

Quality of Health Economic Evaluation in Developing Countries: A Systematic Review in Vietnam

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ABSTRACT

Background: At present, economic evaluation studies are pivotal in decisions on apportion of resources in health care. Vietnam is a country undergoing a healthcare reform requiring health economic information. This study is designed as a systematic review to explore the trend and situation of economic evaluation studies in Vietnam. In order to aid the development of this study, databases of numerous sources, namely PubMed, Science Direct, Google Scholar, and Cochrane library. **Results:** From 1356 records found, twenty-three articles met selection criteria. Average number of articles by years is 0-5 papers except in 2012 (7 papers). There is 95.7 percent used cost effectiveness analysis, only one study conducted cost benefit analysis. Out of these studies, the number of articles was mentioned in prevention interventions (11), diagnostic procedures (3), curative procedures (7), and services delivery (2). Eleven studies did not report clearly the incremental cost-effectiveness ratio (ICER) and also 11 publications did not disclose funding sources. **Conclusions:** This review shows clearly the

current situation and an urgent need for an increase of both quality and quantity of health economic studies in Vietnam. Basically, national methodological guidelines for conducting and reporting economic evaluation in Vietnam should be developed as soon as possible.

Key words: Economic evaluation, economic analysis, cost minimization, cost effectiveness, cost utility, cost benefit, systematic review, Vietnam.

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INTRODUCTION

Since December 1986, the Government provided to shift in political and economic policies, namely *Doi moi* (Renovation) as well as development strategy based on the conversion from a centrally planned economy to form of market socialism. From a domestic perspective, such renovation appears as a potential opportunity which serves the purpose of opening and varying the market of healthcare system.¹ As regards the survey results conducted by The Vietnamese National Population Census in 2012, the population of Vietnam was 88.78 million people, of which nearly 60% were expected to benefit from health insurance by the year 2010 thanks to the high percentage of 92.73% in the contribution of out-of-pocket spending toward financing healthcare.²

Economic evaluation was defined as “the comparative analysis of alternative courses of action in terms of both their costs and consequences” by Drummond.³ It implicated the difference between economic evaluation and other assessment is the identification, appraisal and collation of costs and consequences. However, the characteristics of the outcomes may distinguish remarkable based on the type of economic evaluation, for example, cost minimization analysis (CMA), cost effectiveness analysis (CEA), cost utility analysis (CUA), cost benefit analysis (CBA), *programme budgeting and marginal analysis, discounting, sensitivity analysis* in health economic evaluation (HEE).⁴ Nowadays, economic evaluation studies play a major role in amelioration decisions about the apportion of human resources in healthcare. On the other hand, with the objective to evaluate the quality of economic evaluation results, it is necessary that researchers, policy makers and healthcare providers are to be informed with the appropriate methods used in the studies, the valid results and to the ability settings studies be applied.⁵ Economic evaluation of drugs, medical devices, services and interventions is a useful tool for assessing important decisions regarding the optimal utilization of scarce resources. On the other hand, it is essential to make efficient and effec-

tive use of the limited resources to reduce the burden on the population.⁶ Formerly, it was infeasible to find studies with a comprehensive view about the characteristics and the quality of pharmaco-economic and health economic studies carried out in Vietnam. Meanwhile, there have been studies that evaluated the trends and the quality of health economic implemented studies in India⁶, Bangladesh⁷, Thailand⁸, Zimbabwe⁹, Nigeria¹⁰, Iran¹¹, and South Africa.¹²

Nevertheless, the recent years have witnessed a rapid increase in numbers of economic evaluation studies of health programs and only economic evaluations with high quality are used to assist the decision makers. Until now, despite the suggestion of many published methodological guidelines for economic evaluation that results of reported formats are to be presented in several countries, Vietnam has yet to build a national guideline to evaluate the quality of pharmaco-economic and health economic evaluation studies. Nevertheless, there was prediction of methodological weaknesses and possible lack of standardization. The aim of this study is to have an overview the tendency and assess the quality of HEE studies conducted in Vietnam between 2003 and 2016.

