



## Effectiveness of a health educational intervention on self-care knowledge among patients with chronic heart failure

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### ABSTRACT

**Objective:** To assess the baseline self-care knowledge of patients with chronic heart failure and evaluate the effectiveness of a health education intervention on knowledge improvement and retention. **Subjects and methods:** A one-group pretest–posttest educational intervention study was conducted among 70 hospitalized patients with chronic heart failure at the Department of Cardiology, Nam Dinh General Hospital, from October 2024 to August 2025. Data were collected using a standardized questionnaire; internal consistency reliability was assessed using Cronbach's alpha. Descriptive statistics and inferential statistics (paired *t*-test/chi-square test) were used as appropriate, with statistical significance set at  $p < 0.05$ . **Results:** Before the intervention, patients' self-care knowledge was limited, with a mean score of  $10.98 \pm 3.73$  out of 22; no patient achieved a good level, 55.7% were at a fair level, 34.3% at a moderate level, and 10% at a poor level. After the health education intervention, knowledge improved markedly, with the mean score increasing to  $17.35 \pm 2.36$  and remaining at  $17.42 \pm 2.03$  after one month. The proportion of patients achieving a good level increased to 57.1% immediately after the intervention and 47.1% after one month; there were no poor-level cases, and only 1.4% were at a moderate level. The difference was statistically significant ( $p < 0.001$ ). **Conclusion:** Patients with chronic heart failure had substantial limitations in self-care knowledge. The intervention significantly improved self-care knowledge, supporting the importance of regular education to enhance self-care knowledge and thereby contribute to better quality of life and treatment outcomes in patients with chronic heart failure.

**Keywords:** Self-care; Chronic heart failure; Knowledge, Health education intervention

### INTRODUCTION

Heart failure (HF) is a common clinical syndrome and one of the leading causes of morbidity and mortality, with an increasing prevalence in the community. It is the consequence of various cardiovascular diseases such as hypertension, coronary

artery disease, valvular heart disease, cardiomyopathy, congenital heart disease, and cardiac arrhythmias. Globally, it is estimated that approximately 64 million people are living with heart failure (according to GBD 2017 and ESC 2021 data), and this number continues to rise, particularly among older adults <sup>1</sup>.

Heart failure reduces life expectancy and quality of life; the 5-year mortality after diagnosis may be as high as 67%, and the risk of death increases with each readmission due to decompensation. International studies by Boyoung Hwang (2020) <sup>2</sup>, Binu Koirala (2020) <sup>3</sup>, and Youn-Jung Son (2023) <sup>4</sup> indicate that the quality of life of patients with heart failure is low, largely because many patients lack adequate knowledge and skills for self-care.

Heart failure also places a substantial burden on patients, their families, and the healthcare system. Patients often experience multiple physical and psychosocial problems, leading to a marked decline in quality of life. Self-care plays a core role in maintaining physiological stability, controlling the disease, and preventing complications; however, many patients still do not practice self-care adequately. More than half of readmissions are attributed to suboptimal self-care, such as non-adherence to treatment, failure to follow a low-salt diet and fluid restriction, not monitoring body weight daily, delaying follow-up visits, or failing to recognize early warning symptoms.

In Vietnam, several recent studies have examined the knowledge, attitudes, and self-care behaviors of patients with chronic heart failure. In 2022, Nguyen Minh An and Pham Van Manh reported that self-care behaviors remained limited: 39.2% of patients had a high level of self-care behavior, whereas 60.8% had a low level. Specifically, 40% of patients agreed/strongly agreed that they self-monitor body weight; 50% agreed/strongly agreed that they would contact a doctor or nurse when experiencing shortness of breath; 46.7% agreed/strongly agreed that they would contact a doctor or

nurse when their weight increased by 2 kg per week; and 47.5% agreed/strongly agreed with following a low-salt diet <sup>5</sup>. A study by Le Thi Lieu (2020) among 86 patients with chronic heart failure treated at Hop Luc General Hospital also showed limited knowledge and self-care practices; however, these outcomes improved significantly after a health education intervention <sup>6</sup>.

