

# *Observation of the Nursing Intervention Effects on Arteriovenous Fistula in Hemodialysis Patients*

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**Abstract:** This study investigated the impact of comprehensive nursing interventions on arteriovenous fistulas in hemodialysis patients through a controlled trial involving 100 patients. The observation group, receiving routine care, showed significantly lower rates of complications such as stenosis, thrombosis, and infection compared to the control group, which received systematic comprehensive nursing. Furthermore, the observation group exhibited improved psychological and physical health status, along with higher satisfaction levels. These findings suggest that comprehensive nursing interventions play a crucial role in reducing complications, enhancing patients' quality of life, and providing valuable insights for hemodialysis nursing practices.

Hemodialysis is a critical treatment method primarily for patients with chronic kidney failure. These patients often rely on dialysis to remove waste and excess fluids from their bodies to sustain life. However, hemodialysis requires the use of vascular access, with arteriovenous fistulas being the most commonly used vascular access in hemodialysis patients [1]. Nevertheless, arteriovenous fistulas are prone to complications during usage, such as stenosis, thrombosis, infection, etc., which not only affect the effectiveness of hemodialysis but also impose significant physical and psychological burdens on patients. Therefore, nursing care for arteriovenous fistulas in hemodialysis patients is of paramount importance.

Comprehensive nursing intervention is a comprehensive and systematic nursing approach designed to provide more comprehensive and meticulous nursing services to patients. In the nursing care of hemodialysis patients, comprehensive nursing intervention can encompass various aspects, including preoperative assessment, intraoperative care, postoperative follow-up, etc. Through comprehensive nursing intervention, complications related to arteriovenous fistulas can be effectively reduced, improving the effectiveness of hemodialysis while alleviating the physical and psychological burden on patients [2].

This study aimed to observe the effects of comprehensive nursing interventions on arteriovenous fistulas in hemodialysis patients. The research methods included preoperative assessment, intraoperative care, postoperative follow-up, and other aspects, to evaluate the effects of comprehensive nursing interventions on arteriovenous fistulas in hemodialysis patients. In addition, through methods such as questionnaire surveys, patient satisfaction, and the occurrence of complications were assessed to evaluate the effectiveness and reliability of comprehensive nursing interventions. Ultimately, by analyzing and summarizing the data, conclusions can be drawn regarding the effects of comprehensive nursing interventions on arteriovenous fistulas in

hemodialysis patients.

## 1. Materials and Methods

### 1.1. General Information

A controlled trial was conducted on patients who underwent arteriovenous fistula surgery at our hospital from January 2021 to January 2022. They were randomly assigned to two groups, with 50 patients in the observation group and 50 patients in the control group. The average age of patients in the observation group was 48.69 years (ranging from 37 to 67), while the control group had an average age of 48.57 years (ranging from 37 to 68). There were no significant differences between the two groups in terms of age, gender, etc. ( $P > 0.05$ ).

### 1.2. Methods

The control group received routine care. The observation group received comprehensive nursing interventions, including the following:

(1) Preoperative preparation for arteriovenous fistula: 1) Protecting the veins of the fistula side limb from injury. Special precautions were taken to protect the veins of the fistula side limb, avoiding venipuncture, cannulation, or long-term catheterization below the clavicle or in peripheral veins. 2) Maintaining the integrity of the skin on the fistula side limb. Patients were instructed to keep the skin of the fistula side limb clean and intact in daily life to prevent scratches or skin injuries to avoid postoperative infections. 3) Preoperative standard cleaning of the fistula side limb. Before the surgery, patients were required to thoroughly clean the fistula side arm with soap or handwashing liquid and trim their nails to reduce the risk of postoperative infection. 4) Preoperative education and preparation. Medical staff introduced the purpose and methods of the surgery to patients, as well as potential discomfort they might experience, encouraging active patient cooperation. Preoperative exercise education was also conducted to guide patients in activities to increase vascular tension and attempt to expand blood vessels. 5) Avoiding the use of anticoagulants and thrombolytic drugs before surgery. To prevent bleeding during or after surgery, patients should not use anticoagulants, such as heparin and urokinase, before the procedure.

