

# Red Blood Cell Distribution Width in Holistic Nursing Mode for Patients with Acute Left Heart Failure

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Acute left heart failure is a very common acute heart failure in clinic, which must be treated immediately. If the treatment time is delayed, the mortality will be greatly increased. At present, there is not a good index to judge the severity of acute left heart failure. Therefore, it is necessary to analyze the relevant data and find a suitable measurement index. The purpose of this paper is to study the application effect of red blood cell (RBC) distribution width in holistic nursing mode for patients with acute left heart failure, taking patients with acute left heart failure in our hospital as the research object. The RBC distribution width of patients was detected, and the mortality and symptom relief time of patients were counted. The results showed that there was no significant difference in mortality when RBC distribution width was young. When the RBC distribution width is greater than 14.6%, the mortality rate increases rapidly. The symptom relief time of holistic nursing group was much shorter than that of general duty nursing group, and the difference was the biggest when it was over 14.6% in RBC distribution width, reaching 8.5 minutes. In the holistic nursing group, there was no significant difference in symptom relief time. In the group of general duty nursing, when the RBC distribution width is more than 14.6%, the time of symptom relief increases sharply. RBC distribution width can be considered to predict the severity of a patient's illness.

**Keywords:** Acute Left Heart Failure, Red Blood Cell Distribution Width, Holistic Nursing, Application Effect

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At present, people's work and life are busy, their work and rest are often irregular, and they are under great mental pressure. The number of patients with acute left heart failure has increased in recent years. Acute left heart failure is a very dangerous disease with a very high mortality rate. Patients with acute left heart failure often have difficulty breathing, and may have pulmonary edema and pulmonary congestion. Patients are prone to coma and even shock, and if they are not

treated in time, their lives will be in danger. At present, there is not a good criterion for judging the serious condition of patients. If the patient's condition can be judged by RBC distribution width, it will have a positive impact on the patient's treatment. Therefore, it is necessary to explore the role of RBC distribution width in treatment.

There are many reasons for acute left heart failure. Such as acute exacerbation of chronic heart failure, acute myocardial necrosis, acute

hemodynamic disturbance, acute diastolic left heart failure and so on<sup>1,2</sup>. At present, there have been many studies on acute left heart failure. Many researchers want to select a simple and effective index to measure the severity of left heart failure. However, most of the current indicators are not simple and accurate. RBC distribution width is a very easy index to measure, which has made many achievements in cardiovascular research. Therefore, if there is a certain correlation between RBC distribution width and acute left heart failure, it can be used as a measure of acute left heart failure.

Sun studied the curative effect of early and non-early noninvasive mechanical ventilation on acute left heart failure and respiratory failure. The results showed that the treatment of acute left heart failure and respiratory failure was effective, and early application could improve the cure rate and reduce the intubation rate and mortality<sup>3</sup>. Tamaki et al. studied the relationship between acute heart failure and renal deterioration<sup>4</sup>. Mariëlle studied the situation of heart failure in nursing homes and found that the proportion of heart failure was very high<sup>5</sup>. Weerahandi et al. studied the recurrence of heart failure after hospitalization and rehabilitation, so as to judge the risk of readmission<sup>6</sup>. Jane studied the application of holistic nursing in heart failure. The research shows that holistic nursing has a good curative effect, but the effect varies according to different medical staff, and there is a big difference<sup>7</sup>. Hayes put forward suggestions for the elderly with heart failure, and pointed out how to care for heart failure in common environment<sup>8</sup>. Trivedi et al. have studied a new nursing scheme for patients with heart failure, which can improve their quality of life and reduce the risk of recurrence<sup>9</sup>.

In the process of studying the application effect of RBC distribution width in holistic nursing mode for patients with acute left heart failure, this paper has the following innovations: Firstly, this paper compares the difference of treatment effect between general duty nursing and holistic nursing in acute left heart failure. Secondly, in the course of this study, RBC distribution width is divided into five groups. Finally, this paper not only analyzes the short-term application effect of RBC distribution width in holistic nursing mode, but also analyzes the long-term effect.

## DETERMINATION PRINCIPLE AND CLINICAL APPLICATION OF RBC DISTRIBUTION WIDTH

### Determination Principle of RBC Distribution Width

Simply put, the RBC distribution width refers to the amount used to describe the degree of consistency of RBC size and shape. When this value is smaller, it means that the consistency is better, the RBCs in the blood are more regular, and the shape is closer<sup>10</sup>. If this value is relatively large and exceeds the normal range, it means that there may be some problems. These problems may be congenital blood diseases, anemia, or inflammation.

