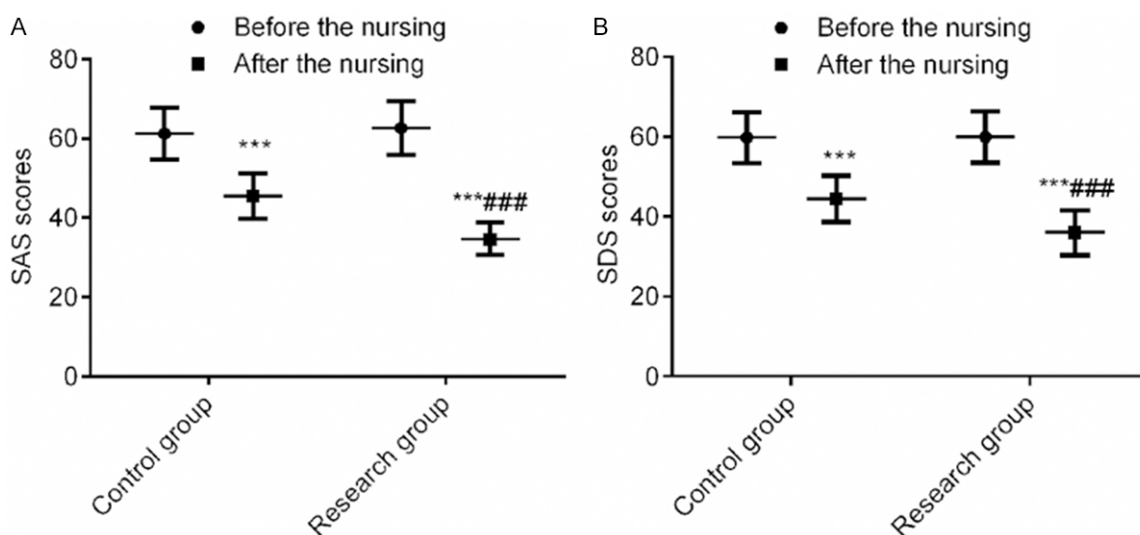
Before intervention, NIHSS scores showed no significant difference between the two groups (*P* > 0.05). After intervention, the NIHSS scores decreased in both groups, with the research group being lower than the control group (*P* < 0.05), demonstrating that compared with routine nursing care, the systemic quality nursing care was more helpful to improve the neurological functions of SAP patients with ARF and systemic organ disorders treated by hemofiltration (**Figure 3**).

#### Self-care ability

Before intervention, there was no significant difference in self-care abilities between the two groups (*P* > 0.05). After intervention, the above indicators in the research group were higher than those in the control group (*P* < 0.05), suggesting that compared with routine nursing

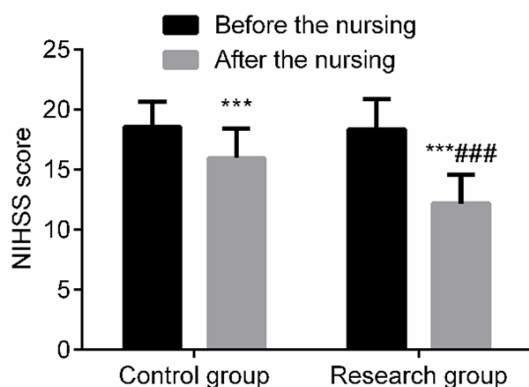


**Figure 1.** Comparison of quality of life between the two groups before and after 3 months of nursing (points). Note: A: The research group had significantly higher cardiac physical function scores than the control group at 3 months after nursing; B: The research group had significantly higher physical function scores than the control group 3 months after care; C: The research group had significantly higher material life scores than the control group 3 months after nursing; D: The research group had significantly higher social function scores than the control group 3 months after nursing. Compared with the same group before nursing, \*\*\* $P < 0.001$ ; compared with the control group, ### $P < 0.001$ .



**Figure 2.** Comparison of psychological status between the two groups before and after 3 months of nursing. Note: A: SAS scores in the research group were significantly higher than those in the control group at 3 months after nursing; B: SDA scores in the research group were significantly higher than those in the control group at 3 months after nursing. Compared with the same group before nursing, \*\*\* $P < 0.001$ ; compared with the control group, ### $P < 0.001$ .





