Physician's perception on the diagnosis and treatment of heart failure in Vietnam

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ABSTRACT

Objective: Assess the perception of cardiologists, internists, and other specialties on the diagnosis and treatment of heart failure in Vietnam.

Subjects and methods: Cross-sectional study, on cardiologists, internists and other specialties at some hospitals in the country.

Results: The study was conducted on 806 physicians nationwide with a mean working time of 7.4 ± 7.1 years. Correct perception of the physician of heart failure is relatively high. However, the perception of cardiologists is better than the non-cardiologists (including internists and other specialties) on the diagnose and treatment heart failure, heart failure with preserved ejection fraction and reduced ejection fraction.

Conclusion: Cardiologists' perception of heart failure is better than the non-cardiologists. We need to improve education and training for physicians about heart failure.

Key words: heart failure, physician's perception, Vietnam.

INTRODUCTION

Heart failure (HF) is a major global health issue with high morbidity and mortality rates.[1] Currently, there are over 23 million people worldwide living with heart failure,[1] In the United States alone, approximately 6.2 million people have the condition[1] and 500,000 new cases are diagnosed each year.[2] From 2012 to 2030, direct medical costs to treat heart failure are projected to increase from $21 billion to $53 billion.[3]

In Vietnam, the number of heart failure patients is also quite high. In 2007, there were 1,962 heart failure inpatients at Vietnam National Heart Institute, accounting for 19.8% of total hospital admissions.[4] According to the 2017 Health Statistics Yearbook, the mortality rate due to heart failure accounted for 0.4% of all-cause mortality, ranking 10th among the leading causes of death in Vietnam.[5] Despite advances in treatment, the overall prognosis remains very poor with a 5-year mortality rate of up to 50%.[6,7]

Over four decades, we have witnessed tremendous advances in heart failure treatment. 1987 marked an important milestone in heart failure history when enalapril was shown to reduce mortality in patients with congestive heart failure.[8] Since then, other drugs emerged to alleviate symptoms and prolong life in heart failure patients. Currently, many heart failure therapies exist including medical therapy, device therapy, phenotype-directed therapy, etc.[9] This requires physicians to

continuously update their knowledge. Insights into etiology, diagnosis and treatment influence how a physician approaches heart failure management. Thus, physicians play a major role in shaping the disease course for individual patients. To enhance effectiveness of heart failure care and management, many countries worldwide have implemented new approaches to improve physicians' knowledge on heart failure treatment.

Internationally, there have been some studies evaluating physicians' practices in diagnosing and treating heart failure. In Vietnam, no research has been done on this issue. Therefore, we conduct a study entitled "The Current Status of Vietnamese Internists' Knowledge on Diagnosing and Treating Heart Failure" with the goal assessing physican's perception on diagnosing and treating heart failure in Vietnam in order to have educational measures to raise doctoers's knowledge.

SUBJECTS AND METHODS

Study subjects

Inclusion criteria:

Cardiologists or general internists, some other specialties: critical care, surgery, traditional medicine, etc. nationwide

Exclusion criteria:

Physicians who did not consent to participate in the study.

Method

Study design: Cross-sectional descriptive study.

Sample size: Estimated using proportion estimation method

$$n = Z^2_{1-\alpha/2}\frac{p(1-p)}{d^2}$$

Where:

- $Z^2_{1-\alpha/2}$ is the reliability coefficient corresponding to statistical significance level $\alpha = 0.05$

- d is the margin of error, 5%

- p: the proportion of physicians with adequate clinical practice in treating heart failure with preserved ejection fraction, 0.45

Thus, the estimated sample size is 380. In reality, we recruited 806 physicians.

Study duration: 01st April, 2022 – 01st May, 2023

Implementing unit: Vietnam Heart Association

Data collection: Survey via email questionnaires

Data analysis

Data was entered into Excel. Strict data validation was enabled to avoid errors. Afterwards, data was transferred to SPSS 26.0 for management and analysis. Data was analyzed and presented as frequencies and percentages. Chi-square test p-values were used to denote differences between independent variables and the dependent variable.

