# Improve knowledge about nutrition and nourishment in patients with acute heart failure in 2023

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## ABSTRACT

To improve the quality of treatment and care for heart failure patients, there is an importance of educating patients about self-care and coordinating among cardiologists, cardiological nurses and nutritionists. A prospective and interventional study was conducted in 86 patients who admitted due to acute heart failure at the department of cardiological emergency and intensive care in Vietnam National Heart Institute, Bach Mai Hospital, from July 1st, 2022 to October 31th, 2023.

**Results:** Of the 86 participants, the highest age group was over 75 years old, accounting for 45.5%, males were 55.8%, higher than females being 44.2%. The general nutritional knowledge score was 11.4%, with 72.5% of participants having cognition at a medium level. The knowledge of them about weight was about half (53.8%), about sodium restriction was 51.2% and they were in medium level. After 1-month of discharging, there was improvement in practice (10.78%), compared to 7.8% in admission. There was a significant difference about nutritional self-care between before and after discharged 1 month (t=10.88, p<0.001). There was no statistical significance between the percentage of malnutrition at admission (23.3%) and at discharge (29.1%). 46.5% of patients were interrupted in nourishment while practicing procedures, accounting for 23.3%. After intervention, three-fourths achieved more energy and the most in the sixth day.

**Keywords:** acute heart failure, malnutrition, nourishment, nutritional knowledge

## INTRODUCTION

Heart failure is the leading cause of mortality, compared to other non-communicable diseases as cancer and stroke. Acute heart failure is represented to a social health problem carried global burden and challenged the modern cardiological research. According to author Agra Bermejo et al. (2017), patients with heart failure are susceptible to malnutrition, which might worsen the prognosis and treatment outcomes, especially in progressive heart failure[1]. Malnutrition and exhaustion are the main causes of hospitalization of chronic heart failure patients with the prevalence was estimated 25-40%[2,3]. These also increase the cardiovascular complications, the duration of hospitalization, the mortality rate and readmission[4]. Moreover, nutritional intervention may minimize these causes and improve the quality of life of patients. In recent

years, there have been many breakthrough medical advances which contribute to the treatment for heart failure such as: pharmaceutical methods, heart transplants, cardiac resynchronization therapy (CRT) and so on. Besides, non-pharmaceutical treatments like rest time, level of action, dietary patterns, and the compliance of treatment also make the prognosis better. These influence the patient's self-care behaviors and then impact their prognosis. Research about heart failure by Linkoping University in 15 countries, including Vietnam, conducted in 126 Vietnamese heart failure patients (in the total of 5964 participants) through 22 trial experiments in 22 places showed that Vietnam is the one of the three lowest countries about the rate of disobeying with sodium restriction with 22%. The research of Nguyen Thi Thuy Ha revealed knowledge and self-care behaviors of heart failure patients were low. The rate of general cognition about drugs and the usage of medication was only 2.1%, about self-care behaviors was 9.8%, and about the compliance with treatment ranged from 25% to 61% (6). Another study conducted in Uong Bi Hospital in 2022 pointed 53.8% had knowledge at medium level and 10.3% had knowledge at good level [7]. In terms of evaluating nutritional condition and nourishment in heart failure patients, 20.4% were malnourished and 60.2% were interrupted while fed, according to the research in Vietnam National Heart Institute, Bach Mai Hospital in 2020.

Nurses play an important role in discovering early complications, educating the way to respond to any change of health problem and the way to adapt to heart failure condition. So that, to improve the quality of care and treatment prognosis for acute heart failure patients, building up a project to innovate the multidisciplinary approach is essential: nutritional intervention and nourishment, education for homecare and the co-ordination among cardiologists, nutritionists and cardiological nurses. Improved of heartcare also improves the treatment.

With these mentioned reasons, we conducted the study named: "Improve the knowledge about nutrition and nourishment in patients with acute heart failure in Vietnam National Heart Institute, Bach Mai Hospital in 2023" with 3 objectives:

Improve the knowledge about nutrition in patients with acute heart failure acute at admission and discharge.

Improve nutrition condition and nourishment in patients admitted due to acute heart failure.