**Figure 3.** Comparison of NIHSS scores between the two groups before and after 3 months of nursing. Note: NIHSS scores in the research group were significantly lower than those in the control group at 3 months after care. Compared with the same group before nursing, \*\*\* $P < 0.001$ ; compared with the control group, ### $P < 0.001$ .

care, the systemic quality nursing care was more helpful to improve the self-care ability of SAP patients with ARF and systemic organ disorders treated by hemofiltration (**Figure 4**).

#### *Satisfaction rate with care*

Overall satisfaction rate towards care in the research group (98.04%) was higher than that in the control group (78.43%) ( $P < 0.05$ ), indicating that compared with routine nursing care, the systemic quality nursing care was more helpful to improve the satisfaction rate with care of SAP patients with ARF and systemic organ disorders treated by hemofiltration (**Table 3**).

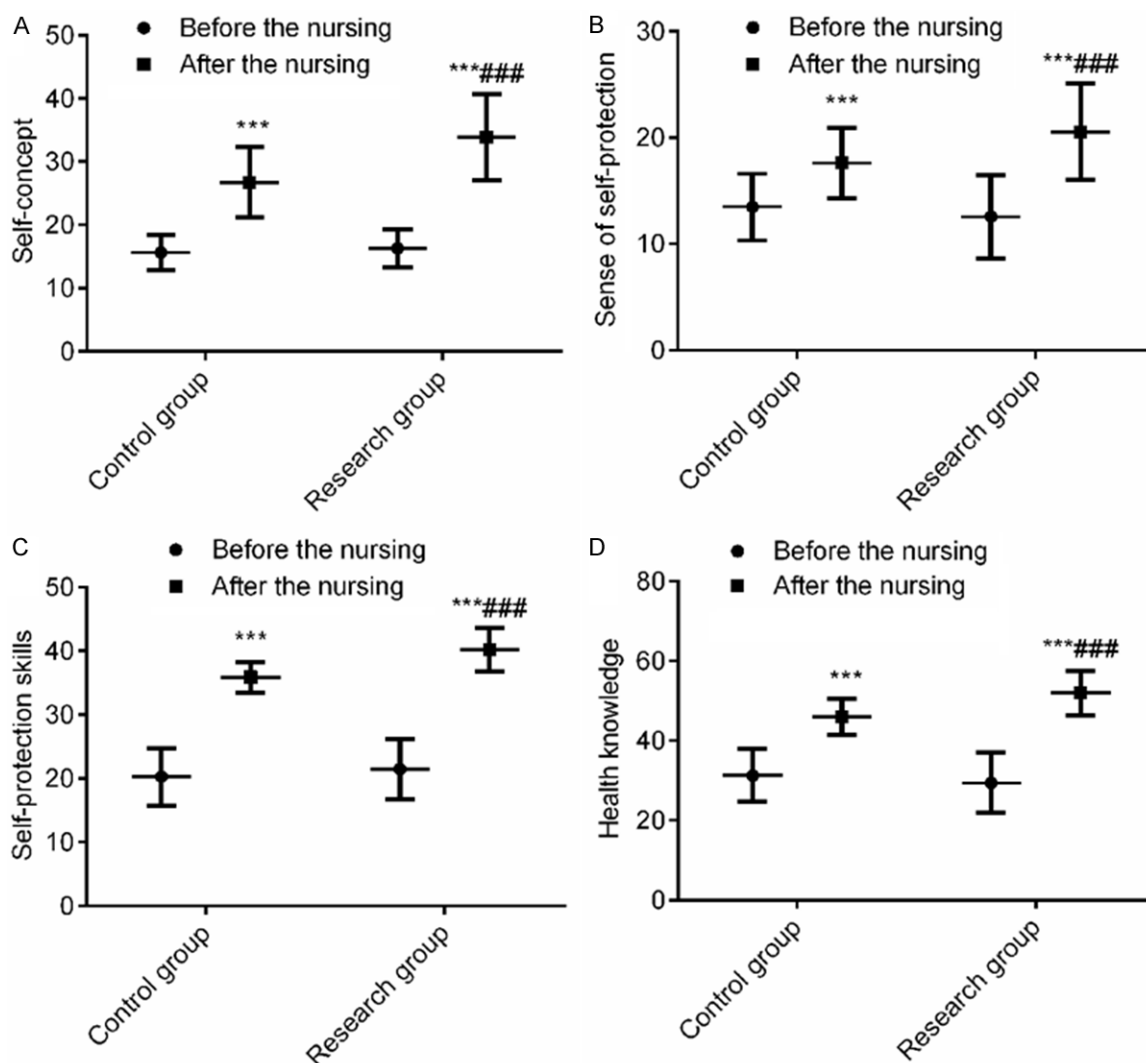
#### **Discussion**

The main pathogenesis of severe pancreatitis is the entry of activated pancreatic enzymes into the pancreatic tissues resulting in systemic multi-organ dysfunction and inflammation, which can lead to peritonitis, infection, and even systemic inflammatory response syndrome [15]. In addition, patients with this ASP are often associated with complications such as abdominal abscess, pseudo-abscesses, organ failure and necrosis. Missing the optimal period for diagnosis and treatment poses a threat to their physical and mental health [16].