Results are presented in tables or charts using appropriate statistical graphs: normally distributed continuous variables as mean ± standard deviation, and categorical variables as absolute (percentage) values: n (%). P-value < 0.05 was considered statistically significant.

Research ethics

The study complied with ethical regulations in biomedical research.

RESULTS

Table 1*. General characteristics of study subjects*

Characteristics		Number n = 806
Gender	Male	490 (60.8)
	Female	316 (39.2)
Specialty	Cardiology	408 (50.6)
	Internal Medicine	288 (35.7)
	Others	110 (13.6)
Level	Central	196 (24.3)
	Provincial	359 (44.5)
	District	251 (31.1)
Region	Northern	345 (42.8)
	Central	171 (21.2)
	Southern	290 (36.0)
Years in practice (years)	$\bar{X} \pm SD$ (min – max)	7.4 ± 7.1 (0 - 40)

Comments: Among 806 subjects. 60.8% were

male and 39.2% were female. 50.6% were cardiologists. 35.7% were internists. and 13.6% had other specialties (surgery. critical care. traditional medicine. etc.). 24.3% worked at central hospitals. 44.5% at provincial hospitals. and 31.1% at district hospitals. 42.8% were from the North. 21.2% from the Central. and 36% from the South.

***Table 2**. Common ancillary tests in diagnosing heart failure*

	Cardiology	Internal Medicine	Others	p (cardiology vs non-cardiology)
Echocardiogram	400 (98)	285 (99)	106 (96.4)	0.425
NT-proBNP	397 (97.3)	279 (96.9)	105 (95.5)	0.501
Troponin T	24 (5.9)	36 (12.5)	15 (13.6)	**0.001**
CK-MB	7 (1.7)	29 (10.1)	12 (10.9)	**< 0.001**
Ferritin	5 (1.2)	6 (2.1)	3 (2.7)	0.260
Blood lactate	3 (0.7)	6 (2.1)	1 (0.9)	0.218

Comments: The appropriate understanding of troponin, CK-MB in diagnosing heart failure was statistically significantly different between cardiologists and non-cardiologists with p<0.05.

***Table 3**. The most important goal in treating heart failure*

	Cardiology (n=408)	Internal Medicine (n=288)	Others (n=110)	p (cardiology vs non-cardiology)
Reduce mortality	298 (73)	177 (61.5)	75 (68.2)	0.010
Prevent rehospitalization due to heart failure progression	200 (49)	140 (48.6)	48 (43.6)	0.217
Improve clinical status. function and quality of life	231 (56.6)	182 (63.2)	64 (58.2)	0.170

Comments: More cardiologists (73%) identified reducing mortality as the most important goal compared to non-cardiology groups (61.5% and 68.2%), which was statistically significant with p<0.05.