MATERIALS AND METHODS

Study design

This study was designed as a systematic review following the PRISMA guidelines.¹³ It was scoped in publication period of 2003 and 2016 in international journals.

Strategy of exploration

The literature review search was updated in June 2015 with citations from pharmaco-economic and health economic evaluation conducted in Vietnam between 2003 and 2016. The database of MEDLINE, SCIENCE DI-

RECT, COCHRANE LIBRARY and GOOGLE SCHOLAR were chosen to search for scholarly articles and peer-reviewed publications, in which their contents matched the following keywords: 'economic evaluation', 'economic analysis', 'cost minimization', 'cost effectiveness', 'cost utility', 'cost benefit', 'Viet*'. Meanwhile, considering of Science Direct databases, this review is used the builder to create our search such as 'economic evaluation' or 'economic analysis' or 'cost minimization' or 'cost effectiveness' or 'cost utility' or 'cost benefit' AND 'Viet*' with [Abstract, Title, Keywords], and the period of time from 2003 to 2016.

Inclusion and exclusion criteria

All publications were included if systematic review intends to categorize and comprise articles which included a pharmaco-economic and health economic evaluation of health or any relevant interventions in Vietnam. Published articles were considered to be studies with primary or secondary data. Moreover, economic evaluation studies were qualified should their publication language was English and the content was related to humans.

Nevertheless, exclusion was made in case of publications being editorial, review or methodological articles or not presenting both the costs and outcomes of a study. Rejection was also applied to studies which content did not have any connection to the health sector, were not implemented

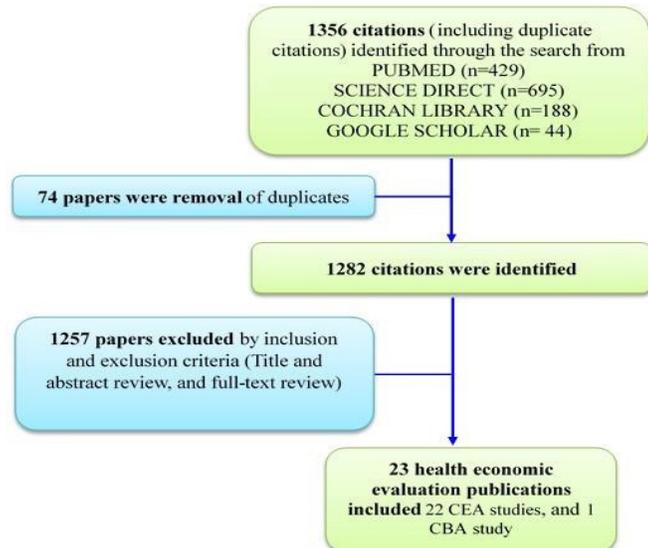


Figure 1: Flow diagram for systematic literature search and evaluation of including publications.

in humans and were not applied in the context of Vietnam. Later on, additional relevant studies were identified and considered via the search for references adapted from qualified articles, which only ceased when there were no more new articles to be found. All identified abstracts were reviewed by the first author. (See **Figure 1.**)

Evaluation of economic evaluation studies in healthcare

This study was analyzed and separated into two parts including general information section and quality of health economic evaluation section. In the former section, the economic evaluation literature and a review of the technical characteristics of the article including the following information: number of authors, training of primary author, country of residence of primary author, publication year, journal publishing said study, the journal's origin (country where the journal is published). Furthermore, this study also explored types of costs including economic evaluation used in publications, the primary outcomes, study design,

perspective considering if the foremost goal of any study was economic evaluation, and funding source. Regarding the latter section, there are two possible ways to assign the quality of health economic evaluation. The first method stated that qualities of reporting have adhered to particular methodological and reporting practices recommended by Drummond *et al.*³⁻¹⁴ with six aspects including (1) clearly the study perspective, (2) description of comparator(s), (3) use of discounting methods in case of the costs and/or outcomes originating from a study with its timespan being over 1 year, (4) report about the incremental cost-effectiveness ratio (ICER), (5) performance of uncertainty analysis, (6) disclose of funding sources. Secondly, the parameters of quality of studies were measured by data source in economic analyses.