## **SUBJECTS AND METHODS**

**Study participants:** The study participants were patients diagnosed with chronic heart failure who were receiving treatment at Nam Dinh General Hospital. Inclusion criteria were: (1) agreed to participate in the study; (2) aged  $\geq 18$  years; and (3) cognitively able and able to communicate to answer the questionnaire. Exclusion criteria were: (1) did not agree to participate; (2) were in critical condition or had other severe comorbidities requiring intensive treatment; or (3) were unable to receive and answer the questions.

### **Study setting and period:**

The study was conducted at Nam Dinh General Hospital from October 2024 to August 2025.

### **Study design:**

A one-group pretest–posttest (before–after) educational intervention study

### **Sample size and sampling:**

During the data collection period from February to April 2025, a convenience (consecutive) sample of all eligible inpatients was recruited. A total of 70 patients who met the inclusion criteria and fully participated in all study activities were included in the analysis.

**Intervention content:** The health education intervention was developed based

on the Vietnamese Society of Cardiology's self-care guidelines for chronic heart failure and materials from the American Heart Association. The core topics included: (1) the concept of heart failure; (2) common signs and symptoms; and (3) key self-care recommendations for patients with heart failure.

#### **Data collection instruments:**

Data were collected using a standardized questionnaire consisting of two parts

Part A (A1–A11): sociodemographic and general information, including age, sex, place of residence, occupation, educational level, living arrangement, marital status, and clinical information.

Part B (B1–B22): self-care knowledge assessed using the Atlanta Heart Failure Knowledge Test (AHFKT) developed by Carolyn Miller Reilly (2009). In this study, internal consistency reliability was acceptable with Cronbach's alpha = 0.89.

#### **Outcome measurement and scoring:**

Each correct answer was scored 1 point; incorrect or blank answers were scored 0. The total score ranged from 0 to 22 and was classified as:

0 – 5: Poor knowledge

6 – 11: Moderate knowledge

12 – 17: Fair knowledge

18 – 22: Good knowledge

#### **Intervention and assessment procedure:**

The same questionnaire was administered at three time points using direct interviews by the research team:

T1 (baseline/pre-intervention): assessed upon admission, at the patient's

bedside at 10:00 AM on the second day of hospitalization (after medication administration); duration ~20 minutes.

Education session: delivered at the bedside at 10:00 AM on the third day of hospitalization (after medication administration). Patients received counseling materials/leaflets; the team provided direct education, discussion, and answered questions; duration ~30 minutes.

T2 (post-intervention 1): reassessed after 7 days of treatment, before discharge, using the same questionnaire; duration ~20 minutes.

T3 (post-intervention 2): reassessed 4 weeks after discharge via telephone using the same questionnaire if the patient did not return for follow-up on time; duration ~20 minutes.

Investigators were trained before data collection. Data were collected directly in the ward; investigators distributed the questionnaires, guided patients to respond, and checked completeness after collection.

#### **Data analysis:**

Descriptive and inferential statistics were used. Paired t-tests and chi-square tests were applied as appropriate for the before–after intervention design, with statistical significance set at  $p < 0.05$ .

#### **Ethical considerations:**

The study was approved by the Ethics Committee of Nam Dinh University of Nursing (Certificate No. 359/GCN-HĐĐ) and was authorized by the Board of Directors of Nam Dinh General Hospital. All data were used solely for research purposes and not for any commercial or personal purposes.