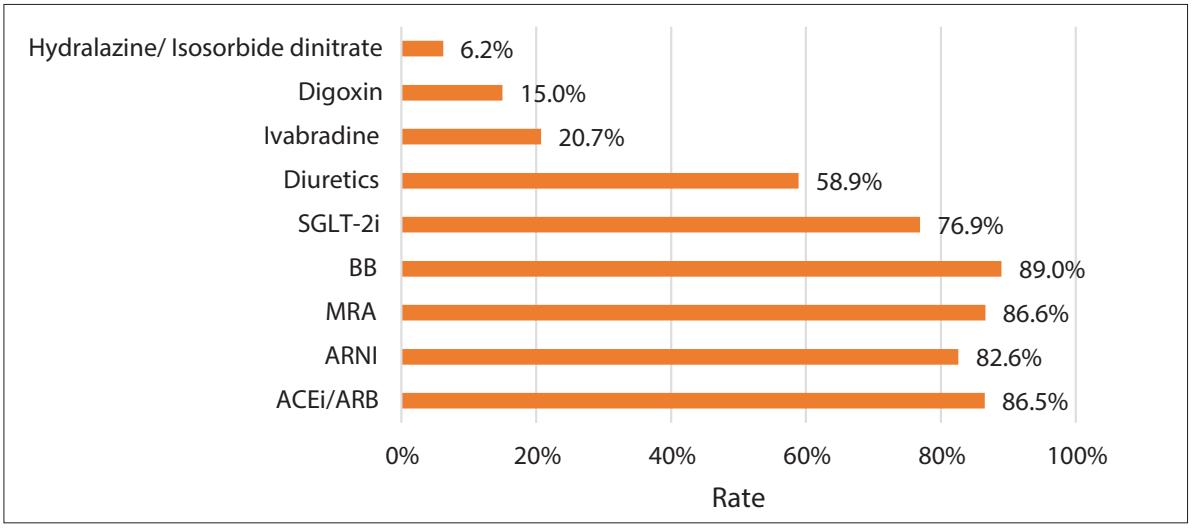

***Chart 1**. Essential and commonly used medications for treating heart failure*

Comments: The majority of physicians correctly identified beta-blockers (89%), MRAs (86.6%), ACEi/ARBs (86.5%), ARNIs (82.6%), SGLT2is (76.9%), and diuretics (58.9%) as commonly used in treating heart failure.

Table 4*. Essential and commonly used heart failure medications by cardiologists vs non-cardiologists*

	Cardiology (n=408)	Internal Medicine (n=288)	Others (n=110)	p 2 groups (cardiology vs non-cardiology)
ACEi/ARB	351 (86)	248 (86.1)	98 (89.1)	0.707
ARNI	359 (88)	225 (78.1)	82 (74.5)	**< 0.001**
MRA	365 (89.5)	249 (86.5)	84 (76.4)	**0.016**
Beta-blocker	377 (92.4)	249 (86.5)	91 (82.7)	**0.002**
SGLT2i	351 (86)	202 (70.1)	67 (60.9)	**< 0.001**
Diuretics	248 (60.8)	158 (54.9)	69 (62.7)	0.279
Ivabradine	92 (22.5)	59 (20.5)	16 (14.5)	0.194
Digoxin	43 (10.5)	58 (20.1)	20 (18.2)	**< 0.001**
Hydralazine/ Isosorbide dinitrate	14 (3.4)	26 (9)	10 (9.1)	**0.001**

Comments: The appropriate understanding of ARNIs, MRAs, beta-blockers, SGLT2is, digoxin, hydralazine for treating heart failure was statistically significantly different between cardiologists and non-cardiologists with p<0.05.

