

# Effectiveness of Comprehensive Nursing Management in Enhancing Blood Donation Outcomes and Donor Experience: A Comparative Study

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**Abstract:** *Objective:* To assess the management effect of comprehensive nursing management on blood donation services in blood stations. *Methods:* Sixty-four individuals who donated blood at a blood station between September 2021 and September 2023 were selected and randomly assigned into two groups of 32 each. The first group received comprehensive nursing management, while the second group received routine nursing management. Blood donation indexes and observational indexes such as adverse reactions were compared between the groups. *Results:* The total blood donation volume and qualified blood donation volume were higher in the first group than in the second group. The amount of discarded blood and the rate of blood discards were lower in the first group compared to the second group ( $P < 0.05$ ). Additionally, the adverse reaction rate in the first group was lower, the blood donation comfort scores were higher, the psychological state scores were lower, and the quality of care scores were higher than those in the second group ( $P < 0.05$ ). *Conclusion:* Comprehensive nursing management can improve the efficiency of blood donation, reduce the rate of blood discards, decrease the incidence of adverse reactions, alleviate negative psychological states of blood donors, and enhance both the comfort level of blood donation and the quality of care provided.

**Keywords:** Comprehensive nursing management; Blood donation service at blood stations; Adverse reactions; Comfort; Quality of care

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## 1. Introduction

Blood stations are public welfare institutions that collect and supply blood for medical institutions, thereby helping to save patients who have experienced blood loss<sup>[1]</sup>. The blood supplied by these stations comes from citizens who donate without compensation. The quality of blood donation services significantly influences the likelihood of repeat donations. Additionally, blood donors tend to have a higher awareness of healthcare and social responsibilities, which necessitates continuous optimization of nursing management at blood stations.

This, in turn, enhances the quality of blood donation services and improves the overall experience for blood donors [2].

Comprehensive nursing management is a widely used method known for its humane and holistic approach. Given this context, this study selected 64 blood donors to evaluate the impact of comprehensive nursing management on their donation experience.

## 2. Materials and methods

### 2.1. General information

A total of 64 personnel who entered the blood station to donate blood between September 2021 and September 2023 were recruited and grouped by randomized numerical table, with 32 cases in each group. The observation group consisted of 18 males and 14 females, with an age range of 22–58 years (mean:  $37.56 \pm 2.14$  years), and a body mass index (BMI) range of 19.1–25.9 kg/m<sup>2</sup> (mean:  $24.02 \pm 2.16$  kg/m<sup>2</sup>). The control group consisted of 19 males and 13 females, with an age range of 21–55 years (mean:  $37.37 \pm 2.20$  years), and a BMI range of 19.3–25.6 kg/m<sup>2</sup> (mean:  $24.14 \pm 2.23$  kg/m<sup>2</sup>). The data between the two groups were comparable ( $P > 0.05$ ).

### 2.2. Methods

The control group received routine nursing management: Before blood collection, donors were clearly informed of the corresponding precautions. The principle of aseptic operation was strictly adhered to, and instructions on how to cooperate during the blood collection process were provided.

The observation group received comprehensive nursing management, which included the following components:

- (1) Environmental care: The blood collection room was adjusted to have soft lighting, windows were opened and ventilated regularly each day, and decorations were appropriately placed to regulate the indoor temperature and humidity. Gentle music was played to create a warm and comfortable atmosphere. The nursing staff paid attention to their dress, used proper nursing terminology, performed skilled nursing operations, and maintained a friendly communication attitude and smile. This approach helped to close the distance between staff and donors and eliminate any negative feelings donors might have.
- (2) Communication nursing: A one-time notification system was adopted, where blood donors received comprehensive information about the blood donation process, precautions, and puncture cooperation through knowledge manuals, graphic materials, and video playback during their waiting period. The system of the first responsible person was implemented, meaning the staff member who first communicated with the donor would be responsible for their care throughout the entire process. Additionally, a joint time-limited completion system was used to control the blood donation service time within a specific period, enhancing service efficiency. Under this accountability system, staff greeted donors upon entering the station, answered questions promptly, and bid farewell when donors left. Inquiries were explained clearly, and relevant forms and materials were issued and reviewed in one go. Service attitude towards acquaintances, locals, and leaders remained consistent with that towards strangers, outsiders, and the public, ensuring a sincere and caring approach.
- (3) Nursing care before blood collection: Donors were guided through the physical examination program and blood laboratory tests to assess their health levels. The procedures of blood collection and possible discomfort symptoms were explained to prepare donors and inform them of precautionary measures.
- (4) Nursing care during blood collection: The donor's name and blood type were checked and labeled

clearly. Veins with good elasticity and clear structure were preferred, and an effort was made to puncture successfully on the first attempt. Donors were shown or guided on how to correctly grasp the pressure ball. Their expressions and color changes were observed during blood collection, and they were asked about any feelings of dizziness or panic. If any abnormalities occurred, blood collection was stopped, and symptomatic treatment was provided. Donors were engaged in conversation during the process, discussing light topics to improve their psychological state.