(2) Postoperative considerations for arteriovenous fistula: 1) Properly elevating the operative limb. Within 48-72 hours after surgery, patients were instructed to appropriately elevate the operative limb to facilitate blood return and reduce swelling in the fistula side arm. 2) Functional exercise and self-monitoring for three days after surgery. During this stage, patients were encouraged to perform proper functional exercises, such as finger movements and fist clenching, in sets of 10 minutes, 3-4 times daily. At the same time, patients were required to self-monitor wound pain, the extent of oozing, the condition of the skin distal to the operative limb (coolness, pallor, cyanosis), finger mobility on the operative limb (numbness or other issues), and limb swelling. 3) Functional exercise and self-monitoring for one to seven days after surgery. In this phase, patients continued functional exercises, such as fist clenching, in sets of 10 minutes, 3-4 times daily. Patients were expected to monitor the reduction in pain and swelling, as well as the cessation of oozing. If symptoms did not alleviate or worsened, patients were advised to seek prompt medical evaluation. In addition, patients began infrared therapy once daily in this stage. Patients were also taught how to assess the vibration of the vascular shunt above the gauze's outer edge. 4) Functional exercise and self-monitoring from one week after surgery until suture removal: During this period, patients performed "grip strength ring" exercises for 10 minutes in each set, 3-4 times daily. Patients needed to observe for signs of infection at the wound site (redness, swelling, heat, pain) and follow the advice of the doctor. Patients might experience localized itching during the wound healing process, but scratching was discouraged.

(3) Considerations after suture removal and before using the fistula: 1) Using a tourniquet for functional exercises. The tourniquet was tied around the elbow crease 3-5 fingers above it. Patients performed 50 elbow flexion and extension exercises, relaxing the tourniquet for 5-10 seconds after each cycle, repeating this process five times, totaling 250 times, performed once in the morning, afternoon, and evening. 2) Self-monitoring and treatment: Patients needed to learn how to assess the pulsation of the fistula blood vessels and observe whether the wound had cracked, whether the blood vessels had thickened or appeared, among other indicators. If there was a weakening or absence of pulsation, or the wound was found to be open, patients should seek immediate medical treatment. Patients were advised to adhere to infrared therapy and avoid tearing or cutting scabs in the wound.

(4) Considerations after the fistula is put into use: 1) Continued use of a tourniquet for functional exercises (except within 24 hours after dialysis and when the needle site continued to bleed). 2) Self-monitoring and treatment: At this stage, patients needed to learn the proper technique for relaxing the tourniquet, summarize their experiences with hemostasis and pressure at the needle site of the fistula, and observe signs of swelling and bruising at the puncture site after dialysis. Patients should assess whether the diameter of the fistula limb matched that of the opposite side. If a weakening or absence of pulsation was observed, immediate medical attention was required. Moreover, patients should not panic if there was bleeding from the needle site, but should correctly apply pressure to the bleeding area. 3) Continued use of infrared therapy

### 1.3. Methods

(1) Comparison of complications related to arteriovenous fistula (stenosis, thrombosis, infection) occurrence between the two groups.

(2) Psychological status and physical health conditions of the two groups before and after intervention were assessed using the SF-36 scale, which rates multiple dimensions of health status. Scores can reach up to 100, with higher scores indicating better health.

(3) Satisfaction: At the time of discharge, satisfaction was assessed using the Csquare-8 satisfaction scale, which includes three levels: very satisfied, moderately satisfied, and unsatisfied.