The cell suspension replaced by electrolyte solution with equal leakage was poured into a non-conductive container, and the small hole tube was inserted into the cell suspension. The small hole tube is an important part of cell counting by electrical impedance method. When the current is turned on, the electrode adjacent to the small hole produces a stable current<sup>11</sup>. The replacement liquid flows into the small hole through the inherent small hole on the wall of the small hole pipe. The pinhole electron pulse is stable. If the supply current and relay are stable, the voltage of the small hole passing through according to ohm's law will not change. When a cell passes through a small hole, because the conductivity of the cell is lower than that of the reducing solution, the increase of the resistance in the sensing area of the small hole in the circuit can instantly cause the voltage change and a pulse signal appears. The volume of sensing area, the volume of cells, the pulse waveform caused, the pulse amplitude change, and the pulse signal go through the following steps to get the cell counting result.

Nowadays, the detection of RBC distribution width mainly depends on blood cell analyzer. This instrument can detect the data of RBCs in blood, including RBC distribution width. The method used in this instrument is the above-mentioned electrical impedance method, which can analyze hundreds of thousands of RBCs in a short time<sup>12</sup>. The results measured in this way are very accurate, and the number of measurements is very large, so the error is relatively small and the randomness is

relatively small. However, in the case of artificial measurement, the number of cells that can be observed is very limited, and the measurement error of human cells is very large, which is influenced by subjectivity, so it is relatively inaccurate. At present, most of them have started to use the instrument detection method, and gradually eliminated the manual detection method.

### **Influencing Factors of RBC Distribution Width**

There have been many researches on RBC distribution width. Studies have proved that reactive protein has certain influence on RBC distribution width, and found that inflammation can lead to an increase in RBC distribution width. The possible reason is that inflammation may affect the production of erythropoietin, which leads to the reduction of the ability to produce RBCs<sup>13</sup>. Therefore, this index is often used to judge whether there is inflammation in human body. In the case of inflammation, an appropriate increase in RBC distribution width is beneficial to human body. However, if it rises a lot, it is very likely to have some bad effects.

Oxidative stress also has some effects on RBC distribution width, and many of these effects have been confirmed. According to many researchers' research experiments, when oxidative stress occurs, the production speed of RBCs slows down, and the morphology of some RBCs in blood changes, and the half-life of cells in blood is different from that under normal circumstances. Under such circumstances, RBC distribution width will become larger than before<sup>14</sup>. Moreover, some studies have shown that the macromolecules involved in RBC activities may be destroyed due to stress reaction, and the existence time of RBCs will be shortened, and the changes of cell morphology will increase, which will lead to greater RBC distribution width. Moreover, oxidative stress can make blood vessel endothelium stick RBCs, thus weakening the ability of RBCs to change shape. Therefore, oxidative stress may be a cause of aggravation of cardiovascular diseases.

The distribution width of RBCs may also reflect the disorder of lipid metabolism in vivo. Cholesterol exchanges free membrane cholesterol between RBCs and plasma lipoprotein. Studies

have shown that the erythrocyte membrane cholesterol of patients with ischemic stroke is obviously increased. In one study, subjects with high cholesterol showed higher RBC distribution width. The reason is not clear. High cholesterol level in erythrocyte membrane may shorten the life span of RBCs and accelerate the renewal of RBCs, resulting in an increase in RBC distribution width.

Generally speaking, the adverse effects of increased RBC distribution width on stroke patients may be due to potential chronic inflammation, and the comprehensive level of oxidative stress or lipid metabolism disorder is reflected in the RBC distribution width.

As a routine blood index, RBC distribution width is a convenient and rapid detection method, which has strong clinical practicability. Although the existence of uneven RBC size does not reflect a certain pathological condition, it does not prevent it from gradually being used as an indicator of disease prognosis in clinic. However, its related mechanism with cardiovascular and cerebrovascular diseases needs further study.