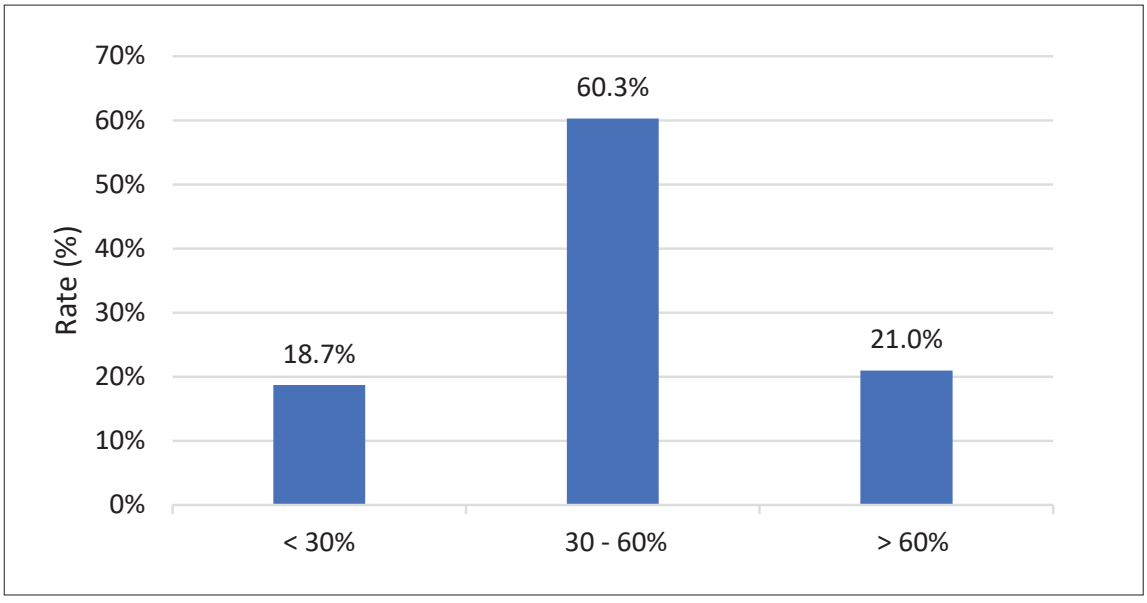

Chart 2*. Proportion of HFpEF among total heart failure patients*

Comments: The majority of physicians correctly identified the proportion of heart failure with preserved ejection fraction to be 30-60%, accounting for 60.3%.

***Table 5**. Diagnosing heart failure with preserved ejection fraction*

Characteristics	Cardiology	Internal Medicine	Others	p (cardiology vs non-cardiology)
Diagnostic scores:				
H_2FPEF	303 (74.3)	189 (65.6)	86 (78.2)	0.103
HAS-BLED	18 (4.4)	37 (12.8)	19 (17.3)	**< 0.001**
HFA–PEFF	188 (46.1)	127 (44.1)	51 (46.4)	0.699
PEP-CHF	57 (14)	66 (22.9)	16 (14.5)	**0.013**

Comments: The inappropriate understanding of HAS-BLED, PEP-CHF in diagnosing HFpEF was statistically significantly different between cardiologists and non-cardiologists with p<0.05.

***Table 6**. Medications proven to improve outcomes in HFpEF patients - cardiologists vs non-cardiologists*

	Cardiology	Internal Medicine	Others	p (cardiology vs non-cardiology)
ACEi/ARB	183 (44.9)	159 (55.2)	65 (59.1)	**0.001**
ARNI	201 (49.3)	177 (61.5)	64 (58.2)	**0.001**
MRA	165 (40.4)	154 (53.5)	54 (49.1)	**0.001**
Beta-blocker	145 (35.5)	130 (45.1)	55 (50)	**0.002**
SGLT2i	335 (82.1)	194 (67.4)	73 (66.4)	**< 0.001**
Diuretics	55 (13.5)	49 (17)	22 (20)	0.088
Digoxin	4 (1)	15 (5.2)	1 (0.9)	**0.006**

Comments: The appropriate understanding of ACEi/ARB, ARNI, MRA, beta-blocker, SGLT2i, digoxin in improving HFpEF outcomes was statistically significantly different between the cardiology and non-cardiology groups with p<0.05.

***Table 7**. Diagnosing heart failure with reduced ejection fraction by physicians*

	Cardiology	Internal Medicine	Others	p 2 groups
Risk factors	205 (50.2)	183 (63.5)	78 (70.9)	**< 0.001**
Clinical symptoms	357 (87.5)	258 (89.6)	98 (89.1)	0.387
Left ventricular ejection fraction	368 (90.2)	269 (93.4)	103 (93.6)	0.090
Structural/functional evidence	274 (67.2)	192 (66.7)	74 (67.3)	0.922
Elevated natriuretic peptides	322 (78.9)	191 (66.3)	67 (60.9)	**< 0.001**
Pulmonary congestion on X-ray	178 (43.6)	115 (39.9)	39 (35.5)	0.155
Elevated troponin	32 (7.8)	28 (9.7)	14 (12.7)	0.183

Comments: The appropriate use of risk factors and natriuretic peptides to diagnose HFrEF was statistically significantly different between cardiologists and non-cardiologists with p<0.05.