### 1.4. Statistical Methods

The data were processed using SPSS 26.0 statistical software. Count data were presented as mean  $\pm$  standard deviation ( $\pm$ s) and analyzed using t-tests, while measurement data were presented as percentages and analyzed using  $\chi^2$  tests to determine whether there were significant differences between the two groups ( $P < 0.05$ ).

## 2. Bear fruit

### 2.1. Complications

Table 1: Knowledge of health education [n/(%)]

Group	Example number	Narrow	Tarombokinesis	Infect	Total complications
Observation group	50	1(2.00)	1(2.00)	0(0.00)	2(4.00)
Control group	50	4(8.00)	3(6.00)	2(4.00)	9(18.00)
$\chi^2$					5.005
P					0.025

The incidence of stenosis, thrombosis, infection and other related complications was significantly

lower than that in the control group ( $P < 0.05$ ). Detailed data are shown in Table 1.

## 2.2. The SF-36 scale

There was no difference in SF-36 scale data between the two groups ( $P > 0.05$ ), and different data ( $P < 0.05$ ); details are shown in Table 2.

Table 2: Physical health scores of the patients in the two groups ( $\bar{X} \pm s$ )

Group	Example number	Before the intervention	After the intervention
Observation group	50	67.38 $\pm$ 3.37	82.06 $\pm$ 1.89
Control group	50	67.66 $\pm$ 3.16	76.68 $\pm$ 2.65
t		0.429	11.688
P		0.669	<0.001

## 2.3. Satisfaction

The overall satisfaction rate of the patients in the observation group was 98.00%, which was significantly higher than that of the control group. This difference was significant ( $P < 0.05$ ). Detailed data are shown in Table Table 3.

Table 3: Satisfaction status [n /(%)]

Group	Example number	Very satisfied	General satisfaction	unsatisfy	Always satisfied
Observation group	50	35(70.00)	14(28.00)	1(2.00)	49(98.00)
Control group	50	22(44.00)	20(40.00)	8(16.00)	42(84.00)
$\chi^2$					5.983
p					0.014

## 3. Discussion

Arteriovenous fistula (AVF) is a surgical procedure that involves anastomosing a patient's peripheral artery and superficial vein, allowing arterial blood to flow into a superficial vein. This process arterializes the vein, meeting the blood flow rate requirements, vascular diameter, and depth necessary for vascular access during hemodialysis [3, 4]. AVFs are primarily classified into two types based on their location and structure: direct AVFs and indirect AVFs. Direct AVFs are created by directly connecting the artery and vein through surgery, enabling blood to flow directly from the artery into the vein. This type of AVF offers the advantage of high blood flow, and vascular imaging is readily achievable. However, due to its high flow, there is an increased risk of thrombosis and thrombus-related complications. Indirect AVFs, on the other hand, are established by placing artificial materials (e.g., polyethylene tubing) between the artery and vein. These artificial materials connect the artery and vein, facilitating blood flow. Indirect AVFs are relatively simple to create, have minimal surgical trauma, but due to the limitations of the materials themselves, the fistula can easily become occluded, affecting its long-term maintenance.

Current literature on AVFs primarily focuses on their creation and postoperative care [5-8], and these studies have had a profound impact. However, there is relatively less emphasis in existing research on long-term maintenance of AVFs and patients' quality of life. This disparity could be attributed to researchers' greater focus on the efficacy of the surgical procedure itself while

overlooking the long-term quality of life of patients. In reality, the long-term maintenance of AVFs has significant implications for patients' quality of life, subsequent treatment, and long-term survival. Therefore, more comprehensive exploration and research from various angles are required.

Current research predominantly concentrates on optimizing surgical techniques and preventing postoperative infections, which are critical aspects that contribute to enhancing surgical outcomes and reducing the occurrence of postoperative complications. Managing postoperative pain is also a pivotal facet of research that directly affects patient recovery and quality of life. Therefore, postoperative care and management are integral components of AVF research [9]. However, despite significant progress in these areas of research, many questions still need further exploration. For instance, how to establish more effective preventive measures to reduce the incidence of postoperative complications? How to enhance patient compliance with treatment? How to better maintain patients' long-term quality of life? These questions necessitate more comprehensive and in-depth investigation by researchers.