### **Clinical Application of RBC Distribution Width**

Cardiovascular disease is considered as one of the major diseases threatening human health. It has been found that for every 0.1% increase of RBC distribution width, the proportion of new coronary heart disease will increase by 1.38%, which indicates that the increase of RBC distribution width is an independent predictor of coronary heart disease risk. From the degree of coronary artery disease, the RBC distribution width of patients gradually increased with the increase of the number of coronary artery diseases. Moreover, RBC distribution width has certain value in the diagnosis of acute coronary syndrome. Some studies have pointed out that for emergency patients with chest pain as the main symptom, the specificity and sensitivity of diagnosing acute coronary syndrome are 50% and 79%, respectively, and the sensitivity of diagnosing acute coronary syndrome can even reach 99% when the distribution width of RBCs is combined with the detection of troponin. Studies have shown that RBC distribution width is an independent predictor of death and new heart failure in patients

with coronary heart disease. Within 6 months after onset, the increase of RBC distribution width was independently related to death and recurrent myocardial infarction. Therefore, RBC distribution width can be used as a predictor of death of various types of coronary heart disease, recurrence of major cardiovascular events and new heart failure. The increase of RBC distribution width is an independent predictor of the prognosis of patients with chronic heart failure and has predictive value for the prognosis of acute heart failure. In one study, 205 patients with acute heart failure were followed up for 12 months after discharge. It is found that for every 1% increase in RBC distribution width, the risk rate of death will increase by 1.03 times, and RBC distribution width is an independent predictor of death. A large number of studies have shown that the distribution width of RBCs is related to a variety of cardiovascular diseases, which has become one of the hot spots at present.

In recent decades, the clinical application of RBC distribution width is relatively limited, mainly for the classification and differential diagnosis of anemia. Clinically, anemia is usually accompanied by many diseases (such as digestive tract tumors, chronic obstructive pulmonary disease, acute and chronic inflammation, etc.), rather than independent diseases. There are many factors leading to anemia, so it is necessary to differentiate the related factors. RBC distribution width has been used in anemia for more than 30 years and is

relatively mature.

Blood routine includes RBC distribution width, and its detection technology is mature, easy to operate, economical and feasible. As an independent, accessible and effective predictor of risk assessment, it has been widely used in acute and severe diseases, such as heart failure, acute coronary syndrome, stroke, peripheral artery disease, renal insufficiency and severe infection.

## EXPERIMENT OF RBC DISTRIBUTION WIDTH IN PATIENTS WITH ACUTE LEFT HEART FAILURE

### Experimental Subjects

Patients with acute left heart failure in our hospital from March 2017 to October 2019 were selected as experimental subjects, and the experiment was divided into 10 groups according to nursing methods and RBC distribution width. Among them, 5 groups were the control group, which adopted the way of general duty nursing. The age range selected in the experiment was 35 to 75 years old. There are some differences in the proportion of people of different ages in each group. The average age of each group is about 60 years old, and the average age deviation is no more than 2 years old. Because the proportion of males in patients with left heart failure is higher than that of females, the proportion of males in selected subjects is also higher than that of females. The specific research objects are shown in Table 1.

Table 1.  
The research objects of each group

Group	Nursing mode	Male to female ratio	RDW (%)	Age range	Number of people
A	General duty nursing	2:1	≤11.6	35~75	42
B	Holistic nursing	2:1	≤11.6	35~75	42
C	General duty nursing	2:1	11.6~12.6	35~75	42
D	Holistic nursing	2:1	11.6~12.6	35~75	42
E	General duty nursing	2:1	12.6~13.6	35~75	42
F	Holistic nursing	2:1	12.6~13.6	35~75	42
G	General duty nursing	2:1	13.6~14.6	35~75	42
H	Holistic nursing	2:1	13.6~14.6	35~75	42
I	General duty nursing	2:1	≥14.6	35~75	42
J	Holistic nursing	2:1	≥14.6	35~75	42

Screening criteria: Only patients with left heart failure are selected. If patients with left heart failure are accompanied by other organ failures, the target is excluded. The selected patient must have left heart failure for the first time and have no

congenital heart disease. The selected patients cannot have severe lung disease and blood system disease, severe diabetes, and severe brain disease and kidney disease. And the patient needs to cooperate with the treatment test. If the patient does not

cooperate with the treatment test, the target is excluded.

### Contents and Precautions of Holistic Nursing

Holistic nursing was carried out on the basis of general duty nursing, including all the contents of general duty nursing, and added psychological nursing, dietary nursing, health education and so on.

The first is psychological nursing. The influence of psychological condition on health has been paid more and more attention. Many clinical studies show that a good psychological condition can have a favorable impact on the illness, and a bad psychological condition is likely to further worsen the illness. In the aspect of acute left heart failure, medical staff need to effectively dredge the patients' psychology, and when necessary, they can seek help from psychologists. Generally speaking, it is necessary to tell the patient the cause or possible cause of the disease, and let the patient not be too anxious. Let patients know that excessive anxiety will have a bad influence on their condition. It is necessary to keep a relaxed state of mind and actively cooperate with medical staff for treatment. Inform patients and patients' families of some matters needing attention, and let patients' families pay attention to patients' mental health. In the process of drug use and patient examination, we should not only pay attention to data, but also communicate with patients and understand their feelings.