RESULTS AND DISCUSSION

After a search conducted in June, 2015 which resulted in a removal of 74 papers of duplicates, a total of 1282 citations were identified, in which 1257 titles and/or abstracts were excluded by reviewers due to their incompetence to meet required criteria., also there were full-text reviews being rejected as their content was not related to the study question. The review unveiled that twenty-three full text publications were retrieved and identified.

See Figure 1 for flow chart for systematic literature search and evaluation of including publications.

General Characteristics of Included Studies

As statistics are shown, the total number of included studies from 2001 to 2015 was 23 which were the works of either Vietnamese or Foreign authors. In the years of 2001, 2005, 2008, 2014 and 2015 it was noticeable that there was only one study being published each year. Meanwhile, the years of 2009 and 2013 had the even number of 3 studies for each year. In 2011, the figure rose to 5 studies and in the final year of 2012 it was 7 studies, which was acknowledged as the highest rate of publication throughout the survey. In reference off 23 studies with various methodology and the subject of evaluation during a period of 15 years, it was concluded that the average number of publications per year was 1.53 (range from 0 to 7), and 100 percent of articles on health economic evaluations program in Vietnam were published in international journals. In term of the published articles, the major type of correspondent or first authors ($n=11$: 47.8%) were reported as Vietnamese people, and the other ($n=12$: 52.2%) was foreign authors. However, most of studies included collaboration with Vietnam institutions. (**Table 1**)

Table 1. The characteristic of health economic evaluation studies ($n=23$) in Vietnam

As can be seen from the Table 1, only two out of four methodologies applied for conducting research on health economic evaluation study including CEA and CUA studies. The number of cost-effectiveness analysis study ($n=22$: 95.7%) were the most frequently type and only one cost-benefit analysis study ($n=1$: 4.3%). Among the health and health-related interventions of studies, the characteristics of the interventions that were consisted of prevention interventions ($n=11$: 47.8%); diagnostic procedures ($n=4$: 14.7%), curative procedures ($n=7$: 30.4%), services deliveries ($n=2$: 8.2%). Vaccination, the methadone maintenance treatment (MMT) for HIV/AIDS patients studies were the most common study interventions with 11 articles. The perspective and study design of the economic evaluation publications were mentioned in ($n=20$: 87.0%) and ($n=23$: 100.0%), respectively. Out of 100 percent of publications in Vietnam, the type of economic evaluation articles were calculated based on the healthcare system perspective in ($n=7$: 30.5%), the societal perspective in ($n=2$: 8.7%) publications, the payer perspective in ($n=3$: 13.0%) publications, the provider perspective in one ($n=1$: 4.3%), the mixed various perspective ($n=8$: 34.8%), and not available ($n=2$: 8.7%). The

Table 1: The characteristic of health economic evaluation studies (n=23) in Vietnam

CHARACTERISTICS OF INCLUDED STUDIES	N	%	CHARACTERISTICS OF INCLUDED STUDIES	N	%
The first author of affiliation			Language published		
Medical/Clinical	11	47.8	English	23	100
Non-medical*	12	52.2	Vietnamese	0	0
Data analysis by software			Type of data used		
Microsoft Excel	8	34.8	Primary data	18	78.3
TreeAge	3	13	Secondary data	4	17.4
Other	3	13	Mixed	1	4.3
Not available	9	39.1	Type of journal		
Time horizon			Medical/Clinical	13	56.5
<= 1 year	9	39.1	Non-medical**	10	43.5
1 - <=5 years	8	34.8	Type of intervention		
> 5 - <=10 years	2	8.7	Prevention interventions	11	47.9
Over 10 years	-	-	Diagnostic procedures	4	17.4
Not specified	4	17.4	Curative procedures	7	30.4
Methodology of health economic evaluation			Services deliveries	1	4.3
CEA	22	95.7	Type of study design		
CBA	1	4.3	Modeling	12	52.2
Type of cost included ***			Modeling and Cohort study	6	26.1
1 item	7	30.5	Randomized clinical trial	1	4.3
2 items	5	21.7	Retrospective data analysis	4	17.4
3 items	6	26.1	Type of sensitivity analysis		
N/a	5	21.7	One-way analysis	2	8.7
Type of outcome			Univariate/multivariate regression	3	13
QALY/DALY, ICER	12	52.2	Probabilistic analysis	6	26.1
Monetary	6	26.2	Mixed >=2 types	5	21.7
Others	5	21.7	Other	1	4.3
Type of perspective			Not performed	4	17.4
Healthcare system	7	30.5	N/a	2	8.7
Societal	2	8.7	Disease categories		
Payer	3	13.0	Vaccination	6	26.1
Provider	1	4.3	The methadone maintenance treatment	4	17.4
Mixed	8	34.8	Anemia	3	13
N/a	2	8.7	Cleft lip and cleft palate surgical services	1	4.3
Type of correspondence or first author			Malaria	1	4.3
Vietnamese	11	47.8	Smoking	1	4.3
Foreign	12	52.2	Oncology	1	4.3
Primary funding resources			Clonorchiasis	1	4.3
Government	5	21.7	Evaluated CrAg prevalence screening strategy	1	4.3
Private non - profit organization	7	30.5	Cardiovascular disease	1	4.3
Healthcare industry	-	-	Postpartum hemorrhages	1	4.3
No funding	11	47.8	HIV	1	4.3
			Brain metastasis	1	4.3
Included studies by authors and publication year					
			Vietnamese authors		Foreign authors
2001			1		0
2005			0		1
2008			0		1