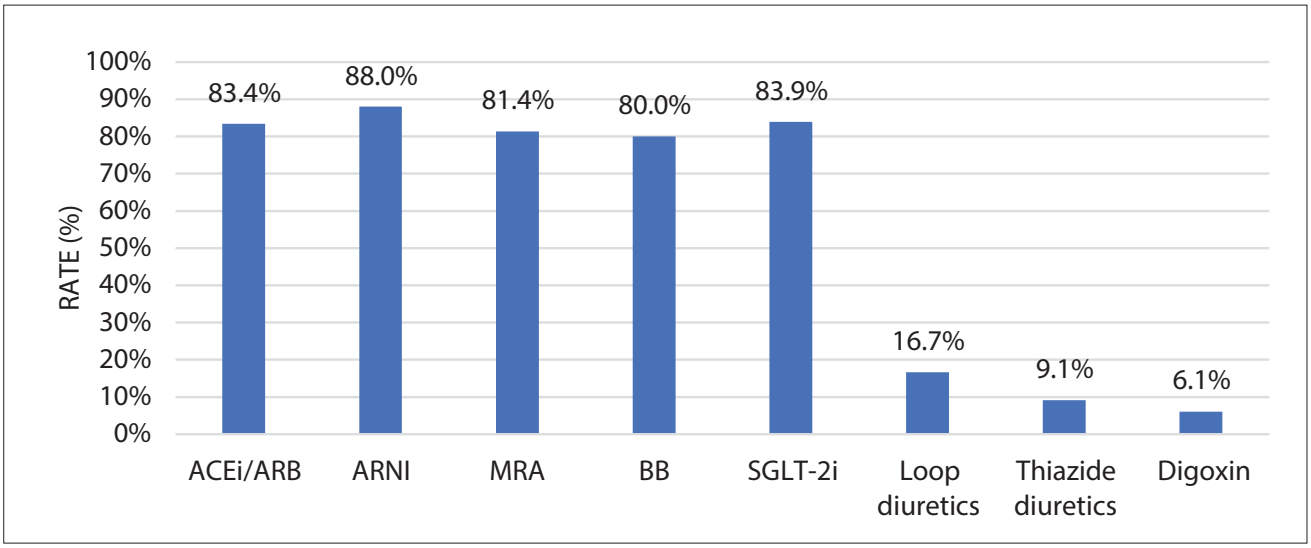

***Chart 4**. Medications proven to improve prognosis in HFrEF patients*

Comments: Most doctors correctly identified ACEi/ARB (83.4%), ARNI (88%), MRA (81.4%), beta-blocker (80%), SGLT2i (83.9%) as having evidence to improve prognosis in HFrEF patients.

***Table 8**. Medications with evidence to improve HFrEF prognosis - cardiologists vs non-cardiologists*

	Cardiology	Internal Medicine	Others	p (cardiology vs non-cardiology)
ACEi/ARB	354 (86.8)	230 (79.9)	88 (80)	0.009
ARNI	376 (92.2)	245 (85.1)	88 (80)	< 0.001
MRA	358 (87.7)	216 (75)	82 (74.5)	< 0.001
Beta-blocker	356 (87.3)	210 (72.9)	79 (71.8)	< 0.001
SGLT2i	362 (88.7)	238 (82.6)	76 (69.1)	< 0.001
Loop diuretics	53 (13)	53 (18.4)	29 (26.4)	0.004
Thiazide diuretics	24 (5.9)	30 (10.4)	19 (17.3)	0.001
Digoxin	18 (4.4)	27 (9.4)	4 (3.6)	0.045

Comments: Cardiologists had better understanding than non-cardiologists regarding medications proven to improve HFrEF prognosis. The proportion of doctors correctly identifying ACEi/ARB, ARNI, MRA, beta-blocker, SGLT2i as improving HFrEF prognosis was significantly higher in the cardiology group compared to the non-cardiology group with p<0.05.

The proportion of doctors incorrectly identifying loop diuretics, thiazides, digoxin as improving HFrEF prognosis was significantly higher in the non-cardiology group compared to cardiology with p<0.05.