The second is dietary nursing. The medicinal value of food has already been proved. Appropriate food can play an auxiliary role in treating patients' illness. Although these effects are hard to see in a short time, they do have a good effect on patients' health recovery. And some things that are not suitable for eating should be strictly forbidden for patients, such as some foods with high fat and some foods with high salt content. These foods will aggravate the condition of acute left heart failure and are not suitable for patients.

Finally, health education, which is not only for patients, but also for accompanying persons or family members of patients. They need to be told some precautions, including diet and living habits. Let them know when heart failure is easy to happen,

and let them try their best to prevent patients from participating in dangerous activities. The content of health education is not only the matters needing attention during treatment, but also the matters needing attention after discharge. It is necessary for patients and their families to realize that the recovery of heart failure is not only a simple treatment in hospital, but also a good aftercare in future life.

### Experimental Content and Data Processing

Acute left heart failure is a very common acute heart failure, which must be treated immediately. If the treatment time is delayed, the mortality will be greatly increased. Once a patient is found, three steps must be taken immediately, namely, body position adjustment, oxygen therapy, and establishment of venous access. These three steps are very important, and the sooner the better.

The first step is the adjustment of body position, which changes the patient's body position into a semi-recumbent position or an upright position, so that the patient's legs droop, thus resisting the trend of blood flowing back to the heart, which can obviously reduce the load on the heart.

The second step is oxygen therapy, that is, oxygen inhalation, which is especially important for patients with dyspnea.

Heart failure will greatly reduce the circulation ability of blood. If enough oxygen is not given at this time, it is likely to cause hypoxia. Once a patient suffers from hypoxia, it is likely to cause new problems in the body, and even other organs may fail. A series of pathological changes caused by hypoxia are very difficult. Medical staff will not only face a problem of heart failure, but also need to deal with diseases caused by hypoxia. Inhalation of high concentration oxygen can increase the content of dissolved oxygen in plasma, thus alleviating the problem of hypoxia. There are many ways of oxygen therapy, such as nasal congestion and mask, tracheal tube and electronic pulse. In this experiment, according to the patient's condition and hospital equipment condition, the optimal oxygen supply mode was adopted. In the process of oxygen therapy, it is necessary to strictly control the concentration and time of oxygen to avoid oxygen poisoning.

Moreover, in the process of oxygen supply, it is necessary to closely observe the patient's condition, and some matters need attention. The nasal obstruction, catheter, mask and other items used by patients need to be replaced in time, and be cleaned and disinfected regularly to avoid infection. In the course of treatment, it is necessary to observe whether the patient's hypoxia has been alleviated at all times. If the patient's hypoxia has not improved, it is necessary to find out the reason immediately. Find out if it's the device or the patient's illness. When the patient suffers from hypoxia, it can be judged from the fingers, toes and lips of the patient.

The third step is to establish venous access, which is to put intravenous needles into patients in non-technical terms. The main reason for this step is that once the patient is in a critical situation, the patient's vein will collapse immediately, and it is difficult to re-insert the intravenous needle, which will lead to the inability to give the patient first aid in medicine. Intravenous needle is a channel that can deliver drugs to patients. Only by establishing intravenous needle can doctors give full play to the effects of drugs. Generally speaking, the number of intravenous needles should be more than two, which will make medication easier and faster.

During the treatment, if the patient's condition is serious, morphine injection should be given to the patient, so as to improve the patient's excitement and avoid fainting. During the treatment, 2ml of blood of the patient was collected for analysis, and the patient and the patient's accompanying personnel were asked about the patient's past medical history to find out the cause of acute left heart failure. Observe the patient's condition and vital signs at all times, and transfer the patient to the general ward for nursing after the patient's condition is stable. The control group was treated with general duty nursing, while the experimental group was treated with holistic nursing. Record the patient's condition and sort out relevant data.

Data processing: SPSS 19.0 statistical software was used for processing and analysis, and chi-square test was carried out to detect the degree of difference.  $P < 0.05$  showed that the difference was

statistically significant.

