

PHYSICIANS' PERCEPTION AND ADHERENCE TO CLINICAL GUIDELINES FOR THE MANAGEMENT OF ACUTE CORONARY SYNDROME IN VIETNAMESE HOSPITALS

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ABSTRACT

Introduction: Understanding guideline acceptance related factors and barriers to guideline adoption may help improve guideline implementation. We aimed to investigate physicians' perception and adherence to ACS guidelines in Vietnamese hospitals. **Methods:** This was a cross-sectional study. Physicians' perception was collected through interviews, using a validated questionnaire. Physicians' adherence to ACS guidelines was determined through medical records of ACS patients treated by interviewed doctors, using prescribing indicators. Data were analyzed using SPSS 20.0, with significant level of $p < 0.05$. **Results:** There were 33 cardiologists completed the interview (mean age 36.4, male 57.6%). Majority of physicians perceived that ACS guidelines were useful, reliable, and available. They definitely understood, would keep updating, and implementing those guidelines. About a third of physicians supposed that guideline adherence did not save treatment costs. Major barrier was lack of health insurance coverage. A total of 342 medical records of ACS patients (mean age 65.3, male 59.1%) was reviewed for physicians' adherence. Patients with unstable angina/non-ST-elevation myocardial infarction accounted for the

largest proportion. Statins were predominantly indicated (in 96.4% of patients), followed by aspirin (89.9%), ACEIs/ARBs (86.3%), P2Y12 inhibitors (84.7%), and beta-blockers (59.5%). Ultimately, 52.2% of patients were prescribed all four recommended medications. No differences in physicians' characteristics, perception and barriers to guideline between high- and low-adherence doctors were found. **Conclusions:** Majority of physicians had positive perception towards ACS guidelines, but there were still certain barriers. Physicians' prescribing practice was highly consistent with the guidelines, but the indication of beta-blockers and all four recommended medications were limited.

Keywords: Physicians' perception; guideline adherence; acute coronary syndromes.

I. INTRODUCTION

Ischemic heart disease, including coronary heart disease, is one of the leading causes of death globally. It was estimated that more than 130 million adults would have some forms of coronary heart disease in the United States, including acute coronary syndromes (ACS), in 2035 [1]. In high income countries, research on risk factors of ACS, along with the development of guidelines, intervention procedures and lifestyle education programs, has provided useful measures for management of ACS patients. Similar tools have been adopted and deployed in low-middle income countries, but challenges still exist in implementing such strategies to improve cardiovascular health as well as to manage ACS.

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The main goals in treating ACS are to reduce disease symptoms and to prevent complications such as reinfarction, heart failure or death. To achieve these goals, prestigious organizations such as the European Society of Cardiology (ESC), the American College of Cardiology/American Heart Association (ACC/AHA) and the Vietnam National Heart Association (VNHA) have developed and published guidelines for ACS. Whereby, aspirin, P2Y12 receptor blockers, beta-blockers, angiotensin-converting enzyme inhibitors/angiotensin II receptor blockers (ACEIs/ARBs), and statins are recommended to be indicated for ACS patients at arrival and discharge. Prescribing according to guidelines helps improve treatment outcomes and reduce mortality rate.

However, previous studies showed that adherence to guidelines remains suboptimal [2, 3]. Therefore, exploring guideline acceptance related factors and barriers to guideline adoption may help improve guideline implementation. Such data in Vietnam is limited. A survey on physicians' views and clinical application of the VNHA ACS guideline conducted at four hospitals in Can Tho province showed that 87% of doctors agreed with the guideline, and guideline adherence was higher in agreeing group compared to disagreeing group [3]. Data from other hospitals about physicians' perception, guideline use and disagreements are needed. For that reason, we conducted this study to investigate physicians' perception and adherence to ACS guidelines in several Vietnamese hospitals.

II. METHODS

2.1. Study design

This was a cross-sectional descriptive study. Data was collected from physician

interviews and patient medical records at three hospitals (The Heart Institute of Ho Chi Minh City, University Medical Center of Ho Chi Minh City, and Gia Dinh People's Hospital) in 2019.

2.2. Study population

Cardiologists who had been treating ACS patients at one of above-mentioned hospitals were invited to participate in the study. We excluded doctors who refused to participate or did not complete the interview and doctors managing < 4 patients per month on average.