Improve the education for patients and their families' patients at the discharge timepoint.

## PARTICIPANTS AND STUDY METHODS
### Participants
Acute heart failure patients admitted in department of cardiology emergency and intensive care from July 1st to October 31th, 2023.

The inclusion criteria include:

- Patients with a diagnosis of acute heart failure according to the criteria for heart failure of the European Society of Cardiology (ESC).

- Duration of hospitalization was more than 5 days.

- Age > 18 years old.

- Patients consent to involve the study and could provide information correctly.

- Coma patients were approval by their family.

The exclusion criteria include:

- Duration of hospitalization was less than 5 days.

- Patients had mental disorders.

- Patients had amputation in upper and lower extremities because of cannot calculating anthropometric indexes.

- Patients had participated to last study.

### Methods
#### Time and location
Department of cardiology emergency and intensive care from July 1st to October 31th, 2023.

#### Study design
A prospective – interventional study.

#### Sample method and sample size
A convenience study was conducted in the total of patients admitted with the diagnosis of acute heart failure or acute period of chronic heart failure. Patients can eat by mouth or through gastroenteric sonde. The number of participants were 86.

### Variables

*General information:*

- Age: the percentage of each age group
- Gender: the percentage of male and female
- Job: the percentage of each job group
- Education level: the percentage of each education level group (primary school, secondary school, high school and higher)

*The knowledge about nutrition:*

- General knowledge about nutrition for heart failure patients: the percentage of awareness level.
- Knowledge about weight: %
- Knowledge about following-up weight: % (how to weight, when)
- Knowledge about nutrition principle: %
- Knowledge about sodium restriction diet: %
- Knowledge about restricting fluid: %
- Practice about following-up weight: %
- Practice about sodium restriction diet: %
- Practice about control weight: %

*Nourishment:*

- Nutrition condition: classify according to BMI (body mass index)
- The percentage of barriers impacted to nourishment
- The energy level in reality.

### Data collection

According to the medical record, feeding monitoring form and 24-hour diet record for the patient. Oral and tube diet: all products the patient eats during the day, quantity in each meal, whole day, formula from product label and from the nutrition department. Nourishment through intravenous vein: all intravenous nutrition fluids collected from the medical record

### Data analysis

Excell software, SPSS version 20.0.

### Ethical consideration

The investigation was conducted on a voluntary basis, with consent, without coercion, and in a respectful manner. All information about the subject was kept confidential and used only for research purposes. The study was approved by the leadership of the Vietnam National Heart Institute, Bach Mai Hospital.

## RESEARCH RESULTS

### General information:

*Table 1. The characteristics of participants*

| Characteristics | | N | % |
|---|---|---|---|
| Age group | <60 years old | 16 | 18,6 |
| | 60-74 years old | 31 | 36 |
| | ≥ 75 years old | 39 | 45,4 |
| Gender | Male | 48 | 55,8 |
| | Female | 38 | 44,2 |
| Occupation | Farmer | 13 | 15,2 |
| | Worker | 7 | 8,1 |
| | Retired | 66 | 76,7 |
| Education level | Primary school | 20 | 23,3 |
| | Secondary school | 28 | 32,5 |
| | High school or higher | 38 | 44,2 |

**Comments:** The age group over 75 was dominant at 45.4%. Gender: Males were 55.8%, higher than females were 44.2%. Occupation: Most patients were elderly, the percentage of retired accounted for 76.7%. Education level: Most patients had studied from high school or higher, accounting for 44.2%.

### General knowledge of patients about nutrition

*Table 2. General knowledge about nutrition of patients with heart failure*

| Level | Percentage (%) |
|---|---|
| Poor | 9,7 |
| Medium | 72,5 |
| Good | 17,8 |
| Very good | 0 |
| Total | 100 |

**Comments:** The overall knowledge score of the 86 patients studied was 11.4. The lowest score was 1 and the highest was 20 points. The majority of patients had an average level of understanding about

nutrition (72.5%) and had no patient achieved a good level of understanding.

