



Healthcare Costing Studies in Developing Countries: A Systematic Review in Vietnam

Trung Quang Vo^{1,4}, Usa Chaikledkaew^{1,2}, Minh Van Hoang³, Arthorn Riewpaiboon^{1,*}

¹Division of Social and Administrative Pharmacy, Dept of Pharmacy, Faculty of Pharmacy, Mahidol University, Bangkok, Thailand.

²Health Intervention and Technology Assessment Program (HITAP), Ministry of Public Health, Nonthaburi, Thailand.

³Hanoi School of Public Health, Hanoi, Vietnam.

⁴Department of Pharmacy Administration, Faculty of Pharmacy, University of Medicine and Pharmacy, Ho Chi Minh City, Vietnam.

*Corresponding author's E-mail: arthorn.riew@gmail.com

Accepted on: 20-06-2016; Finalized on: 31-07-2016.

ABSTRACT

Recently, many costing studies have been conducted in Vietnam but up until now, there is no statistics on detail of these studies. The aim of this systematic review is to analyse the trend and situation of costing studies in Vietnam. The study was designed as a systematic review. The publications were searched in PubMed database between the year 2003 and 2016. From 258 records, 33 articles met the selection criteria. The average number of articles per year is 1-3 articles except the year 2012 with 6 articles. Study perspectives are patient/ family (10 articles), societal (9 articles), hospital (7 articles) and ministry of health (5 articles). Types of study are cost of illness (21 articles), cost of healthcare program (8 articles) and hospital cost analysis or unit cost analysis (1 articles). The number of costing studies in Vietnam implemented particularly by Vietnamese researchers remain low. Regarding health insurance reform starting in 1992, more health economic studies are required. Therefore, there is an urgent need for the development of national methodological guidelines and training people to conduct and report costing studies in Vietnam.

Keywords: Cost analysis, cost of illness, cost of healthcare program, hospital cost analysis, unit cost analysis, Vietnam.

INTRODUCTION

At present, medicine and healthcare service prices are often unaffordable for large sectors of the population in low- and middle- income countries^{1,2} including Vietnam.

In 1986, the Vietnamese government committed to a political reform and development strategies based on the socialist-oriented market economy, known as *Doi Moi* (Renovation)³.

After over 25 years of implementing the Renovation (*Doi Moi*), Vietnam's health care sector can proudly point out several solid achievements.

Vietnamese people's health has been significantly and comprehensively improved. Many diseases have been controlled and even eliminated, and targets of nearly all basic health indicators have been achieved or exceeded.

The health care system has been strengthened and expanded to achieve equity, efficiency, and development, which increasingly satisfies the population's health care needs in terms of both quantity and quality⁴.

Health economics has been initiated to public health management.

In addition, Vietnam has implemented healthcare reform pursuing universal health coverage.

Recently, many costing studies have been conducted in Vietnam but up to until now, no study provides a comprehensive view of characteristics of costing studies.

The aim of this study is to review situation of costing studies in healthcare conducted in Vietnam.

MATERIALS AND METHODS

Study Design

This study was designed as a systematic review following the PRISMA guidelines⁵. It was scoped in publication period of 2003 and 2016 in international journals.

Search Strategy

The publications were searched in PubMed database using the following keywords: ('Costs and Cost Analysis' OR 'Cost of Illness' OR 'Hospital Costs' OR 'Direct Service Costs') and ('Vietnamese' OR 'Vietnam' OR 'Vietnam').

Define types of keywords by adding MeSH or Title/Abstract in bracket after all keywords.

Selection Criteria

This study was set out to identify and include all published articles conducted in Vietnam with the characteristics as follows (i) types of studies are hospital cost analysis or unit cost analysis (HCA or UCA), cost of illness (COI), cost of healthcare program (COHP); (ii) and the articles were published in English.

Studies were excluded if they were non-health economic studies (just a costing-related discussion or recommendations), an editorial or methodological article, expert opinions and narrative literatures as it was not a primary study.



The progress of selection articles was presented in Figure 1.