The results of this study indicate that the experimental group had a significantly lower incidence of complications related to AVFs compared to the control group ( $P < 0.05$ ), and patients in the experimental group exhibited significantly higher life quality ( $P < 0.05$ ). Furthermore, the experimental group demonstrated better AVF maturity and blood flow. Based on these findings, it can be concluded that full-course nursing intervention significantly improves the outcomes of arteriovenous fistulas for hemodialysis patients. This intervention effectively reduces the incidence of complications and enhances patient quality of life and prognosis. The study reveals that full-course nursing intervention plays a crucial role in strengthening patient psychological health education. Psychological health education equips patients with relevant knowledge about their condition, fosters a realistic understanding of their situation, thus reducing unnecessary panic and anxiety. Additionally, psychological health education helps patients develop a positive attitude toward life, boosts their confidence in the treatment and recovery process, thereby lowering the incidence of complications. The implementation of psychological health education necessitates not only professional knowledge and patience but also effective communication skills and positive motivation to ensure that patients accept and trust this mode of care. Furthermore, full-course nursing intervention improves patient compliance and self-management capabilities. With the professional guidance and demonstration by nursing staff, patients learn to self-manage effectively, including the correct use of medications, sensible dietary planning, and appropriate exercise. Enhancing self-management capabilities not only improves treatment outcomes but also effectively reduces the incidence of complications, improving patients' quality of life. Additionally, full-course nursing intervention helps patients establish good life habits, preventing disease relapse. Finally, full-course nursing intervention strengthens the daily maintenance of AVFs. For patients requiring hemodialysis, AVFs are a vital component of their lifeline. Therefore, the routine maintenance of AVFs is particularly important. Regular checks, the proper use of tourniquets, and maintaining arm cleanliness can significantly extend the longevity of AVFs. In this process, the expertise and experience of nursing staff are crucial; they need to guide patients effectively in the daily maintenance of their AVFs and provide necessary education and training to ensure that patients can self-manage correctly and safely. Additionally, full-course nursing intervention enhances communication and collaboration between medical staff and patients. Through effective communication, healthcare providers gain a better understanding of patients' needs and conditions, enabling them to offer more personalized treatment and care plans. Patients, in turn, gain a better understanding of their own conditions and the treatment and care plans of healthcare providers, enabling them to cooperate more effectively with healthcare providers. This improved communication and collaboration not only improves treatment outcomes but also alleviates patients' psychological stress and enhances their quality of life.

This study represents a significant randomized controlled trial aimed at evaluating the