Medical records of ACS patients treated by physicians who completed the interview were collected to evaluate guideline adherence. We included medical records of patients: (1) discharged within two months prior to the interview, and (2) having discharge diagnoses: unstable angina (I20.0), myocardial infarction (I21), or subsequent myocardial infarction (I22), according to the International Classification of Diseases, 10th revision (ICD-10). We excluded medical records of patients who readmitted to the hospitals during the survey period, requested to discharge due to poor prognosis, left intentionally, and were transferred to another hospital.

2.3. Data collection and tools

2.3.1. Physician interview

Physicians were interviewed using a validated questionnaire about their views on the use of ACS guidelines [3, 4]. The questionnaire comprises of 27 items (including five reversed questions: items 13, 14, 15, 16, and 19), divided into 2 aspects: perception towards guideline and barriers when using guideline. Physicians respond to each item using a 5-level Likert scale: (1) strongly disagree; (2) disagree; (3) neutral; (4) agree; (5) strongly agree. Response of the reversed items were converted back after interview, i.e. 5 to 1.

2.3.2. Data from medical records

Data from medical records of ACS patients who treated by participating physicians and were discharged within two months prior to the interview was used to evaluate guideline adherence. Data collected was patient characteristics, treatment information, and discharge prescription details (medication name, dosage form, dosage, and route of administration). Information on contraindications for certain medications (antiplatelets, beta-blockers, ACEIs/ARBs, and statins) was also recorded.

2.3.3. Data evaluation

First, to evaluate physician’s perception, the score of each item was recorded, a score

$$\text{Prescribing indicator} = \frac{\text{Number of eligible patients who were prescribed the medication}}{\text{Number of eligible patients who should be prescribed the medication}}$$

of 4 or 5 indicated an agreement with the statement. The average score of each domain was calculated, a perception score of ≥ 4 indicated positive perception, a barrier score of ≥ 4 indicated high barrier.

Second, physician’s adherence was assessed through prescribing indicators for medications at discharge. The prescribing indicators used in the study were developed based on recommendations of VNHA, ACC/AHA, and ESC guidelines (Table 1). Prescribing indicator was calculated for individual medication and for all guideline recommended medications, using below formula:

Table 1. Prescribing indicators for medications at discharge in ACS management

Prescribing indicators	Description	Guideline recommendations: class of recommendation and level of evidence					
		VNHA		ACC/AHA		ESC	
		STEMI	UA/NSTEMI	STEMI	UA/NSTEMI	STEMI	UA/NSTEMI
Aspirin	Use aspirin at discharge for ACS patients if there are no contraindications	I-A	I-A	I-A	I-A	I-A	I-A
P2Y12 receptor inhibitors	Use clopidogrel or ticagrelor at discharge for ACS patients if there are no contraindications	I-B	I-B	I-A, B	I-A, B	I-A, B	I-A, B
Beta-blocker	Use beta-blocker for ACS patients if there are no contraindications	I-C	I-C	I-B	I-B	I-A	I-A
ACEI/ARB	Use of ACEI for ACS patients with heart failure, LVSD (EF < 40%), diabetes or hypertension if there are no contraindications Use ARB when patients are allergic or intolerant to ACEI	I	I	I-A	IIa-A	I-A	IIa-A
Statin	Use statin for ACS patients if there are no contraindications	I-A	I-A	I-B	I-B	I-C	I-C

Prescribing indicators	Description	Guideline recommendations: class of recommendation and level of evidence					
		VNHA		ACC/AHA		ESC	
		STEMI	UA/NSTEMI	STEMI	UA/NSTEMI	STEMI	UA/NSTEMI
All four recommended medications	Use all four recommended medications including: platelet aggregation inhibitors, beta-blockers, statin, and ACEI/ARB if there are no contraindications	NA	NA	NA	NA	NA	NA

Abbreviations: I, class I of recommendation; I-A, class I of recommendation and level A of evidence; I-B, class I of recommendation and level B of evidence; I-C, class I of recommendation and level C of evidence; IIA-A, class IIA of recommendation and level A of evidence; NA, not available; ACC/AHA, American College of Cardiology Foundation/American Heart Association; ACEI/ARB, angiotensin-converting enzyme inhibitor or angiotensin II receptor blocker; ESC, European Society of Cardiology; EF, Ejection Fraction; LVSD, left ventricular systolic dysfunction; NSTEMI, Non-ST-elevation myocardial infarction elevated myocardial infarction; STEMI, ST-elevation myocardial infarction; UA, Unstable angina; VNHA, Vietnam National Heart Association.

Physician’s guideline adherence was divided into two levels. A high-adherence physician was defined if his/her prescribing indicator for all recommended medications was greater than or equal to overall prescribing indicator for all recommended medications (i.e. 52.2%, please see the results section), otherwise the physician was considered as low-adherence.