2009	0	3
2011	1	4
2012	6	1
2013	1	2
2014	1	0
2015	1	0

* Consisted of epidemiology, health economics, etc.

** Consisted of public health, health policy and management etc.

*** Consist of direct medical costs; direct non-medical costs; and indirect costs

n/a: Not available

Table 2: Articles evaluated checklist in this review (n= 23)

No.	Study (year)	Perspective specified	Description of comparator(s)	Used discounting	Recommendations		
					Calculated and reported ICER	Performed uncertainty analysis - Probabilistic sensitivity analysis (PSA)	Disclosed funding source
1	Phuc <i>et al</i> (2015) 15	✓	✓	✓	✓	✓ (PSA)	n/a
2	Dam <i>et al</i> (2014) 16	n/a	✓	✓	✓	✓ (PSA)	n/a
3	Lan <i>et al</i> (2013) 17	✓	✓	✓	✓	✓ (PSA)	✓
4	Rachel M. Smith <i>et al</i> (2013) 18	✓	✓	n/a	✓	✓ (PSA)	n/a
5	Chantal M. Morel <i>et al</i> (2013) 19	✓	✓	✓	n/a	✓ (PSA)	n/a
6	Hong <i>et al</i> (2012) 20	✓	✓	✓	✓	✓ (PSA)	✓
7	Bach Xuan Tran <i>et al</i> (2012) 21	✓	✓	n/a	✓	✓ (PSA)	n/a
8	W. Moon <i>et al</i> (2012) 22	✓	✓	✓	n/a	n/a	n/a
9	Bach Xuan Tran <i>et al</i> (2012) 23	✓	✓	✓	✓	✓ (PSA)	✓
10	Duong Vuong Anh <i>et al</i> (2012) 24	✓	✓	n/a	✓	✓ (PSA)	n/a
11	Hong-Anh T. Tu <i>et al</i> (2012) 25	✓	✓	✓	✓	✓ (PSA)	✓
12	Bach Xuan Tran <i>et al</i> (2012) 26	✓	✓	n/a	✓	✓ (PSA)	✓
13	Gerard J. Casey <i>et al</i> (2011) 27	✓	✓	✓	n/a	n/a	n/a
14	Hideki Higashi <i>et al</i> (2011) 28	✓	✓	✓	✓	✓ (PSA)	✓
15	Christine Poulos <i>et al</i> (2011) 29	n/a	✓	✓	n/a	✓ (PSA)	✓
16	A. Tyrell <i>et al</i> (2011) 30	n/a	✓	✓	n/a	✓ (PSA)	n/a
17	Duc Anh Ha <i>et al</i> (2011) 31	✓	✓	✓	✓	✓ (PSA)	✓
18	Vivien D Tsu <i>et al</i> (2009) 32	✓	✓	✓	✓	✓ (PSA)	✓
19	Aya Yajima <i>et al</i> (2009) 33	n/a	✓	n/a	n/a	✓ (PSA)	n/a
20	Sun-Young Kim <i>et al</i> (2009) 34	✓	✓	✓	✓	✓ (PSA)	✓
21	Jane J. Kim <i>et al</i> (2008) 35	✓	✓	✓	✓	✓ (PSA)	✓