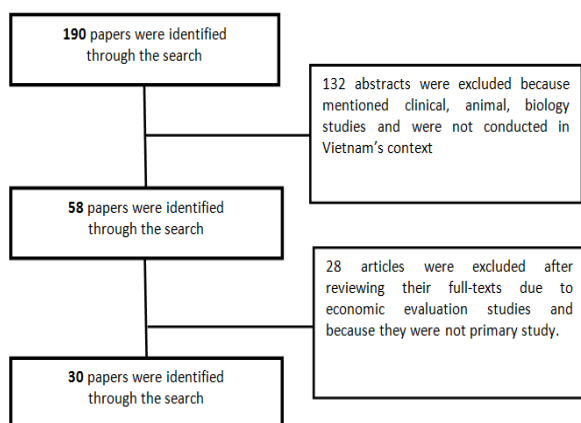


Figure 1: Flow chart of the selection of articles included in the review

Analysis

Analyses were composed of the quantitative factors of costing studies including: number by year, the perspective, the study setting, type of study, researchers.

RESULTS

A total of 190 abstracts were identified through the search until March, 2016. Among those, 132 abstracts were excluded because they mentioned clinical, animal, biology studies and were not applied to the Vietnam’s context. From 58 full-text papers, 30 papers were identified and included in this study; 28 articles were excluded after reviewing their full texts because they are economic evaluation studies using secondary data on costing or estimating by expert opinion.

Costing studies play an important role in health economics. With opened policies of the Government in Vietnam, many projects have been conducted in the country so the number of publications reporting costing studies has increased in recent years. Figure 2 illustrates the amount of publications from the year 2003 to 2016. According the chart, the number of papers increased from 2003 to 2007 following by a decrease in the number of publications in 2008 and 2009 and from 2010, the trend was an increase to reach six publications in 2012. After that, the number of paper decreased and got the average one paper per year until 2016.

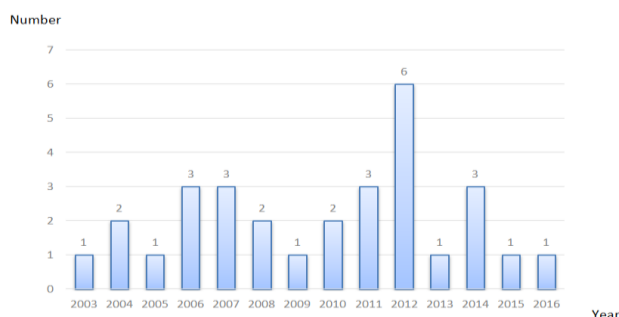


Figure 2: The number of costing studies publications in Vietnam

Table 1 shows the number of Vietnamese authors which were classified base on their affiliations, including Vietnamese authors working for School of Pharmacy, School of Medicine, School of Public Health, Ministry of Health (MOH) and others organizations or non – Vietnamese authors (foreign authors). It is highlighted that proportion of Vietnamese and non – Vietnamese authors was the same. Among the others, two people work in Institute of research and one works in provincial health center.

Table 1: Type of Correspondent and/or First Authors

Author	Number	Total	%	
Vietnamese	School of Pharmacy	0	15	50
	School of Medicine	3		
	School of Public Health	5		
	MOH	3		
	Other organizations	4		
Non - Vietnamese	15	15	50	
Total	31	31	100	

From the data in Figure 3, it is apparent that the proportions of perspective of cost of illness studies. Patient and family account for 32.3%, the highest rate in cost of illness studies and the lowest rate is of MOH with only 16.1%. While publications were published from 2003 to 2016, the year of cost value was recorded from 1997 to 2013. All of them were published the cost value. It is recognized that the amount of cost value between 1997 and 2010 usually had one until three values without 2005 with 7 cost values. Nearly 47 percent of costing studies were conducted in one province in Vietnam. Only two studies were conducted in district which account for 6.7%. The number of studies implemented both in the region and in the whole country are the same with 23.3%.