Finally, we compared the differences in physician’s characteristics (age, gender, academic degree, working experience, perception and barriers in applying guideline) between high- and low-adherence groups.

2.4. Sample size and sampling

The study included all physicians and medical records of ACS patients meeting inclusion criteria and had no exclusion criteria.

2.5. Statistical method

Data were analyzed using SPSS 20.0. Descriptive statistics were performed to calculate study outcomes: physician’s demographic characteristics, perception and barriers in using guidelines; patient’s demographic characteristics, and prescribing indicators. Results were presented as percentage (%), and mean ± S.D. Independent samples T test, Chi-square, or Fisher's exact test were used to investigate the differences in physician’s characteristics (age, gender, academic degree, working experience, perception and barriers in applying guideline) between high- and low-adherence groups. Significant level was set at $p < 0.05$.

2.6. Ethical considerations

The study was approved by the Scientific and Ethics Committee of the study hospitals before being conducted (reference number: 23-2019/NDGD-HĐĐĐ; 218/2020/HĐ-ĐHYD).

There were 33 physicians participating in the study. The mean age was 36.4 ± 5.8 (78.8% of doctors were younger than 40 years old), male accounted for 57.6%. Most of the doctors had postgraduate degrees (81.8%) and had been working in the Cardiology field for at least 5 years (75.7%) (Table 2).

III. RESULTS

Table 2. Physicians' demographic characteristics

	Number (N = 33)	Percentage (%)
Age (years)		
<i>Mean ± SD</i>	36.4 ± 5.8	
< 30	5	15.2
30 – 40	21	63.6
> 40	7	21.2
Gender		
<i>Male</i>	19	57.6
<i>Female</i>	14	42.4
Academic degree		
<i>Graduate</i>	6	18.2
<i>Postgraduate</i>	27	81.8
Working experience (years)		
< 5	8	24.3
5 – 10	14	42.4
> 10	11	33.3

All interviewed doctors stated that they definitely understood recommendations from VNHA, ACC/AHA and ESC guidelines about prescribing for ACS patients, as the study hospitals strongly support the implementation of these guidelines in clinical practice. Majority of physicians perceived that guidelines provided useful and objective advice, and they would keep applying guideline recommendations in clinical performance.

Most physicians (90.9%) perceived that guideline availability and guideline adherence helped improve the quality of health care. They also affirmed that guidelines helped physicians continuously update knowledge, and guideline recommendations were reliable to apply in daily practice. Majority of physicians noticed that guidelines were useful for

communicating with patients and their families (96.7%), as those were developed by a panel of experts (87.8%). Only 66.7% of physicians agreed that guideline adherence helped save treatment costs. A small proportion of doctors (6.1% - 21.2%) supposed that guidelines were quite theoretical and inflexible. This was a challenge in making treatment decisions for individual patients, and changing prescribing habits to comply with guidelines was difficult. The participating doctors also explained two major barriers to guideline adherence. These included the lack of health insurance coverage for several indications, and patients in clinical practice were not actually comparable to patients in the guidelines. Physicians' perception and barriers to using guideline are shown in Table 3.

Table 3. Physicians' perception and barriers to using guideline

Item	Questions	Agree*	Percentage (%)
A. Physician's perception on using guidelines			
1	Guideline are available at hospital	30	90.9
2	The hospital ACS guidelines were developed based on recommendations from reputable organizations	33	100.0
3	Physician definitely understand recommendations from guidelines	33	100.0
4	Guideline adherence helps improve the quality of health care	30	90.9
5	Guideline adherence helps save treatment costs	22	66.7
6	Guidelines are useful for communicating with patients and their families	32	96.7
7	Guidelines help physicians continuously update knowledge	30	90.9
8	Guidelines are a source of useful advice	33	100.0
9	Guidelines were developed by a panel of experts	29	87.8
10	Guidelines were developed based on scientific evidence	33	100.0
11	The development of guidelines ensures objectivity	33	100.0
12	The guideline recommendations are reliable	30	90.9
13	Guidelines are too strict to apply to a specific patient	6	15.2
14	Guidelines reduce the physician's initiative in making treatment decisions	7	21.2
15	Guidelines often oversimplify clinical practice	2	6.1
16	Guidelines are rather theoretical	5	15.2
17	I often use guidelines in clinical practice	30	90.9
18	I will continue to apply guidelines in my practice	33	100.0
19	I find it difficult to change my habits to comply with the recommendations of guidelines	3	9.1
B. Barriers to implementing guidelines			
20	Patients in clinical practice are not actually comparable to patients in the guidelines	16	48.5
21	Guidelines are not consistent with each other	9	27.3
22	It takes more time to use guidelines	6	18.2
23	Costs are higher when using guidelines	6	18.2
24	Recommendations are not covered by health insurance	26	78.8
25	The hospital does not have enough resources to comply with guidelines	7	21.2
26	Guidelines are too complicated to use	6	18.2
27	Patient is unable to comply	6	18.2