Clinically, it was found that the electrolyte and acid-base balance of SAP patients with ARF

and systemic organ disorders were severely disturbed, while the hemofiltration treatment with transfusion of a large amount of replacement fluid containing physiological concentration electrolyte could effectively correct the disordered state of internal environment [17]. Regular monitoring of the level changes of BUN and Scr of patients can effectively understand the recovery of the patient's renal function, and timely adjustment of the replacement fluid formula according to the monitoring results can effectively promote the recovery of the patient's renal function. In this study, after intervention, the levels of BUN and Scr were decreased in both groups, and were lower in the experimental group than the control group, indicating that the systemic quality nursing care could effectively improve the renal function of SAP patients with ARF and systemic organ disorders treated by hemofiltration and promote the physical recovery.

This study found that negative mood scores in the research group was lower than that in the control group after intervention; NIHSS scores in the research group were lower than those in the control group; and self-care ability score in the research group was higher than that in the control group, suggesting that quality nursing care improved the psychological state, promoted the recovery of neurological function and self-care abilities of SAP patients with ARF and systemic organ disorders. The reason may be that after patients are admitted to the hospital, professional nursing staffs popularize health education knowledge about the disease to patients and their families and strengthen patients' disease awareness through explanations, quizzes, etc., so as to alleviate their adverse psychological emotions and make them more cooperative with treatment [18, 19]. In addition, dietary interventions could reduce the amount of metabolic waste to a great extent, so that the metabolic capacity can be corrected and adjusted, thus restoring the hemodynamics of patients and preventing the continuous deterioration of chronic renal failure [5]. Systemic quality nursing care provides early rehabilitation training and encourage patients to adhere to daily quantitative training, thereby promoting the recovery of neurological function and gradually improving their self-care ability, which in turn is beneficial to their prognosis [20].



**Figure 4.** Comparison of self-care ability between the two groups before and after 3 months of care (points). Note: A: Self-care scores in the research group were significantly higher than those in the control group; B: Self-concept scores in the research group were significantly higher than those in the control group; C: The material life scores in the research group were significantly higher than those in the control group; D: The self-care skills scores in the research group were significantly higher than those in the control group. Compared with the same group before nursing, \*\*\* $P < 0.001$ ; compared with the control group, ### $P < 0.001$ .

**Table 3.** Comparison of nursing satisfaction between the two groups n (%)

Grouping	Very satisfied	Satisfied	Unsatisfied	Total satisfaction rate
Control group (n=51)	14 (27.45)	26 (50.98)	11 (21.57)	40 (78.43)
Research group (n=51)	25 (49.02)	25 (49.02)	1 (1.96)	50 (98.04)
Z/ $\chi^2$	Z=2.998			9.444
P	0.003			0.002

This study found the total nursing compliance of the research group was higher than that in the control group. After intervention, the quality of life score of the research group was higher than that of the control group; the total nursing

satisfaction of the research group was higher than that of the control group, suggesting that systematic quality nursing interventions can effectively improve the nursing compliance of SAP patients with ARF and systemic organ dis-

orders following hemofiltration therapy, thereby improving their quality of life and resulting in higher satisfaction rate. The reason may be that systematic quality nursing interventions can improve patients' awareness of the disease, ensure them take the medication on a regular basis after discharged and monitor blood pressure and blood glucose levels on time, ask patients to pay visits to the hospital for re-examination once a month, and give targeted nursing guidance according to the degree of recovery, which will recover quality of life of patients and improve satisfaction rate from patients and their families [21-24].

However, this study also has limitations such as the small sample size and short follow-up time, and its credibility needs to be verified by more relevant and in-depth studies in the future.

In summary, systemic quality nursing care can improve the psychological state of patients, improve their compliance, and promote neurological recovery and self-care abilities, thus improving quality of life and achieving high satisfaction in patients with ASP and ARF.

## Disclosure of conflict of interest

None.

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