- (5) Post-donation care: After blood collection, donors were instructed to press the puncture point with appropriate strength and correct posture for 5 to 10 minutes and were issued an honorable blood donation card. Donors were informed not to press or rub the puncture site or lift heavy objects for 4 hours. Strenuous exercise and high-risk work were prohibited for 24 hours.
- (6) Continuous improvement: A quality control team was established to assess the quality of blood donation services through random inspections, unannounced visits, and self-inspections. Nursing management problems were identified and addressed according to the corresponding system, and relevant responsible persons were held accountable. This included deducting bonuses or canceling eligibility for advanced individual selection to improve staff's sense of responsibility.

### 2.3. Observation indicators

- (1) Blood donation indicators: Observe the total blood donation volume, qualified blood volume, scrapped blood volume, and scrapped blood rate.
- (2) Adverse reactions: Observe reactions such as hypoglycemia, panic, nausea, dizziness, cold sweat, and pain during blood donation.
- (3) Comfort level of blood donation: After the completion of blood donation, distribute the simplified comfort status scale (GCQ). Blood donors fill out the relevant forms independently without staff handling the forms. Members of the quality control team organize and analyze the data. The scale includes items on environmental, social, physiological, and psychological/spiritual comfort, with each item scored from 1 to 4 points, using positive scoring.
- (4) Psychological state: Distribute, fill out, and retrieve the scale in the same manner as the Comfort Scale. Use the Anxiety Self-Assessment and Depression Self-Assessment scales, with standardized scores of 50 and 53, respectively. Higher scores indicate more negative psychological states.
- (5) Nursing care quality: Distribute self-made questionnaires containing items on communication frequency, blood collection preparation, service attitude, management system, individual guidance, nursing safety, and skill operation. Each item is scored out of 100 points, using positive scoring.

### 2.4. Statistical analysis

The data were analyzed using SPSS 28.0 software. Measured values were compared using the *t*-test and expressed as mean  $\pm$  standard deviation (SD), while counted values were compared using the  $\chi^2$  test and expressed as [*n* (%)]. The statistical significance was indicated by a *P*-value of less than 0.05.

## 3. Results

### 3.1. Comparison of blood donation indexes between the two groups

**Table 1** shows that the blood donation indexes of the observation group are better than those of the control group ( $P < 0.05$ ).

**Table 1.** Comparison of blood donation indexes of groups [mean ± SD; *n* (%)]

Group	Total blood donation (mL)	Qualified blood volume (mL)	Volume of scrapped blood (mL)	Scrapped blood rate
Observation group ( <i>n</i> = 32)	9,956.24 ± 29.62	9,884.98 ± 21.53	71.26 ± 6.32	0.00 (0/32)
Study group ( <i>n</i> = 32)	9,418.62 ± 29.77	9,340.93 ± 22.61	77.69 ± 6.91	12.50 (4/32)
<i>t</i> / $\chi^2$	72.419	98.575	3.884	4.267
<i>P</i>	0.000	0.000	0.000	0.039

### 3.2. Comparison of adverse reaction rates between the two groups

As shown in **Table 2**, the adverse reaction rate of the observation group was significantly lower than that of the control group ( $P < 0.05$ ).

**Table 2.** Comparison of adverse reaction rates in the two groups [*n* (%)]

Group	Hypoglycemia	Panic	Nausea	Dizziness	Cold sweats	Pain	Total incidence
Observation group ( <i>n</i> = 32)	0	0	1 (3.13)	0	0	1 (3.13)	2 (6.25)
Study group ( <i>n</i> = 32)	1 (3.13)	1 (3.13)	2 (6.25)	1 (3.13)	1 (3.13)	2 (6.25)	8 (25.00)
$\chi^2$	-	-	-	-	-	-	4.267
<i>P</i>	-	-	-	-	-	-	0.039

### 3.3. Comparison of blood donation comfort scores between the two groups

The blood donation comfort scores of the observation group were significantly higher than those of the control group ( $P < 0.05$ ), as shown in **Table 3**.