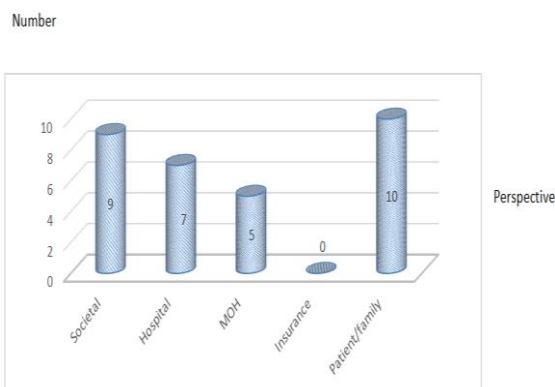


Figure 3: Type of perspective studies in Vietnam between 2003 and 2016

Table 2 illustrates the proportions of three types of studies of 30 articles by year.



Table 2: Types of Costing Studies in Vietnam from 2003 to 2016

No.	Articles Year	Author	Perspective	Year of Cost Value	Study Setting	Type		
						HCA or UCA	COI	COHP
1	Jowett ⁶	Non - Vietnamese	Patient/Family	1999	Country		General illness	
2	Flessa ⁷	Non - Vietnamese	Hospital	2000	Country	Medical services		
3	Danielsson ⁸	Non - Vietnamese	Societal	1995-1999	Province		Intracranial hemorrhage	
4	Fischer ⁹	Non – Vietnamese	Societal	2004	Province		Rotavirus diarrhea	
5	Thuan ¹⁰	Vietnamese - MOH	Societal	2001-2002	District		All illness	
6	Mondadori ¹¹	Non – Vietnamese	Societal	2005	Province			School deworming program
7	Sepehri ¹²	Non – Vietnamese	Hospital	1997-1998	Country			To reduce out-of-pocket health expenditures
8	Ross ¹³	Non – Vietnamese	Hospital	2005	Country		Three major smoking-related diseases	
9	Montresor ¹⁴	Non – Vietnamese	Ministry of Health	2005	Region			School deworming program
10	Harving ¹⁵	Non – Vietnamese	Patient/Family	2005	Region		Dengue fever	
11	Morel ¹⁶	Non – Vietnamese	Societal	2005	Region		Malaria	
12	Hoang ¹⁷	Vietnamese – Medical	Ministry of Health	2005	Region			Immunization program
13	Minh ¹⁸	Non – Vietnamese	Ministry of Health	2007	Region		3 diagnose and intervention of clonorchiasin	
14	Kay ¹⁹	Non – Vietnamese	Ministry of Health	2008	Province			New community-based mosquito control
15	Anh ²⁰	Vietnamese - Public Health	Hospital	2005	Province		Pneumonia, meningitis, sepsis, and other diseases	
16	Poulos ²¹	Non – Vietnamese	Societal	2001-2002	Province		Typhoid fever	
17	Palmer ²²	Non - Vietnamese	Patient/Family	2001-2002	Country			Disability
18	Essue ²³	Non - Vietnamese	Societal	2006	Province			Anemia control program
19	Tam ²⁴	Vietnamese – Medical	Patient/Family	2006-2007	Province		Dengue	
20	Nguyen ²⁵	Vietnamese – others	Patient/Family	2008	Province		All illness	
21	Nguyen ²⁶	Vietnamese – others	Patient/Family	2008	District		All illness	
22	Nguyen ²⁷	Vietnamese – others	Patient/Family	2010	Province		Road traffic injuries	
23	Nguyen ²⁸	Vietnamese - Public Health	Patient/Family	2010	Province		Injury	
24	Chu ²⁹	Vietnamese - Medical	Hospital	2009-2010	Province			"Twinning" surgical Program
25	Lan ³⁰	Vietnamese – others	Patient/Family	2001-2006	Province		Breast cancer	
26	Duong ³¹	Vietnamese – others	Ministry of Health	2008-2010	Country		HIV	
27	Nguyen ³²	Vietnamese – Medical	Patient/Family/Hospital	2011	Province		HIV	
28	Nguyen ³³	Vietnamese – others	Hospital	2010-2011	Region		Hypertension	
29	Hoang ³⁴	Vietnamese - Public Health	Societal	2013	Region		Foodborne Diarrhea	
30	Anh ³⁵	Vietnamese – others	Societal	2011	Country		Five smoking-related diseases	