* Physicians responded with a score of 4 or 5 on the Likert scale

There were 342 medical records of ACS patients collected to investigate guideline adherence. Patient mean age was 65.3 ± 12.3 , male accounted for 59.1%. Majority of patients were diagnosed with unstable angina/ non-ST-elevation myocardial infarction. Among risk factors for ACS, hypertension accounted for the highest rate (76.3%), followed by dyslipidemia (32.5%) and diabetes (28.1%) (Table 4).

Table 4. Patients' demographic characteristics

Characteristics	Number (N = 342)	Percentage (%)
Age (years)		
<i>Mean ± SD</i>	65.3 ± 12.3	
<i>≥ 65 years</i>	70	49.7
Gender		
<i>Male</i>	202	59.1
<i>Female</i>	140	40.9
Diagnosis at discharge		
<i>Unstable angina / Non-ST-elevation myocardial infarction</i>	235	68.7
<i>ST-elevation myocardial infarction</i>	83	24.3
<i>Acute myocardial infarction</i>	24	7.0
Risk factors for coronary artery disease/comorbidities		
<i>Hypertension</i>	261	76.3
<i>Dyslipidemia</i>	111	32.5
<i>Diabetes</i>	96	28.1
<i>Heart failure</i>	57	16.2
<i>Chronic kidney disease</i>	25	7.3

The use of medications to treat ACS was quite consistent with existing treatment guidelines. However, the level of adherence to each medication was various. Statins were properly indicated for most patients (96.4%). In contrast, beta-blockers were prescribed appropriately in only 59.5% of ACS patients. Ultimately, about half (52.2%) of patients were prescribed all four recommended medications appropriately (Table 5).

Table 5. Results of prescribing indicators at discharge

No.	Medication	Number of eligible patients who were prescribed the medication	Number of eligible patients who should be prescribed the medication	Prescribing indicators (%)
1	Aspirin	301	335	89.9
2	P2Y12 receptor inhibitors	288	340	84.7
3	Beta-blocker	197	331	59.5
4	ACEI/ARB	295	342	86.3
5	Statin	318	330	96.4
6	All four recommended medications	169	324	52.2

Physician's characteristics (such as age, gender, academic degree, working experience, perception and barriers to using guideline) had not shown any significant association with guideline adherence level (Table 6).

Table 6. Comparison of physician's characteristics between the high- and low-adherence groups

Physician's characteristics	High-adherence group (N = 19)	Low-adherence group (N = 14)	P
Age (Mean ± SD)	36.4 ± 5.1	36.3 ± 6.5	0.964
Gender			
Male	8 (42.1%)	6 (42.9%)	0.966
Female	11 (57.9%)	8 (57.1%)	
Academic degree			
Graduate	2 (10.5%)	4 (28.6%)	0.184
Postgraduate	17 (89.5%)	10 (71.4%)	
Working experience (years)			
Mean ± SD	7.84 ± 5.13	7.71 ± 4.60	0.942
< 5	5 (26.4%)	3 (21.4%)	0.751
5 - 10	7 (36.8%)	7 (50.0%)	
> 10	7 (36.8%)	4 (28.6%)	
Positive perception			
Yes	16 (84.2%)	10 (71.4%)	0.375
No	3 (15.8%)	4 (28.6%)	
Barriers			
High	16 (84.2%)	10 (71.4%)	0.375
Low	3 (15.8%)	4 (28.6%)	

IV. DISCUSSION

Almost all (96.9%) physicians were aware of the availability of ACS guidelines at the hospitals (questions from 1 to 3). This rate is quite similar to the results from a study by Carlsen B (2009) (97.2%) [5], but higher than those in the research of Tran QNN (2019) (92.6%) [3]. Perhaps the complexity of diseases had required healthcare providers to frequently update treatment measures. In addition, guidelines are widely available online and offline, facilitating physician approach. The percentage of doctors positively perceiving the usefulness, reliability and feasibility of the guideline (questions from 4 to 16) were 84.9%; 87.9% and 33.3%, respectively. These rates are lower than the results in Tran QNN (2019) study (96.3%, 94.4% and 64.8%) [3]. The proportion of doctors considering treatment guideline useful is lower than those in the studies of Kasje WN (2004) (87.1%) and

Reiner Z (2010) (97%) [6, 7]. This can be explained by the fact that 33.3% of participating doctors stated that "guideline adherence does not help improve treatment costs". In a previous study, the percentage of doctors agreeing with the feasibility of guideline were higher and widely varied [6, 7].