## APPLICATION EFFECT ANALYSIS OF RBC DISTRIBUTION WIDTH IN HOLISTIC NURSING MODE

### Analysis of Short-term Effect of RBC Distribution Width in Holistic Nursing Mode

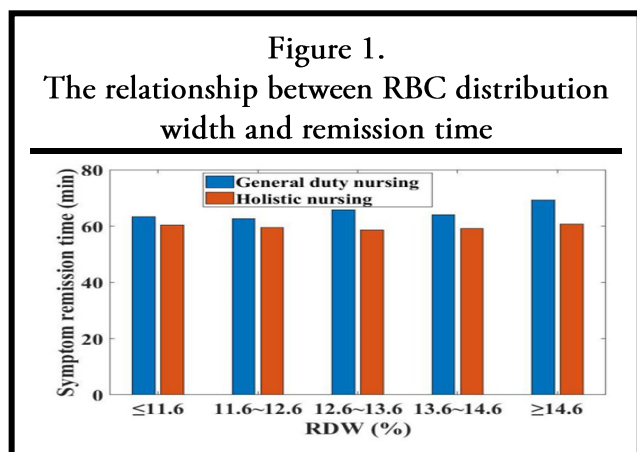
In this experiment, all groups using general duty nursing method are control groups. We subdivided the groups according to RBC distribution width, so as to study the influence of RBC distribution width and nursing methods on the treatment effect. The index that can best reflect the therapeutic effect is the mortality rate. If the therapeutic effect is better, the mortality rate should be lower. Through experiments, we found that under different cell distribution widths, there are obvious differences in the case fatality rate. In general duty nursing, when the RBC distribution width is less than 12.6%, the case fatality rate is 4.8%. When RBC distribution width is in the range of 12.6% to 13.6%, the mortality rate is 7.1%. When RBC distribution width is in the range of 13.6% to 14.6%, the mortality rate is 11.9%. When the RBC distribution width is greater than 14.6%, the mortality rate is 21.4%. In the holistic nursing group, when the RBC distribution width was less than 11.6%, the mortality rate was 7.1%. When RBC distribution width is in the range of 11.6% to 12.6%, the mortality rate is 2.4%. When RBC distribution width is in the range of 12.6% to 13.6%, the mortality rate is 4.8%. When RBC distribution width is in the range of 13.6% to 14.6%, the mortality rate is 7.1%. When the RBC distribution width is greater than 14.6%, the mortality rate is 9.5%. Therefore, we can find that when RBC distribution width was younger, there was no significant difference in mortality. When the RBC distribution width is greater than 14.6%, the mortality rate increases rapidly. Therefore, we can consider using the value of RBC distribution width to judge the severity of the patient's illness. Details are shown in Table 2.

Table 2.

## Different Nursing Methods and Mortality Rate of RBC distribution width (%)

RDW (%)	≤11.6	11.6~12.6	12.6~13.6	13.6~14.6	≥14.6
General duty nursing	4.8	4.8	7.1	11.9	21.4
Holistic nursing	7.1	2.4	4.8	7.1	9.5

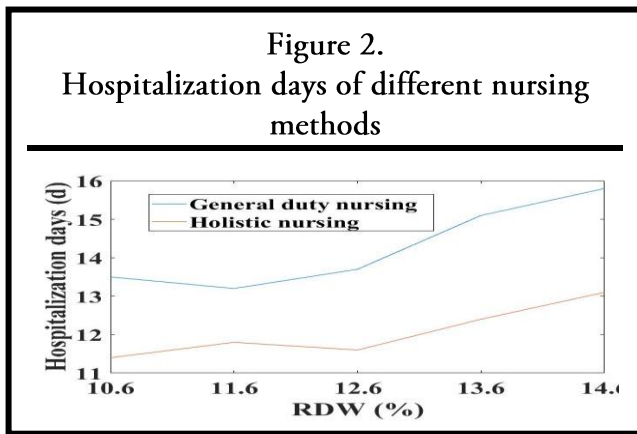
From the table, we can see that when the RBC



distribution width is over 11.6%, the fatality rate of holistic nursing group is lower than that of general duty nursing group. Moreover, when the mortality rate in RBC distribution width is higher than 14.6%, the mortality rate in the group of holistic nursing is much lower than that in general duty nursing, which proves that the beneficial effect of holistic nursing is more obvious when RBC distribution width is bigger. When RBC distribution width is less than 11.6%, the mortality rate of holistic nursing group is higher than that of general duty nursing group. It may be because the number of research objects is not enough, and the randomness is high, which leads to errors. For the evaluation of short-term treatment effect, an important indicator is the time of symptom relief, and the sooner the symptoms are relieved, the better it is for the patient's condition. The specific symptom relief time is shown in Figure 1.