For 14 years, only 3 papers studied HCA or UCA with 10%. By contrast, cost of illness studies account for 63.3% and cost of healthcare program is about 26.7%. About the hospital cost analysis or unit cost analysis studies, there was only 3 papers for 14 years from 2003 to 2016.

This paper focused on costing of services in Vietnamese hospitals including one central, two provincial and two district hospitals.

The paper showed basic activity statistics, cost of hospital services, unit cost of outpatient department and inpatient department. Moreover, there were 21 cost of illness papers from 2003 to 2016. They focused on costing of Rotavirus diarrhea (1 study), road traffic injuries (2 studies), smoking (1 study), injection of trematode, meningitis, sepsis (3 studies), typhoid, dengue fever (4 studies), breast cancer (1 study), HIV (2 studies), hypertension (1 study), foodborne diarrhea (1 study), five smoking-related diseases (1 study) and all illness (4 studies).

On the other hand, there were 8 papers of cost of healthcare program studies.

They concentrated on costing of school-based deworming program (2 studies), immunization program (1 study), health care utilization, cost burden and coping strategies by disability status (5 studies).

DISCUSSION

The quantity of publications from 2003 to 2015 is from 1-3 papers published each year except for 2012 with 6 papers. After over 25 years of implementing the Renovation (Doi Moi), there are many researchers, who are lecturers in universities or colleges go aboard. They usually study in the field of public health or health economic. The authors who conduct costing studies in Vietnam are both Vietnamese and foreigners. As a result of open policy reform, the number of international projects conducted in Vietnam by foreign researchers and organizations has been high. Besides, there are more and more Vietnamese researcher concerned about health care issues. This systematic review found that cost of illness was the most popular study during 14 years, account for 70%. In 2005, there were seven published cost values. This study shows that 46.7% percent of costing studies in Vietnam had conducted in one province, and the number of studies implemented in the region of Vietnam is equal to that in the whole country with 23.3 percent.

CONCLUSION

This is the first literature review of costing studies conducted in Vietnam. This study provides a clear understanding of the current state and extent of costing research in Vietnam. Health care and health insurance reform from 1992 until now might be derived by an increase of costing studies in Vietnam. Therefore, there is an urgent need for development of national methodological guidelines and training people to conduct and report costing studies in Vietnam.