**RESULT****Table 1. Demographic characteristics of study participants (n = 70)**

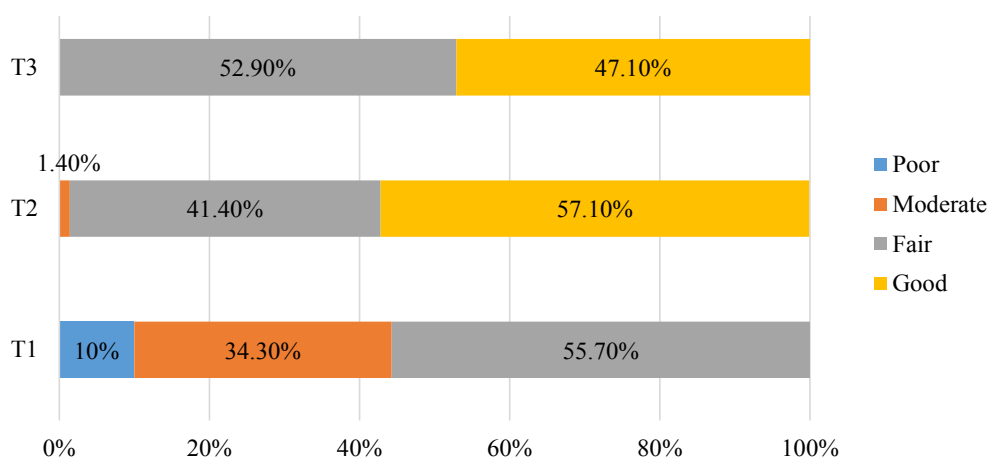
Variable	Category	Frequency (n)	Percentage (%)
Age (year)	≤ 60	7	10.0
	61-80	30	42.9
	> 80	33	47.1
Mean ± SD: 77.71 ± 12.37			
Gender	Male	28	40.0
	Female	42	60.0
Place of residence	Urban	25	35.7
	Rural	45	64.3
Educational level	Primary school	30	42.9
	Secondary school	28	40.0
	High school	9	12.9
	Vocational/college/university/ postgraduate	3	4.3
Occupation	Farmers	40	57.1
	Worker	15	21.4
	Small trader	6	8.6
	Homemaker	3	4.3
	Civil servant	6	8.6
Living arrangement	Living alone	7	10.0
	Living with spouse	9	12.9
	Living with family	54	77.1
Total		70	100

The mean age of participants was  $77.71 \pm 12.37$  years, and 90.0% were aged  $\geq 60$  years. Female patients accounted for 60.0%. Most participants lived in rural areas (64.3%), had an educational level below upper secondary school, and the largest occupational group was farmers (57.1%).

**Table 2. Self-care knowledge scores before and after the intervention (n = 70)**

Assessment time	Score achieved			p-value (paired t-test)	
	Min	Max	Mean ± SD	T1 with T2	T1 with T3
T1	4	17	10.98 ± 3.73		
T2	11	21	17.35 ± 2.36	p < 0.001	p < 0.001
T3	13	22	17.42 ± 2.03		

Before the intervention (T1), patients’ self-care knowledge was limited, with a mean score of 10.98 ± 3.73 (out of 22), ranging from 4 to 17. Immediately after the intervention (T2), the mean score increased to 17.35 ± 2.36 (range 11–21) and remained high at 17.42 ± 2.03 one month later (T3; range 13–22). The improvements from baseline were statistically significant (T1 vs T2 and T1 vs T3: p < 0.001).



**Figure 1 Level of self-care knowledge (n = 70)**

At baseline (T1), 10.0% of patients had poor knowledge, 34.3% had moderate knowledge, 55.7% had fair knowledge, and none achieved a good level. After the intervention (T2), no patient remained in the poor category; 57.1% achieved good knowledge, 41.4% were at a fair level, and only 1.4% were moderate. One month after discharge (T3), all patients remained at fair or good levels (good: 47.1%; fair: 52.9%), with no poor or moderate cases.

**Table 3. Correct knowledge about heart failure (n = 70)**

Content	Assessment time					
	T1		T2		T3	
	n	%	n	%	n	%
Correct understanding of heart failure	30	42.9	49	70.0	51	72.9
Correct understanding that heart failure can be managed/controlled	31	44.3	41	58.6	45	64.3

At baseline (T1), correct knowledge about heart failure was limited: 42.9% of patients correctly understood heart failure, and 44.3% correctly recognized that heart failure can be managed/controlled. After the health education intervention, these proportions increased to 70.0% and 58.6% at T2 and remained relatively high at T3 (72.9% and 64.3%).

**Table 4. Correct knowledge about medication use (n = 70)**

Content	Assessment time					
	T1		T2		T3	
	n	%	n	n	%	n
Correct understanding of the effects/purpose of diuretics	25	35.7	44	62.9	46	65.7
Correct understanding that potassium supplementation is needed when using diuretics	15	21.4	36	51.4	36	51.4
Correct understanding that if a dose is missed, it should be taken as soon as remembered	24	34.3	59	84.3	54	77.1

Before the intervention (T1), correct knowledge about medication use was limited, particularly regarding diuretics and potassium supplementation (35.7% and 21.4%, respectively). After the intervention (T2), the proportions of patients answering correctly increased substantially for all items (62.9% for diuretic effects, 51.4% for potassium supplementation, and 84.3% for appropriate handling of missed doses). At one month (T3), correct knowledge was generally maintained (65.7%, 51.4%, and 77.1%, respectively).