**Table 3.** *Knowledge about weight monitoring*

| Level | Percentage (%) |
|---|---|
| Poor | 27.5 |
| Medium | 53.8 |
| Good | 18.7 |
| Very good | 0 |
| Total | 100 |

**Comments:** Patients' knowledge about weight monitoring was not good, had no patient achieved good knowledge level, up to 53.8% of the study patients had average knowledge level and 27.5% achieved poor knowledge level, only 18.7% of patients achieved fair knowledge level.

**Table 4.** *Knowledge about salt reduction diet in patients*

| Level | Percentage (%) |
|---|---|
| Poor | 7.5 |
| Medium | 51.2 |
| Good | 36.3 |
| Very good | 5.0 |
| Total | 100 |

**Comment:** Patients' knowledge about salt reduction diet was mainly at an average level, accounting for more than half of the studied patients, 51.2%, followed by a fair level, accounting for 36.3%. Patients with good and poor knowledge accounted for a very small proportion, only 5% and 7.5%.

**Table 5.** *Knowledge about fat selection*

| Level | Percentage (%) |
|---|---|
| Poor | 37.5 |
| Medium | 51.2 |
| Good | 7.5 |
| Very good | 3.8 |
| Total | 100 |

**Comments:** Patients' knowledge about fat

selection, the percentage of patients with poor knowledge was 37.5%, the percentage of patients with average knowledge was highest at 51.2%. The percentage of patients with good and fair knowledge was very low at 3.8% and 7.5%.

**Table 6.** *Nutritional care practices of heart failure patients before discharge*

| | Options | n | (%) |
|---|---|---|---|
| The frequency of monitoring weight | None or seldom | 43 | 53,8 |
| | Usually | 23 | 28,7 |
| | Almost always | 12 | 15,0 |
| | Every day | 2 | 2,5 |
| Reduction of sodium intake | None or seldom | 23 | 28,7 |
| | Usually | 23 | 28,7 |
| | Almost always | 13 | 16,3 |
| | Every day | 21 | 26,3 |
| Weight control | None or seldom | 49 | 61,3 |
| | Usually | 17 | 21,3 |
| | Almost always | 6 | 7,5 |
| | Every day | 8 | 10 |
| The frequency of exercising | None or seldom | 37 | 46,3 |
| | Usually | 14 | 17,5 |
| | Almost always | 12 | 15,0 |
| | Every day | 17 | 21,3 |

**Comments:** The practice of self-monitoring and weight control of patients before discharge was quite low, almost none or very little, accounting for 53.8% and 61.3%. The practice of low-salt diet was best performed by patients with a daily rate of 26.3%.

**Table 7.** *Nutritional care practices of heart failure patients before and one month after discharge from hospital*

| Level | Before discharge (%) | After discharge 1 month (%) | p |
|---|---|---|---|
| Poor | 18.8 | 0 | |
| Medium | 40 | 11.3 | |
| Good | 25.3 | 68.8 | P<0.001 |
| Very good | 16.3 | 20 | |

**Comments:** - The average of practice level after 1 month of discharge (10.78) was higher than the practice level before discharge (7.8).

- There was a difference in nutritional care practices of heart failure patients before and after 1 month of hospitalization (t=10.88, p<0.001). Specifically, practice after 1 month of discharge was higher than before discharge.

- Before discharge, 18.8% of patients had poor practice, but after 1 month of discharge, there were no patients with poor practice.

### Patient nutrition

*Table 8. Nutritional status during hospitalization according to BMI*

| Nutrition condition | Admission | Discharge | p |
|---|---|---|---|
| Malnutrition | 20 (23,3%) | 25 (29,1%) | p>0.05 |
| Not malnutrition | 66(76,7%) | 61 (70,9%) | |
| Total | 86 | 86 | |

**Comment:** The rate of malnutrition in patients at admission was 23.3% lower than at discharge 29.1% but this difference was not statistically significant with p >0.05 (Chi-Square).

### Change in patient weight during the first week of hospitalization

*Table 9. Change in patient weight during the first week of hospitalization*

| | X+-SD | Min | Max | P |
|---|---|---|---|---|
| Admission | 53±10,7 | 33 | 94 | P<0,05 (Pair T-test) |
| Discharge | 51,7±11,05 | 31 | 93 | |
| The change | -2±3.1 | -8 | 7 | |

**Comment:** Average weight at admission was higher than weight at discharge. This difference was statistically significant with p<0.05.