It can be seen from Figure 1 that, on the whole, the symptom relief time of the group with holistic nursing is much shorter than that of the group with general duty nursing, and the difference is the

largest when it is over 14.6% in RBC distribution width, reaching 8.5 minutes. Secondly, when RBC distribution width was in the range of 12.6% to 13.6%, the difference reached 7.2 minutes. Generally speaking, the greater the RBC distribution width, the more obvious the effect of holistic nursing. In the group of general duty nursing, when the RBC distribution width was less than 11.6%, the symptom relief time was 63.4 minutes. When the RBC distribution width was in the range of 11.6% to 12.6%, the symptom relief time was 62.7 minutes. When the RBC distribution width was in the range of 12.6% to 13.6%, the symptom relief time was 65.8 minutes. When the RBC distribution width was in the range of 13.6% to 14.6%, the symptom relief time was 64.1 minutes. When the RBC distribution width was greater than 14.6%, the symptom relief time was 69.2 minutes. In the holistic nursing group, when the RBC distribution width was less than 11.6%, the symptom relief time was 60.3 minutes. When the RBC distribution width was in the range of 11.6% to 12.6%, the symptom relief time was 59.4 minutes. When the RBC distribution width was in the range of 12.6% to 13.6%, the symptom relief time was 58.6 minutes. When the RBC distribution width was in the range of 13.6% to 14.6%, the symptom relief time was 59.2 minutes. When the RBC distribution width was greater than 14.6%, the symptom relief time was 60.7 minutes. We can find that in the group of general duty nursing, when the RBC distribution width is more than 14.6%, the time of symptom relief increases sharply. Therefore, we can infer the severity of the patient's illness and the time of symptom relief from RBC distribution width.

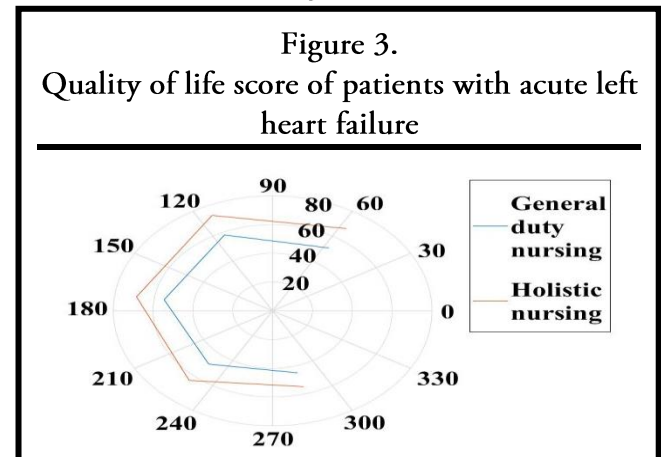


As shown in Figure 2, it can be seen from Figure 2 that the hospitalization days of holistic nursing group are much less than those of general duty nursing group, and the difference is the biggest when it is over 13.6% in RBC distribution width, reaching 2.7 days. In the group of general duty nursing, when the RBC distribution width is less than 11.6%, the hospital stay is 13.5 days. When RBC distribution width was in the range of 11.6% to 12.6%, the hospital stay was 13.2 days. When RBC distribution width was in the range of 12.6% to 13.6%, the hospital stay was 13.7 days. When RBC distribution width was in the range of 13.6% to 14.6%, the hospital stay was 15.1 days. When the RBC distribution width is greater than 14.6%, the hospital stay is 15.8 days. In the holistic nursing group, when the RBC distribution width was less than 11.6%, the hospitalization days were 11.4 days. When RBC distribution width was in the range of 11.6% to 12.6%, the hospital stay was 11.8 days. When RBC distribution width was in the range of 12.6% to 13.6%, the hospital stay was 11.6 days. When RBC distribution width was in the range of 13.6% to 14.6%, the hospital stay was 12.4 days. When the RBC distribution width is greater than 14.6%, the hospital stay is 13.1 days. We can find that when RBC distribution width was younger, the length of stay did not change significantly with RBC distribution width. When RBC distribution width is older, the hospital stay will increase obviously.

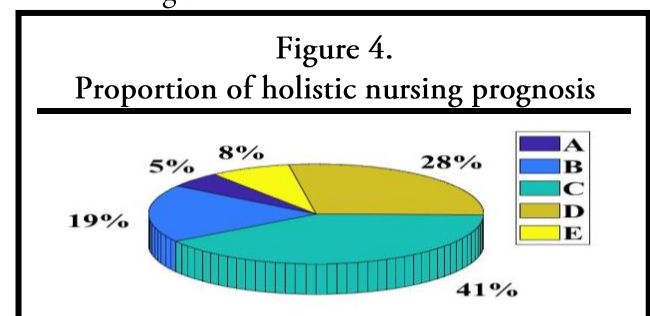
### Long-term Effect Analysis of RBC Distribution Width in Holistic Nursing Mode

In order to explore the long-term effect of RBC distribution width in holistic nursing mode, we followed up the patients. After the patients

recovered for 6 months, the quality of life of the patients was investigated. The specific investigation situation is shown in Figure 3.