**Table 5 : Correct knowledge about selected self-care measures among study participants (n = 70)**

Content	Assessment time					
	T1		T2		T3	
	n	%	n	%	n	%
Limit salt intake.	63	90.0	70	100.0	70	100.0
Limit fluid intake.	44	62.9	70	100.0	70	100.0
Do not smoke.	62	88.6	67	95.7	68	97.1
Avoid daily alcohol consumption.	59	84.3	68	97.1	69	98.6
Do not stop heart failure medications even when feeling better	51	72.9	62	88.6	62	88.6
Know when to contact a healthcare professional or seek medical care when experiencing heart failure symptoms	52	74.3	57	81.4	61	87.1

Before the intervention (T1), most patients already had correct knowledge regarding several self-care measures, particularly salt restriction (90.0%), smoking cessation (88.6%), and avoiding daily alcohol consumption (84.3%). Knowledge gaps were more apparent for limiting fluid intake (62.9%) and not stopping heart failure medications when feeling better (72.9%). After the health education intervention, correct knowledge improved across all items at T2 and was generally maintained at T3, with 100% of patients answering correctly for salt restriction and fluid restriction at both follow-up time points.

## DISCUSSION

The results of this study showed that after the health education intervention, patients' self-care knowledge improved markedly and was still maintained after one month, although it decreased slightly compared with the immediate post-intervention time point. This suggests that health education not only has an immediate effect but also provides short-term maintenance of benefits. The slight decline may be related to the characteristics of older adults, including lower educational attainment and limited memory; therefore, periodic health education sessions are necessary to reinforce knowledge over time. This finding is consistent with both domestic and international studies reporting that self-care knowledge increases immediately after intervention and can be maintained during follow-up.

### General self-care knowledge

Before the intervention, general self-care knowledge among patients with chronic heart failure was still limited, with a mean score of only  $10.98 \pm 3.73$ . After the intervention, the mean score improved

substantially to  $17.35 \pm 2.36$  and remained high after one month ( $17.42 \pm 2.03$ ); the difference was statistically significant ( $p < 0.001$ ). This result is similar to Dao Thi Phuong's study<sup>7</sup> in terms of baseline scores; however, our post-intervention score was higher, whereas at the one-month follow-up, Phuong's results were slightly higher. Compared with the study by Le Thi Lieu and colleagues<sup>6</sup>, our baseline score was higher, but their post-intervention and one-month results were better.

Our findings are also comparable to an intervention study among 32 patients with heart failure in Japan<sup>2</sup>. At baseline, the mean knowledge score in the intervention group was slightly higher than in the control group ( $10.6 \pm 3.2$  vs.  $8.1 \pm 3.6$ ). After one month of health education, the intervention group's mean score increased markedly compared with the control group. By month six, knowledge scores in the intervention group tended to decrease slightly but remained higher than in the control group. This pattern is similar to our results: knowledge increased clearly immediately after health education but decreased slightly with longer follow-up. This may be explained by age-related factors and the fact that health education is not maintained regularly and continuously. Most patients with heart failure are older adults; without periodic updates and reminders, it is difficult to sustain adequate knowledge and self-care practices. Overall, the findings indicate that health education interventions can improve self-care knowledge in patients with heart failure; however, the degree of improvement and maintenance depends on the frequency and format of education and on patient characteristics, especially in older adults with limitations in learning and memory. Therefore, periodic and repeated

education programs tailored to patients' cognitive levels are needed to help sustain long-term self-care behaviors.

### **Knowledge about heart failure**

In our study, correct knowledge about the concept of heart failure and its controllability before the intervention was limited (42.9% and 44.3%). This is consistent with the study by Le Thi Lieu and colleagues <sup>5</sup> (41.9% and 30.2%) but lower than Nguyen Thi Hong Thuan's study <sup>1</sup>, which reported that over 60% of patients had correct knowledge. These differences may relate to variations in study populations, educational levels, and access to health information across healthcare settings. Sedlar and colleagues (2017) <sup>8</sup> in Slovenia reported that only 26% of patients correctly understood the nature of the disease-much lower than in our study. In contrast, Evangelista and colleagues (2003) <sup>9</sup> in the United States found that more than 70% of patients had basic knowledge about heart failure at baseline, which is considerably higher than results reported in Vietnam. This may reflect differences in the availability of chronic disease management programs and in health communication and education systems in developed countries.