REFERENCES

1. WHO, Health Action International. Medicine Prices - A new approach to measurement, 2003. Working draft for field testing and revision. 2008.
2. OECD. Pharmaceutical pricing policies in a global market. 2009.
3. Gabriele A. Social services policies in a developing market economy oriented towards socialism: the case of health system reforms in Vietnam. *Review of International Political Economy*, 13(2), 2006, 258-89.
4. Vietnam MoHo. Vietnam National Health Report 2006. 2006.
5. Moher D, Liberati A, Tetzlaff J, Altman DG, Group TP. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *Ann Intern Med*, 151(4), 2009, 264-269.
6. Jowett M, Contoyannis P, Vinh ND. The impact of public voluntary health insurance on private health expenditures in Vietnam. *Social Science & Medicine*, 56(2), 2003, 333-42.
7. Flessa S, Dung NT. Costing of services of Vietnamese hospitals: identifying costs in one central, two provincial and two district hospitals using a standard methodology. *The international journal of health planning and management*, 19(1), 2004, 63-77.
8. Danielsson N, Hoa D, Thang N, Vos T, Loughnan P. Intracranial haemorrhage due to late onset vitamin K deficiency bleeding in Hanoi province, Vietnam. *Archives of Disease in Childhood-Fetal and Neonatal Edition*, 89(6), 2004, 546-50.
9. Fischer TK, Anh DD, Antil L, Cat N, Kilgore PE, Thiem VD. Health care costs of diarrheal disease and estimates of the cost-effectiveness of rotavirus vaccination in Vietnam. *Journal of Infectious Diseases*, 192(10), 2005, 1720-6.
10. Thuan NTB, Lofgren C, Chuc NTK, Janlert U, Lindholm L. Household out-of-pocket payments for illness: evidence from Vietnam. *BMC Public Health*, 6(1), 2006, 283.
11. Mondadori E, Ehrhardt A, Anh TL, Cong DT, Sepe G, Huyen NV. Appreciation of school deworming program by parents in Ha Giang Province (Vietnam). 2006.
12. Sepehri A, Sarma S, Simpson W. Does non-profit health insurance reduce financial burden? Evidence from the Vietnam living standards survey panel. *Health economics*, 15(6), 2006, 603-16.
13. Ross H, Trung DV, Phu VX. The costs of smoking in Vietnam: the case of inpatient care. *Tobacco control*, 16(6), 2007, 405-9.
14. Montresor A, Le Anh T, Ehrhardt A, Mondadori E, Thi TD, Le Khanh T. Cost containment in a school deworming programme targeting over 2.7 million children in Vietnam. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 101(5), 2007, 461-4.
15. Harving ML, Ronsholt FF. The economic impact of dengue hemorrhagic fever on family level in Southern Vietnam. *Dan Med Bull*, 54(2), 2007, 170-2.
16. Morel CM, Thang ND, Xa NX, Hung LX, Thuan LK, Ky P. The economic burden of malaria on the household in south-central Vietnam. *Malaria Journal*, 7(1), 2008, 166.
17. Hoang MV, Nguyen TBY, Kim BG, Dao LH, Nguyen TH, Wright P. Cost of providing the expanded programme on immunization: findings from a facility-based study in Viet Nam, 2005. *Bulletin of the World Health Organization*, 86(6), 2008, 429-34A.
18. Minh HV, Giang KB, Huong DL, Huong LT, Huong NT, Giang PN. Costing of clinical services in rural district hospitals in northern Vietnam. *The International journal of health planning and management*, 25(1), 2009, 63-73.
19. Kay BH, Hanh TTT, Le NH, Quy TM, Nam VS, Hang PV. Sustainability and cost of a community-based strategy against *Aedes aegypti* in northern and central Vietnam. *The American journal of tropical medicine and hygiene*, 82(5), 2010, 822-30.