It can be seen from Figure 3 that the quality-of-life score of the group of holistic nursing is higher than that of the group of general duty nursing. It shows that the long-term effect of holistic nursing is better than that of general duty nursing. The possible reason is that patients and their relatives have a higher understanding of the matters needing attention in the process of holistic nursing, and the mental health of patients has been paid attention to. In general duty nursing group, with the increase of RBC distribution width, the patients' quality of life decreased obviously. A similar situation appeared in the group of holistic nursing, but the change of patients' quality of life was not obvious when the RBC distribution width was low. When RBC distribution width is in the range of 12.6% to 13.6%, the quality-of-life score of the holistic nursing group is 73, which is slightly higher, which may be due to the insufficient number of subjects and easy to make errors. In order to better study the quality of life of patients under holistic nursing, we sorted out the distribution of patients' quality of life grades, as shown in Figure 4.



It can be seen from Figure 4 that the quality of



life of about 41% of patients is at the level of C, and the quality of life of about 28% of patients is at the level of D. More than half of the patients with these two levels of quality-of-life levels, that is to say, the quality of life of most patients is not high. Most of the patients in grade A and grade B are young people. After paying attention to the body, the quality of life has been greatly improved, and the distribution of RBCs in this group is also relatively small. Those with lower quality of life have relatively larger RBC distribution.

## CONCLUSIONS

(1) When RBC distribution width was small, there was no significant difference in mortality. When the RBC distribution width is greater than 14.6%, the mortality rate increases rapidly. Therefore, we can consider using the value of RBC distribution width to estimate the severity of the patient's illness. When the RBC distribution width is higher than 11.6%, the fatality rate of holistic nursing group is lower than that of general duty nursing group. Moreover, when the mortality rate in RBC distribution width is higher than 14.6%, the mortality rate in the group of holistic nursing is much lower than that in general duty nursing, which proves that the beneficial effect of holistic nursing is more obvious when RBC distribution width is bigger. In the group of holistic nursing care, when RBC distribution width is in the range of 11.6% to 12.6%, the mortality rate is 2.4%. When RBC distribution width is in the range of 12.6% to 13.6%, the mortality rate is 4.8%. When RBC distribution width is in the range of 13.6% to 14.6%, the mortality rate is 7.1%. When the RBC distribution width is greater than 14.6%, the mortality rate is 9.5%.

(2) The symptom relief time of holistic nursing group is much shorter than that of general duty nursing group, and when it is over 14.6% in RBC distribution width, the difference is the biggest, reaching 8.5 minutes. Secondly, when RBC distribution width was in the range of 12.6% to 13.6%, the difference reached 7.2 minutes. Generally speaking, the greater the RBC distribution width, the more obvious the effect of holistic nursing. In the group of general duty nursing, when the RBC distribution width is more

than 14.6%, the time of symptom relief increases sharply. Therefore, we can infer the severity of the patient's illness and the time of symptom relief from RBC distribution width. However, in the holistic nursing group, there was no significant difference in symptom relief time.

(3) The quality-of-life score of holistic nursing group is higher than that of general duty nursing group. It shows that the long-term effect of holistic nursing is better than that of general duty nursing. The possible reason is that patients and their relatives have a higher understanding of the matters needing attention in the process of holistic nursing, and the mental health of patients has been paid attention to. In general duty nursing group, with the increase of RBC distribution width, the patients' quality of life decreased obviously. A similar situation appeared in the group of holistic nursing, but the change of patients' quality of life was not obvious when the RBC distribution width was low. When RBC distribution width is in the range of 12.6% to 13.6%, the quality-of-life score of the holistic nursing group is 73, which is slightly higher, which may be due to the insufficient number of subjects and easy to make errors.