After the intervention, we observed clear improvement: the proportion of patients who correctly understood the concept of heart failure increased to 70%, and those recognizing that heart failure can be controlled increased to 58.6%. These results were lower than those of Vu Van Thanh <sup>6</sup> (over 80% after health education). In Dao Thi Phuong's study <sup>7</sup>, the post-intervention proportions at one month were also higher than ours (74.2% and 77.5%). Taken together, although health education shows immediate effectiveness across studies, the extent to which the effect is maintained

varies depending on implementation methods, how frequently knowledge is reinforced, and the characteristics of each patient group.

### **Knowledge about medication use**

Our findings indicate that before the intervention, patients had substantial limitations in medication-related knowledge, particularly regarding diuretics, a core medication class in heart failure management. Only 35.7% correctly understood the effects of diuretics, 21.4% knew that potassium supplementation may be needed when using diuretics, and 34.3% knew how to respond when they missed a dose. This reflects the reality that many patients take medications passively, relying on physicians' prescriptions without fully understanding the purpose, effects, and appropriate use of medications to achieve the best outcomes.

After the intervention, patients' knowledge improved markedly, especially for the item on managing missed doses (increasing from 34.3% to 84.3% immediately after the intervention and 77.1% after one month). This was higher than Dao Thi Phuong's study <sup>7</sup> immediately after the intervention (55.8%) but lower at the one-month follow-up (86.7%). This suggests that health education helps patients readily absorb practical, everyday topics (e.g., what to do when a dose is missed), while the maintenance of knowledge depends strongly on ongoing reminders and reinforcement.

Compared with other studies, our baseline results were lower than those reported by Le Thi Lieu <sup>6</sup>, where more than 60% of patients knew about the effects of diuretics from the outset. However, we observed strong improvement after health education,

similar to Nguyen Thi Hong Hai's study <sup>10</sup>, which also showed that the proportion of patients with correct medication knowledge doubled after intervention. Internationally, Nieuwenhuis and colleagues (2012) <sup>11</sup> in the Netherlands found that only 28% of patients had correct knowledge about diuretics before education, but this increased to over 70% after participation in a chronic disease management program. Overall, these findings highlight a common pattern: patients with heart failure often lack medication knowledge, but they can learn well when provided with clear, understandable guidance. In general, our results confirm that improving medication knowledge not only supports treatment adherence but also helps reduce the risk of hospitalization due to complications related to inappropriate medication use. However, to maintain long-term effects, health education should be delivered continuously, with coordination among healthcare professionals, families, and the community.

### **Knowledge about selected self-care measures**

In addition to the above knowledge domains, patients with chronic heart failure also need to understand key self-care measures to support disease management. Our study showed that most patients had relatively good baseline knowledge for several measures: limiting salt intake (90.0%), limiting excessive fluid intake (62.9%), not smoking (88.6%), avoiding daily alcohol consumption (84.3%), not discontinuing heart failure medications when feeling better (72.9%), and knowing when to contact healthcare professionals or seek medical care when experiencing heart failure symptoms (74.3%). Compared with Dao Thi Phuong's study, the corresponding

proportions were 90.8%, 31.7%, 85%, 74.2%, 53.3%, and 95%, respectively. Overall, the two studies were broadly similar, except for some differences: our study showed higher proportions for fluid restriction and not stopping medications when feeling better, while Phuong's study reported a higher proportion for knowing when to contact healthcare professionals or seek care when experiencing heart failure symptoms <sup>7</sup>.

We delivered small-group health education counseling, focusing on explaining the benefits of salt restriction, fluid restriction, and smoking cessation for patients with heart failure. The results showed that immediately after the intervention and at one month, patients' knowledge improved markedly and was maintained relatively well. From Orem's perspective (2001), knowledge is a key enabling factor that promotes self-care behaviors. Previous studies have also confirmed that health education for patients with heart failure helps them gain meaningful understanding of the disease as well as self-care strategies <sup>12</sup>. With better knowledge, patients tend to adhere more closely to treatment recommendations, thereby improving disease management effectiveness and quality of life. Therefore, providing education should be considered one of the fundamental solutions within heart failure management programs.