**Table 3.** Comparison of blood donation comfort scores of the two groups (mean ± SD; points)

Group	Environment	Social	Physiological	Psychological / Spiritual
Observation group ( <i>n</i> = 32)	3.06 ± 0.24	3.16 ± 0.27	3.29 ± 0.31	3.08 ± 0.33
Study group ( <i>n</i> = 32)	2.84 ± 0.22	2.91 ± 0.24	3.01 ± 0.27	2.74 ± 0.30
<i>t</i>	3.822	3.915	3.853	4.313
<i>P</i>	0.000	0.000	0.000	0.000

### 3.4. Comparison of the psychological state scores of the two groups

**Table 4** shows that the psychological state scores of the observation group were lower than those of the control group ( $P < 0.05$ ).

**Table 4.** Comparison of the psychological state scores of the two groups (mean ± SD; points)

Group	Anxiety	Depression
Observation group ( <i>n</i> = 32)	30.26 ± 2.71	28.35 ± 2.37
Study group ( <i>n</i> = 32)	34.83 ± 2.76	32.19 ± 2.43
<i>t</i>	6.683	6.400
<i>P</i>	0.000	0.000

### 3.5. Comparison of quality of care scores between the two groups

As shown in **Table 5**, the observation group had higher quality of care scores than those of the control group ( $P < 0.05$ ).

**Table 5.** Comparison of the quality of care scores of the two groups (mean  $\pm$  SD; points)

Group	Communication frequency	Blood collection preparation	Service attitude	Management system	Individual guidance	Nursing care safety	Skill operation
Observation group ( $n = 32$ )	93.26 $\pm$ 2.54	94.18 $\pm$ 2.43	95.15 $\pm$ 2.38	94.37 $\pm$ 2.84	95.02 $\pm$ 2.21	95.13 $\pm$ 2.37	95.47 $\pm$ 2.40
Study group ( $n = 32$ )	90.01 $\pm$ 2.51	90.13 $\pm$ 2.40	91.75 $\pm$ 2.34	91.05 $\pm$ 2.79	91.47 $\pm$ 2.16	92.01 $\pm$ 2.33	91.76 $\pm$ 2.38
<i>t</i>	5.148	6.708	5.763	4.717	6.498	5.310	6.209
<i>P</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## 4. Discussion

Blood transfusion is a common treatment for patients with blood loss. It involves the infusion of different blood components to increase the patient's blood volume, regulate coagulation function, and improve microcirculation. This enhances the blood's oxygen-carrying capacity, increases hemoglobin levels, and reduces disease risks [3]. Despite advances in clinical treatment technology, there is no alternative to blood transfusion, making it an indispensable method for emergency care. Blood for transfusions primarily comes from unpaid donors, who engage in this honorable and selfless public welfare activity. These donors, motivated by a spirit of dedication, require high-quality and comprehensive nursing management to optimize their donation experience and encourage repeat donations [4].

Routine nursing management can educate blood donors about the blood collection process, ensuring efficient cooperation. However, this approach is limited in scope and flexibility, potentially leading to oversights and reducing the donor's overall experience [5]. The lack of rigor in routine care can also result in increased blood wastage, thereby lowering the efficiency of blood stations. Comprehensive nursing management, on the other hand, is a refined and holistic approach that leverages the professional skills, knowledge, and experience of staff to provide high-quality services [6]. This method's diverse and targeted implementation can offer individualized services based on each donor's specific situation, enhancing the quality of care.

The study results showed that the total and qualified blood donation volumes were higher in the comprehensive nursing management group compared to the routine management group. Additionally, the comprehensive management group had lower rates of scrapped blood and adverse reactions. Comfort scores, psychological state scores, and nursing care quality scores were all significantly better in the comprehensive management group ( $P < 0.05$ ). This is because comprehensive nursing management allows for the timely detection and resolution of quality issues, ensuring the safety of blood donation services and reducing blood waste. By focusing on donors, this management style continually improves service concepts and enhances the cultural connotation of blood stations, leading to higher donor comfort [7].

Furthermore, comprehensive nursing management improves the blood collection environment, refines the work system, and standardizes guidance services before, during, and after blood collection. This approach fosters closer relationships between staff and donors, improving their psychological state [8]. The process-oriented nursing management can promptly identify and respond to donor discomfort and adverse reactions, resulting in fewer adverse incidents and a safer, more pleasant donation experience, thereby leading to higher

nursing care quality scores <sup>[9,10]</sup>.

In conclusion, comprehensive nursing management improves blood donation service quality at blood stations, increases total and qualified blood donation volumes, minimizes blood waste, prevents adverse reactions throughout the donation process, and enhances donor comfort and psychological well-being, making it a highly valuable nursing management approach.

## Disclosure statement

The author declares no conflict of interest.

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