22	Thea K. Fischer <i>et al</i> (2005) 36	✓	✓	✓	✓	✓ (PSA)	✓
23	Huong <i>et al</i> (2001) 37	✓	✓	n/a	n/a	n/a	n/a
	Total	19	23	17	16	20	12
	Percentage (%)	82.61	100	73.91	69.57	86.96	52.17

most frequently method of study design is modeling (52.2%). Thus, the proportion of retrospective data analysis, modeling and Cohort study and randomized clinical trial publications are 26.1 percent, 4.3 percent, 17.4 percent, respectively. Microsoft Excel (n=8), TreeAge (n=3) were the most favorable softwares to be used to analyse data in the papers.

THE QUALITY OF INCLUDED STUDIES

Quality of reporting practice

Table 2. Articles evaluated checklist in this review (n= 23)

In the light of Drummond *et al's* checklist, the assessment of methodological quality of economic evaluation of all articles was made.^{3,14} Table 2 shows the extent to which eighteen publications met the recommendation for reporting economic evaluations.

The economic evaluation's viewpoint play a major role in determining which expenses and effectiveness should be coordinated closely in the study . However, four studies (82.61%) were not mentioned clearly in his systematic review. Performing sensitivity analysis is a matter of great importance to assess the lustiness of the results to changes in assumptions. Sixteen of the assessed articles performed probabilistic sensitivity. Furthermore, in consideration of the twenty-three studies, which revealed their discounting rate and reported ICER, have been applied in many studies; the using discounting rate was either 3% or 5%. Considering funding resources, there were 12 studies in which the authors declared their supporters.

Proportion of economic evaluation publications in Vietnam from 2003 to 2016

Table 1 shows the proportion of DALYs by major disease categories and the proportion of economic evaluation publications in Vietnam from 2003 to 2016. The most frequently investigated issues states were vaccination (26.1%), the methadone maintenance treatment (17.4%) and anemia (13.9%). Other issues state which account for 4.3% investigated include malaria, cleft lip and cleft palate surgical services, smoking, clonorchiasis, brain metastasis, cardiovascular disease, postpartum hemorrhages, evaluated CrAg prevalence screening strategy. The table highlights only one study (i.e. cardiovascular disease) that mentioned major disease categories in Vietnam.

The recent years (2009-2016) have experienced an increase in the number of articles, despite the fact that such statistics are still considered to be low compared to setting where EE used in policy decision making. However, other factors such as training, curriculums, and so on have an impact on increase in the quantity and quality of EE studies. The methodological issues of health economic evaluation studies in Vietnam context are composed of lack of caculation of an ICER, and limited use of discount rate with more one year servey. A report is marked as unqualified should it fail to indicate the the usefulness of economic assessment in policy decision- making

Limitation of this study

In the recent context of Vietnam, it is considered to be infeasible to find any national database for healthacre publications. Meanwhile, available literatures from international databases are published in English, which

do not belong to categories, namely, abstract, conference proceedings, unpublished reports, Vietnam publications, master and Doctor of Philosophy theses, paper presented at the meeting or seminars. Furthermore, Viet researchers can perform many HEE studies - "grey literature", and were not publised in journals.

CONCLUSIONS

This review of economic evaluation studies is considered to be pioneering to be conducted in the particular context of Vietnam. Moreover, this study helps to understand clearly the current situation and the urgent need for development of national methodological guideline for conducting and reporting economic evaluation in Vietnam. On the other hand, it is essential that the Ministry of Health develop a comprehensive and systematic methods for prioritizing topics in order to conduct future economic assessment in Vietnam by many different steps such as: set up standardization of guidelines, support education starting from undergraduate level to professional level.

CONFLICT INTREST

The authors declare none.

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