### Reasons for feeding interruption

There were 40 patients with feeding interruptions, accounting for 46.5%.

*Table 10. Changes in patient weight during the first week of hospitalization*

| Causes of feeding interruption | n | % |
|---|---|---|
| High gastric residual (>250ml) | 17 | 19,7 |
| Procedure (Dialysis, remove endotracheal tube, tracheostomy, surgery, cardiopulmonary resuscitation,….) | 20 | 23,3 |
| Other causes | 10 | 11,6 |

**Comments:** The most common reason for feeding interruption was procedure 23.3% followed by high gastric residual 19.7%.

### Actual energy received before and after intervention

*Table 11. Actual energy received compared to actual energy provided before and after intervention*

| Actual energy received / Total | Before intervention | After intervention |
|---|---|---|
| Day 1 | 49,5% | 55% |
| Day 3 | 61,5% | 65% |
| Day 6 | 68,3% | 75% |

**Comments:** After the intervention, the actual amount of energy the patient received was higher and reached a peak of 75% on the 6th day.

## DISCUSSION

### The characteristics of participants:

As the results mentioned in chapter 3, the characteristics of 86 participants was showed in tables 3.1 and 3.2. Through that, we had some comments:

The mean of age was 65.6 ± 12.9 with the minimum age was 29 years old and the maximum age was 88 years old. Participants were almost elderly. The median age in the research of Nguyen Ngoc Huyen was 20.38±8.14 with the oldest patient was 90 years old. Most participants in their research were 60 and older. Moreover, in the research of Wal MH et al (2006), the mean of age was 72±11, the youngest patient was 23 and the oldest one was 93. The similar in the median among these researches were acceptable because the incidence of heart failure was increased

with age all over the world. It affected patients over 65 years old up to nearly 10%. Heart failure was the main cause of admission and rehospitalization with the rate of readmission was reported increasing from 877.000 to 1.106.000 in 2006, accounting 171% in American.

About gender, in our research, male were nearly two thirds compared to the 45.4% in the research of Nguyen Ngoc Huyen and 60% in the Wal MH et al.'s research. This proved that male at higher risk than female. There was no difference among education level groups so that heart failure patients could get in any age groups. The number of patients diagnosed with heart failure were 58.8%, was higher than the number of patients have not diagnosed (41.3%). However, patients had been treating (44%) were lower than the ones had not been treated (56%). This indicated that almost patients were examined and diagnosed but them did not obey the treatment.

### Knowledge about heart failure disease

*Knowledge about sodium restriction diet*

Our research was pointed more than a half of patients (51.2%) had the knowledge about sodium restriction diet in medium level, 36.3% was in good level, 5% was in good level and 7.5% was in poor level. These results were opposite to results of Peggy Paulbee (2009) which said that all heart failure patients should avoid high-sodium food. The misunderstanding of selecting food could affected to the practice decreasing sodium in diet because they did not know how much of sodium was enough.

*Knowledge about following-up weight*

The knowledge about following-up weight in heart failure was restricted in our research. There were no patients had very good knowledge, 53.8% was in medium, 27.5% was in poor and 18.8% was in good level, which were unsimilar to the research of Wal MH et al (50). This impressed that the way of propaganda about following-up weight had not been focused, heart failure patients knew the reason why needed to monitored weight every day but did not know how to do.

*Knowledge about nutrition*

In our research, the score of general nutritional knowledge was not high with the median score was 11.4

in 20, the lowest score was 1 and the highest score was 20. There was the significance change in their cognition about heart failure disease. Almost patients (72.5%) were considered categorizing general knowledge in medium level and having no ones in very good level. Educating knowledge about nutrition for heart failure patients played an important role in the treatment. Poor knowledge about that could impacted to the decision of choosing food and worsen the prognosis.