### **CONCLUSION**

Self-care knowledge among patients with chronic heart failure (HF) was limited at baseline, with a mean score of  $10.98 \pm 3.73$  out of 22 (minimum 4, maximum 17). No patient achieved a good level; 55.7% were at a fair level, 34.3% at a moderate level, and 10.0% at a poor level.

The health education intervention significantly improved patients' self-care knowledge ( $p < 0.001$ ). The mean score increased from 10.98 at baseline to  $17.35 \pm 2.36$  immediately after the intervention and was maintained at  $17.42 \pm 2.03$  after one month. The proportion of patients with good knowledge increased to 57.1% immediately after the intervention and 47.1% after one month. The proportion with fair knowledge was 41.4% immediately after the intervention and 52.9% after one month. No patient remained in the poor category, and only 1.4% were at the moderate level after one month.

### RECOMMENDATIONS

Nurses should strengthen health education for patients with chronic heart failure, with emphasis on daily weight monitoring, recognizing warning signs/abnormal symptoms, and adherence to diet and lifestyle recommendations to enhance self-care and reduce complications.

Future studies should increase the sample size, extend the follow-up period, and develop a standardized health education package to evaluate long-term effectiveness.

### REFERENCES

1. Nguyen THH. Changes in self-care behaviors and quality of life among patients with chronic heart failure after a health education intervention at Quang Ninh Provincial General Hospital, 2023 [Master's thesis in Nursing]. 2023.
2. Hwang B, Pelter MM, Moser DK, Dracup K. Effects of an educational intervention on heart failure knowledge, self-care behaviors, and health-related quality of life of patients with heart failure: exploring the role of depression. *Patient Educ Couns.* 2020;103(6):1201-1208. doi:10.1016/j.pec.2020.01.007
3. Koirala B, Dennison Himmelfarb CR, Budhathoki C, Davidson PM. Heart failure self-care, factors influencing self-care and the relationship with health-related quality of life: a cross-sectional observational study. *Heliyon.* 2020;6(2):e03412. doi:10.1016/j.heliyon.2020.e03412
4. Son YJ, Lee SJ, Kim SH. The role of patient activation in self-care behaviours of Korean older adults with heart failure. *Nurs Open.* 2023;10(8):5202-5210. doi:10.1002/nop2.1756
5. Minh An Nguyen, Van Manh Nguyen. Research on the self-care practice of heart failure patient at Thai Binh provincial general hospital in 2022. *Vietnam Medical Journal.* Vol. 531 No. 2 (2023). <https://doi.org/10.51298/vmj.v531i2.7183>
6. Vu VT, Le TL. Changes in self-care knowledge and practices among patients with heart failure treated at Hop Luc General Hospital (Thanh Hoa) in 2020 after a health education intervention [Master's thesis in Nursing]. 2020.
7. Dao TP. Self-care knowledge and practices among patients with chronic heart failure after a health education intervention at Quang Ninh Provincial General Hospital, 2021 [Master's thesis in Nursing]. 2021.
8. Berbiglia VA, Banfield B. Self-care deficit theory of nursing. In: *Nursing Theorists and Their Work.* p. 198-217.
9. Benjamin EJ, Blaha MJ, Chiuve SE, Cushman M, Das SR, Deo R, et al. Heart disease and stroke statistics—2017 update: a report from the American Heart Association. *Circulation.* 2017;135(10):e146-e603. doi:10.1161/CIR.0000000000000485
10. Nguyen THH. Current status of self-care behaviors among older adults with heart failure receiving treatment at

the Viet Nam–Cuba Friendship Hospital, Dong Hoi, Quang Binh [Master's thesis in Nursing]. Nam Dinh: Nam Dinh University of Nursing; 2017.

11. Hu SS, Kong LZ, Gao RL, Zhu ML, Wang W, Wang YJ, et al. Outline of the report on cardiovascular disease in China,

2010. *Biomed Environ Sci.* 2012;25(3):251-256. doi:10.3967/0895-3988.2012.03.001.

12. Vietnamese Society of Cardiology. Recommendations on the diagnosis and treatment of heart failure, 2015 [Internet]. 2015 [cited 2017 Nov 11]. Available from: [http://vnha.org.vn/cate.asp?cate\\_id=168](http://vnha.org.vn/cate.asp?cate_id=168)