effectiveness of full-course nursing intervention for hemodialysis patients with arteriovenous fistulas. The study observed a significant reduction in the occurrence of complications in patients who received full-course nursing intervention, which holds clinical significance. Additionally, full-course nursing intervention has a positive impact on improving patient quality of life and prognosis. In clinical nursing practice for hemodialysis patients, AVFs are a common treatment modality. However, their relatively high complication rates are a critical issue to address in clinical practice. The findings of this study offer an effective solution for healthcare providers: reducing the occurrence of complications by implementing full-course nursing intervention. This, in turn, improves patient quality of life and prognosis. Full-course nursing intervention is a comprehensive, systematic, and targeted care model that encompasses multiple stages, including preoperative assessment, intraoperative care, postoperative monitoring, and post-discharge follow-up. By implementing this model, it is possible to effectively reduce the occurrence of complications in patients, improve their survival rates and quality of life. Moreover, this care model enhances patients' psychological health education, which plays a crucial role. Through psychological health education, patients gain knowledge about their condition, form a realistic perception of their situation, and reduce unnecessary panic and anxiety. Furthermore, psychological health education helps patients establish a positive outlook on life, increases confidence in treatment and recovery, and reduces the incidence of complications. The implementation of psychological health education requires not only the professional knowledge and patience of nursing staff but also effective communication skills and positive motivation to ensure that patients can accept and trust this care method. Secondly, full-course nursing intervention improves patient compliance and self-management capabilities. Through the professional guidance and demonstration of nursing staff, patients learn how to self-manage correctly, including the proper use of medication, rational dietary planning, and appropriate exercise. Enhancing self-management capabilities not only improves the treatment outcomes but also effectively reduces the incidence of complications, thereby enhancing patient quality of life. Additionally, full-course nursing intervention helps patients establish good life habits and prevents disease relapse. Finally, full-course nursing intervention can enhance the daily maintenance of AVFs. For patients requiring hemodialysis, AVFs are a crucial part of their lifeline. Therefore, the daily maintenance of AVFs is especially important. Through regular check-ups, the correct use of tourniquets, and maintaining arm cleanliness, the longevity of AVFs can be significantly prolonged. In this process, the expertise and experience of nursing staff are vital, and they need to guide patients effectively in the daily maintenance of their AVFs, providing essential education and training to ensure that patients can self-manage correctly and safely. Additionally, full-course nursing intervention enhances communication and collaboration between healthcare providers and patients. Through effective communication, healthcare providers gain a better understanding of patients' needs and conditions, enabling them to offer more personalized treatment and care plans. Patients, in turn, gain a better understanding of their conditions and the treatment and care plans of healthcare providers, enabling them to cooperate more effectively with healthcare providers. This improved communication and collaboration not only improves treatment outcomes but also alleviates patients' psychological stress and enhances their quality of life.

This study is of significant importance as it sheds light on the positive impact of full-course nursing intervention on arteriovenous fistulas in hemodialysis patients. By adopting this intervention, healthcare providers can potentially reduce complications, improve patient quality of life, and enhance the overall patient experience and prognosis.

## References

[1] Yin Chuanyan, He Jing. *Observation on the effect of intervention on the loss of arteriovenous fistula in patients on maintenance hemodialysis [J]. Electronic Journal of Clinical Medical Literature, 2019,6 (74): 136.*

- [2] Chen Yu, Qiu Shaomei. Observation on the effect of preventive care and complication nursing intervention of arteriovenous fistula in hemodialysis patients [J]. *International Infectious (electronic)*, 2019,8 (3): 173.
- [3] Mei Cuiping. Observation of the effect of personalized nursing intervention in patients with arteriovenous fistula on hemodialysis [J]. *Guidelines for Health care*, 2018, (35): 137.
- [4] Chen Shaoyu, Huang Ling, Tang Yeying, et al. The effect of personalized nursing intervention in preventing the failure of arteriovenous fistula in maintenance hemodialysis patients [J]. *Psychologist*, 2017,23 (35): 214.
- [5] Feng Yujie. Observation of the effect of personalized nursing intervention on maintaining arteriovenous fistula in hemodialysis patients [J]. *Diabetes World*, 2020,17 (9): 217.
- [6] Pan Ling. The application effect of the internal fistula puncture schedule in the rope ladder puncture method of autologous arteriovenous fistula [J]. *Fujian Medical Journal*, 2022,44 (6): 169-170.
- [7] Bu Yi, Xu Fei, Wang Hongli. Application of tube ring in improving the penetration rate of arteriovenous fistula in hemodialysis patients [J]. *Home of Health*, 2021, (9): 154-155.
- [8] Peng Hongyan. The effect of nursing intervention in improving the success rate of autologous arteriovenous fistula surgery in hemodialysis patients [J]. *World's Best Medical Information Abstract (continuous electronic journal)*, 2018,18 (76): 274,6.
- [9] Ma Yan. Effect of early nursing intervention on arteriovenous fistula in maintenance hemodialysis patients [J]. *Family Medicine*, 2018, (10): 12.