DISCUSSION

General knowledge on diagnosing and treating heart failure among our study subjects was quite good. 98.1% of subjects correctly understood echocardiography to assess ejection fraction, with no difference between cardiology and non-cardiology

groups (p>0.05). 96.9% of doctors were aware of NT-proBNP biomarkers for diagnosing heart failure, again with no difference between groups (p>0.05). The proportion of doctors with incorrect understanding of ancillary heart failure diagnostic tests was very low: troponin 9.3%; CK-MB 6%, ferritin 1.7%, etc. This shows there was no difference in awareness of basic diagnostic tests for heart failure between doctor groups. In Milan Gupta's survey[10], there were differences in the use of natriuretic peptides due to cost and availability of tests, with cardiology and internal medicine groups utilizing them more than family medicine. In our study, most doctors identified reducing mortality as the most important goal in treating heart failure (68.2%), with a higher rate in cardiology (73%) than non-cardiology groups (61.5% and 68.2%) (p<0.05). The proportion of doctors correctly identifying commonly used essential medications for treating heart failure was very high: beta-blockers highest at 89%, MRAs 86.6%, ACEi/ARBs 86.5%, ARNIs 82.6%, SGLT2is 76.9%, diuretics 58.9%. However, some still had misconceptions: ivabradine 20.7%; digoxin 15%; hydralazine 6.2%. Appropriate understanding of ARNIs, MRAs, beta-blockers, SGLT2is, digoxin, hydralazine for treating heart failure was significantly higher in cardiology than non-cardiology (p<0.05). Although many had correct understanding, some still had misconceptions, likely because they lacked heart failure training - cardiologists had better awareness than non-cardiologists.

60.3% of doctors stated HFpEF prevalence was 30-60%. This is similar to Milan Gupta's study at 42%[10], and S.Angela's study with 56% HFrEF, 21% HFmrEF, 23% HFpEF among 42,061 heart failure patients.[11] Only 45.4% correctly understood the HFA-PEFF score since it is unpopular and not used clinically - we need more HFpEF diagnostic education. Meanwhile, significantly more non-cardiologists than cardiologists had misconceptions about using HAS-BLED and PEP-CHF scores to diagnose HFpEF (p< 0.001 and 0.013). 74.7% correctly understood that SGLT2is improve HFpEF prognosis. This rate was lower for drugs not improving HFpEF outcomes: ARNIs 54.8%, ACEi/ARBs 50.5%, MRAs 46.3%, beta-blockers 40.9%. This demonstrates updated knowledge on HFpEF treatment. Cardiologists had better understanding than non-cardiologists. Significantly more non-cardiologists incorrectly thought ACEi/ARBs, ARNIs, MRAs, beta-blockers, digoxin improve HFpEF outcomes (p<0.05). Significantly more cardiologists correctly understood SGLT2is improve HFpEF outcomes (p<0.05). Similarly, Milan Gupta[10] found family physicians were more likely than internists and cardiologists to think ACEi/ARBs, beta-blockers, loop diuretics and MRAs improve HFpEF prognosis (p<0.001). Their study preceded the EMPEROR-Preserved trial[12] demonstrating SGLT2is improve HFpEF prognosis, thus we examined awareness of updated evidence.

Cardiologists had significantly better understanding of using natriuretic peptides to diagnose HFrEF than non-cardiologists (p< 0.001<0.05). Meanwhile, more non-cardiologists used risk factors to diagnose HFrEF (p<0.05), thus cardiologists were better at HFrEF diagnosis. Most doctors correctly identified ACEi/ARBs (83.4%), ARNIs (88%), MRAs (81.4%), beta-blockers (80%), SGLT2is (83.9%) as proven to improve HFrEF prognosis. Cardiologists had superior awareness compared to non-cardiologists of medications improving HFrEF prognosis. Significantly more cardiologists correctly identified ACEi/ARBs, ARNIs, MRAs, beta-blockers and SGLT2is as improving HFrEF prognosis (p<0.05); while significantly more non-cardiologists incorrectly identified loop diuretics, thiazides and digoxin (p<0.05). This difference is understandable since cardiologists receive more heart failure training and clinical experience than non-cardiologists.

CONCLUSION

Physicians' knowledge of heart failure was relatively good, however there were still differences in appropriate understanding between cardiologists and non-cardiologists. Cardiologists had superior awareness than non-cardiologists regarding all aspects of heart failure - diagnosis and management of general heart failure, heart failure with preserved ejection

fraction, and heart failure with reduced ejection fraction. Heart failure patients should be managed and treated by cardiologists. More education is needed to improve non-cardiology physicians' knowledge.

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