20. Anh DD, Riewpaiboon A, Le Huu Tho S, Kim BN, Kilgore P. Treatment costs of pneumonia, meningitis, sepsis, and other diseases among hospitalized children in Viet Nam. *Journal of health, population, and nutrition*, 28(5), 2010, 436.
21. Poulos C, Riewpaiboon A, Stewart JF, Clemens J, Guh S, Agtini M. Cost of illness due to typhoid fever in five Asian countries. *Tropical Medicine & International Health*, 16(3), 2011, 314-23.
22. Palmer M, Nguyen T, Neeman T, Berry H, Hull T, Harley D. Health care utilization, cost burden and coping strategies by disability status: an analysis of the Viet Nam National Health Survey. *The International journal of health planning and management*, 26(3), 2011, e151-68.
23. Essue BM, Hackett ML, Mueller A, Duc NTH, Phuc HT, Jan S. Investigating the psychological and economic impact of cataract surgery in Vietnam: The visionary observational study protocol. *BMC ophthalmology*, 11(1), 2011, 25-7.
24. Tam PT, Dat NT, Thi XCP, Duc HM, Tu TC, Kutcher S. High household economic burden caused by hospitalization of patients with severe dengue fever cases in Can Tho province, Vietnam. *The American journal of tropical medicine and hygiene*, 87(3), 2012, 554-8.
25. Nguyen KT, Khat OTH, Ma S, Pham DC, Khat GTH, Ruger JP. Coping with health care expenses among poor households: evidence from a rural commune in Vietnam. *Social Science & Medicine*, 74(5), 2012, 724-33.
26. Nguyen KT, Khat OTH, Ma S, Pham DC, Khat GTH, Ruger JP. Impact of health insurance on health care treatment and cost in Vietnam: a health capability approach to financial protection. *American journal of public health*, 102(8), 2012, 1450-61.
27. Nguyen H, Ivers RQ, Jan S, Martiniuk AL, Li Q, Pham C. The economic burden of road traffic injuries: evidence from a provincial general hospital in Vietnam. *Injury prevention*, 19(2), 2012, 79-84.
28. Nguyen H, Ivers R, Jan S, Martiniuk A, Pham C. Catastrophic household costs due to injury in Vietnam. *Injury*, 44(5), 2012, 684-90.
29. Chu QD, Nguyen T, Nguyen P, Ho HS. Cost analysis of establishing a relationship between a surgical program in the US and Vietnam. *International surgery*, 97(2), 2012, 155-60.
30. Hoang Lan N, Laohasiriwong W, Stewart JF, Tung ND, Coyte PC. Cost of treatment for breast cancer in central Vietnam. *Glob Health Action*, 6, 2013, 18872.
31. Duong AT, Kato M, Bales S, Do NT, Minh Nguyen TT, Thanh Cao TT. Costing analysis of national HIV treatment and care program in Vietnam. *J Acquir Immune Defic Syndr*, 65(1), 2014, e1-7.
32. Nguyen LT, Tran BX, Tran CT, Le HT, Tran SV. The cost of antiretroviral treatment service for patients with HIV/AIDS in a central outpatient clinic in Vietnam. *Clinicoecon Outcomes Res*, 6, 2014, 101-8.
33. Nguyen TP, Nguyen TB, Nguyen TT, Vinh Hac V, Le HH, Schuiling-Veninga C. Direct costs of hypertensive patients admitted to hospital in Vietnam- a bottom-up micro-costing analysis. *BMC Health Serv Res*, 14, 2014, 514.
34. Hoang VM, Tran TA, Ha AD, Nguyen VH. Cost of Hospitalization for Foodborne Diarrhea: A Case Study from Vietnam. *J Korean Med Sci*, 30 Suppl, 2, 2015, S178-82.
35. Hoang Anh PT, Thu le T, Ross H, Quynh Anh N, Linh BN, Minh NT. Direct and indirect costs of smoking in Vietnam. *Tob Control*, 25(1), 2016, 96-100.

Source of Support: Nil, Conflict of Interest: None.

Corresponding Author's Biography : Associate Professor. Dr. Arthorn Riewpaiboon



Head, Division of Social and Administrative Pharmacy (SAP), Department of Pharmacy, Faculty of Pharmacy, Mahidol University, Thailand
Address: 447, Sri Ayutthaya Road, Bangkok 10400, Thailand. Phone: 0-2644-8677-90, Fax: 0-2644-8694

Corresponding Author's Biography : Associate Professor. Dr. Usa Chaikledkaew

Division of Social and Administrative Pharmacy, Department of Pharmacy, Faculty of Pharmacy, Mahidol University, Thailand.
Address: 447, Sri Ayutthaya Road, Bangkok 10400, Thailand. Phone: 0-2644-8677-90, Fax: 0-2644-8694

Corresponding Author's Biography : Associate Professor. Dr. Minh Van Hoang

Hanoi School of Public Health, Vietnam.
Address: 138 Giang Vo Street, Ba Đình District, Ha Noi 100000, Viet Nam, Phone: 0462662343, Fax: 0462662385

Corresponding Author's Biography : Mr. Vo Quang Trung, (PhD Candidate, Bsc. Pharm, Bsc. Law)



- PhD Candidate - Division of Social, Economic and Administrative Pharmacy, Department of Pharmacy, Faculty of Pharmacy, Mahidol University, Thailand.
- Lecturer - Department of Pharmacy Administration, Faculty of Pharmacy, University of Medicine and Pharmacy, Ho Chi Minh, Vietnam.