Concerning barriers to using guideline, 78.8% of doctors reported that health insurance had not covered some guideline-based indications. This may reduce level of guideline compliance. This may be explained that health insurance pays in case the medication is prescribed in line with the instruction of Summary of Product Characteristic, Vietnamese national drug formulary, or Ministry of Health treatment guidelines [8]. Meanwhile, doctors at the study hospitals regularly update and apply international guidelines. Indications beyond

above mentioned documents may result in out of pockets payment. Prevalence of other barriers, such as inconsistency among guidelines, time consumption and costliness of treatment based on guideline recommendations, complexity of treatment guideline, lack of hospital resources and patients' adherence ability were 27.3%, 18.2%, 12.1%, 21.2% and 18.2%, respectively. This may be supposed that such barriers insignificantly impact on guideline application in clinical practice of participating physicians. According to a study by Adeodu A (2009), the biggest barrier to guideline adherence was time consuming task and unavailability of guideline at hospital, Reiner Z (2010) found that the main barrier to applying guideline was lack of financial support [7, 9]. Barriers to guideline compliance could be influenced by several factors such as national policy, socioeconomic characteristics of a country in general, and the hospital in particular [9].

At discharge, platelet aggregation inhibitors and statins were appropriately prescribed for most patients. This is understandable as there have been a lot of clinical evidence proving the benefits of these medications in ACS treatment. In contrast, prescribing indicator of beta-blockers was low (59.5%). Maybe doctors were concerned about the risks of hypotension, bradycardia or cardiogenic shock. In comparison to a study by Tra J (2015), ACEIs/ARBs prescribing indicators in our study was higher, prescription of P2Y12 receptor inhibitors, aspirin, and statin was comparable, and prescribing indicators of beta - blockers and all four medication groups were suboptimal [10]. In general, physicians' prescribing performance for ACS patients at discharge was consistent with

treatment guidelines, except for beta-blockers and all recommended medications.

The study found no differences in physician's characteristics, including age, gender, academic degree, working experience, perception and barriers to using guideline, between two groups of doctors. Research by QNN Tran (2019) [3] reported that doctors agreeing with guideline had significantly higher guideline adherence level than doctors disagreeing with guideline. Meanwhile, research by Radwan M (2017) [11] showed that doctors' positive attitudes or knowledge towards guideline did not increase guideline compliance. Majority of participating doctors were young (< 40 years) and had post-graduate degrees. This similarity may explain why we have not noticed any differences in age and academic degree between high- and low-adherence group of doctors. This is similar to the study of QNN Tran (2019) [3]. Working experience of the participating doctors was 7.79 years in average (ranging from 1 to 19 years). With wide distribution of this variable and relatively small sample size, difference in working experience was hardly found. We have identified no differences between doctors with positive and negative views on treatment guideline, or with high and low barriers to guideline, and level of guideline adherence. Therefore, more research is needed to investigate reasons of low adherence, this may help improve the use of guideline recommended medications, especially beta-blockers.

To our knowledge, this was one of the first study investigating physicians' perception and adherence at three hospitals leading in the field of cardiovascular diseases. Nevertheless, the study still has some limitations. The number of interviewed

doctors was relatively small because physicians meeting the inclusion criteria was limited. Besides, physicians' age and academic degree were quite similar. Consequently, we have not found any differences between the high-adherence doctors and the low-adherence doctors in terms of physicians' characteristics.

V. CONCLUSIONS

Majority of physicians had positive perceptions towards ACS guidelines, but there were still certain barriers. Physicians' prescribing practice was highly consistent with the guidelines, but the use of beta-blockers and the indication of all four recommended medications were limited. Differences in doctor's characteristics and perception between high- and low-adherence groups of doctors have not been found. Future research is needed to investigate reasons of low adherence, this may help improve the use of guideline recommended medications, especially beta-blockers.

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CONFLICT OF INTEREST

No potential conflicts of interest relevant to this article to report.

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ETHICS APPROVAL

The study was approved by the Scientific and Ethics Committee of the study hospitals before being conducted (reference number: 23-2019/NDGD-HĐĐĐ; 218/2020/HĐ-ĐHYD).

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