### The practice about self-care in heart failure population

*Practice restricting sodium on the diet*

In this research, the percentage of patients practicing a sodium-restriction diet was still not high, responsible for 26.3% which was not same with the research of Linkoping University, Sweden (88%) or of the Wal MH's (79%). The reason of poor compliance was having no knowledge about why need to restrict sodium in the diet. Restricting sodium was not different thing when they understood. Patients would eat sodium less than normal. In the other hands, who would not obey this principle were due to having not enough ambition to change this habit.

*Practice following-up weight*

The study results showed that up to 53.8% of the subjects did not monitor their weight at all or only occasionally. The daily monitoring of the patients in the study accounted for a very low rate, only 2.5%, which was completely suitable for the rate of knowledge that the patients had in the study. This result was similar to the results of the research group at Linkoping University, Sweden and colleagues [45] at 40.0%, or the study of Wal MH and colleagues [50] at 35.0%. The reason might be that the patients have not seen the effects of weight gain on people with heart failure, so they did not create a habit of daily weight control.

*Practicing exercises*

Only 36.3% of patients exercised regularly, up to 63.7% of research subjects practiced occasionally, or very little or even not exercise at all. There were also similar to the research group at Linkoping University, Sweden and colleagues [45] that 40.0% of participants did not exercise, or the study of Wal MH and colleagues [50] up to 60.0%. The main reason for

this might be due to health conditions, patients had many difficulties, evenly their body was always in a state of fatigue, depression, so the spirit also became depressed and did not want to exercise. It was also possible that the feature of each patient's work made them unable to spend time on exercise. And about the geography, living conditions in each patient's life also hinder them exercising.

### Practicing nutritional care of heart failure patients before and after one month of discharge.

There was a difference in nutritional care practices of heart failure patients before and after one month of hospitalization (t=10.88, p<0.001). Specifically, the practicing after one month of discharge was higher than before discharge (10.78>7.8). During hospitalization, 18.8% of patients had poor practice, but after one month of discharge, having no patients had poor practice. This was completely reasonable because during the treatment and recovery process after discharge, patients are often provided with nutritional information and guidance by doctors, nurses, and nutritionists. They could provide patients with basic knowledge about important nutritional factors for heart failure and how to adjust their diet to improve the immune system.

## CONCLUSION

### Knowledge and practice of patients with chronic heart failure

- The average general knowledge score of patients with heart failure was 11.4. The lowest score is 1 and the highest score is 20. The majority of patients had an average level of understanding of nutrition (72.5%) with no patient achieving a good level of understanding.

- The knowledge of patients about reducing salt intake was mainly at an average level, accounting for more than half of the patients studied, accounting for 51.2%, followed by good level with a rate of 36.3%, patients with very good and poor knowledge account for a very small proportion, respectively only 5 and 7.5%.

- There was no patient achieved a good level of knowledge, up to 53.8% of the study patients had an average level and 27.5% achieved a poor level, only 18.8% of the patients achieved a good level of knowledge.

- In the study, the percentage of patients following a low-salt diet was quite low at 26.3%.

- Up to 53.8% of the subjects did not monitor their weight at all or only occasionally. The daily weight monitoring of the patients in the study accounted for a very low rate, only 2.5%.

- Only 36.3% of patients exercised regularly, while 63.7% of the study subjects exercised occasionally, very little, or not at all.

### The differences in nutritional care practices of heart failure patients before and after one month of discharge

Patients who discharge one month had a better level of compliance with nutritional care practices than before discharge, 10.78 points compared to 7.8 points. In summary, this study showed a significant improvement in nutritional care practices of heart failure patients after hospitalization and one month after discharge. This can be considered a positive result and showed the important impact of treatment and education on the patient's nutritional care process.

## RECOMMENDATIONS

### At the hospital

- Update knowledge about heart failure for cardiovascular nurses, both basic and advanced, so that nurses can be more proactive in advising patients.

- Organize specialized talks on heart failure for patients and their families.

- Distribute leaflets with basic knowledge as well as instructions for self-care at home for heart failure patients.

### In the community:

- There needs to be more extensive communication activities on different information channels about heart failure in the community about knowledge and practice of self-care at home.

- This study only stops at the descriptive level at a central hospital, so the results are not representative of the whole country, especially for lower-level hospitals. Therefore, further studies are needed on a larger sample size.

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