## REFERENCE

- Iida Y, Izawa T, Kobari C, Yatsuhashi T, Makishima N. Transient left bundle branch block due to massive increase of His bundle pacing threshold associated with acute heart failure in a patient with complete heart block. *HeartRhythm Case Rep.* 2018;5(3):143-147. doi:<https://dx.doi.org/10.1016%2Fj.hrcr.2018.11.017>
- Masters J, Barton C, Blue L, Welstand D. Increasing the heart failure nursing workforce: recommendations by the British Society for Heart Failure Nurse Forum. *British Journal of Cardiac Nursing.* 2019;14(11):1-12. doi:<https://doi.org/10.12968/bjca.2019.0109>
- Sun T, Gong, T., Sun, Q., Zhang, J., & Cao, J. Clinical Analysis of Early Non-invasive Mechanical Exploration in the Treatment of Acute Left Heart Failure Complicated with Respiratory Failure. *International Journal of Infectious Diseases.* 2019;8(2):5-7.
- Tamaki S, Sato Y, Yamada T, et al. Tolvaptan Reduces the Risk of Worsening Renal Function in Patients With Acute Decompensated Heart Failure and Preserved Left Ventricular Ejection Fraction — Prospective Randomized Controlled Study —. *Circulation Journal.* 2017;81(5):740-747. doi:<https://doi.org/10.1253/circj.CJ-16-1122>
- Daamen MA, Hamers JP, Gorgels AP, Tan FE, Schols JM, Brunner-la Rocca H-P. Treatment of heart failure in nursing home residents. *J Geriatr Cardiol.* 2016;13(1):44-50. doi:<https://dx.doi.org/10.11909%2Fj.issn.1671-5411.2016.01.001>

6. Weerahandi H, Li L, Herrin J, et al. 2492 Risk of readmission after discharge from skilled nursing facilities following heart failure hospitalization. *Journal of Clinical and Translational Science*. 2018;2(S1):87-87. doi:<https://doi.org/10.1017/cts.2018.303>
7. Brennan EJ. Chronic heart failure nursing: integrated multidisciplinary care. *British Journal of Nursing*. 2018;27(12):681-688. doi:<https://doi.org/10.12968/bjon.2018.27.12.681>
8. Hayes C, Cox C, Parkin L, Scott-Thomas J, Graham Y. Heart failure in practice: enhancing knowledge for nursing and residential care. *Nursing and Residential Care*. 2020;22(4):1-7. doi:<https://doi.org/10.12968/nrec.2020.22.4.8>
9. Trivedi N, Kewcharoen J, Vymen-Williams E, Bander J. HOSPITAL READMISSIONS FROM NURSING HOMES DRAMATICALLY REDUCED USING A NOVEL, COST-EFFECTIVE HEART FAILURE PROTOCOL. *Journal of the American College of Cardiology*. 2020;75(11\_Supplement\_1):953-953. doi:[https://doi.org/doi:10.1016/S0735-1097\(20\)31580-1](https://doi.org/doi:10.1016/S0735-1097(20)31580-1)
10. Cheng Y-L, Cheng H-M, Huang W-M, et al. Red Cell Distribution Width and the Risk of Mortality in Patients With Acute Heart Failure With or Without Cardiorenal Anemia Syndrome. *The American Journal of Cardiology*. 2016/02/01/ 2016;117(3):399-403. doi:<https://doi.org/10.1016/j.amjcard.2015.11.011>
11. Muhlestein JB, Lappe DL, Anderson JL, et al. Both initial red cell distribution width (RDW) and change in RDW during heart failure hospitalization are associated with length of hospital stay and 30-day outcomes. *International Journal of Laboratory Hematology*. 2016;38(3):328-337. doi:<https://doi.org/10.1111/ijlh.12490>
12. Sun P, Zhang F, Chen C, et al. The ratio of hemoglobin to red cell distribution width as a novel prognostic parameter in esophageal squamous cell carcinoma: a retrospective study from southern China. *Oncotarget*. 2016;7(27):42650-42660. doi:<https://dx.doi.org/10.18632/oncotarget.9516>
13. Xu Yaping YL, Hu Shanyou, Xu Qin, XUYaping, & LIUYan. Application of Red Blood Cell Distribution width in Holistic Nursing Model for Patients with Acute Left Heart Failure. *Chinese Medicine Guides*. 2015;12(8):131-134.
14. Zhang Hongbo XW, Zhang Qingna, Zang Lihui, & Ren Aibing. Changes of Red Blood Cell Distribution Width Level in Elderly Patients with Cerebral Infarction and its Correlation with Acute Left Heart Failure. *Chinese Journal of Difficult and Complicated Cases*. 2017;16(12):1213-1216.
15. Vetrivel Chezian Sengodan NT, Iniya Prasanna Raajendiren. Evaluating the Efficacy of Platelet Rich Plasma Injection for the Treatment of Chronic Plantar Fasciitis. *J Nat Sci Biol Med*. 2020;11(2):135-139. doi:10.4103/jnsbm.JNSBM