

Out-of-Pocket Payments (OOP) of Poor Households in Health Care Finance

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Abstract: Every governments are trying to solve the health financial problems of the poor people. Out-of-pocket payments (OOP) and catastrophic payments may cause households to incur catastrophic health expenditures especially in poor households. By analyzing 72,516 citations of 2000 articles published in SSCI and SCI journals on the health care finance from 2004 to 2013. We plotted the virtual social network to describe the relationship between scholars of health care finance and found out the hot topics in this field. Our interpretation of the analysis is that health care finance research between year 2009 and 2013 was composed of at least five subfields: equity and catastrophic payment, health expenditure, cost of health, health system performance and fee exemption policy. We combine quantitative bibliometrics and qualitative literature reviews to find out the important topics in this field. The solution of protecting the poor people's healthcare finance was that government may take strategy to reduce catastrophic payments and provide fee exemption policy for the poor. This study applies bibliometrics to find out hot topics for health care finance, and provides solutions for catastrophic payment.

Key-Words: catastrophic payment; health care; finance; co-citation; social network

1 Introduction

It is necessary for the government to intervene and provide protection against catastrophic payment of medical expenses and reduce out-of-pocket payments (OOP) for poor families. The catastrophic payments are those that absorb more than a pre-specified fraction of consumption; and those that leave a household's nonmedical consumption (total consumption net of out-of-pocket spending) below a pre-specified multiple of the poverty line [1]. Improving access to health care and financial protection of the poor is a key concern for policymakers in low- and middle-income countries [2]. Providing protection of healthcare finance for the poor is the important issue of every countries.

Coupled with the economic development, health insurance has been increasingly developed in all countries. There is no doubt that health insurance was a important role in the health care and financial protection, especially for the poor [3]. Payment mechanisms of health care represent a fundamental building block of any health system, introducing powerful incentives for actors in the system [4]. Health care financing can be defined as raising funds from different sources according to their

specific type of health care needs, in order to meet the health care needs of the country and its distribution in different regions and population groups [5].

Many countries are to protect the human rights of the people for medical treatment, and reduce the quantity of households facing medical financial disaster. The poor become sick is a sad thing. Poor families often face significant financial disaster because of illness and medical expenses. "A person is sick, the whole family suffer." When one person of family is sick, the whole family will carry the tremendous mental stress, including anxiety, worry, irritability and other negative emotions. Medical expenses will be an economic burden for the family. Health insurance and medical aid are the effective tools against the economic burden of disease.

Bibliometric analysis of articles were adopted popularly. Wagstaff took a bibliometric tour of the last forty years of health economics. They used bibliographic "metadata" from EconLit supplemented by citation data from Google Scholar, and to report the development of health economics [6]. After bibliometric analysis of health care finance, we found catastrophic medical expenses and out-of-pocket payments were the hot issues in

many health care finance papers. Many authors provided methods to protect poor people's health and finance. Therefore, this study found out the hot topics and depicted social networks of researchers in health care finance.

2 Methods

In this study, well-recognized high-quality database of SCI and SSCI were adopted. First, we used the bibliometric analysis to find out the quantity of hot papers, hot authors and hot key words. Second, we adopted social network analysis to identify popular issues that were interesting for many researchers. Finally, critical qualitative literature review was performed. The aim of this study is to provide virtual social networks of health care finance to understand the relationship of authors and found the solutions for hot issues.

On this basis, the authors adopted the citation analysis of health care finance between 2004 and 2013. We searched the terms "health care" and "finance" in journals listed in the Social Sciences Citation Index (SSCI) and the Science Citation Index (SCI). We selected the top-ranking 1,000 papers (times-cited ranking, highly-cited ranking) in each five-year period (2004–2008, 2009–2013). Finally, we analysed 72,516 citations of 2,000 articles in the period 2004–2013. We tried to define a "Virtual" social networks. One paper cited two different authors in the same time was called the "co-citation". There were some relationship between these two different authors. Virtual social networks meant these two authors even without contacting with the other one, but they did similar research in the field, so these two authors could produce a link in the virtual social network.

Citation and co-citation analysis is the main method for this study. First, the databases were identified as the sources of health care finance publications. Then data collection and analysis techniques were designed to collect information about topics and authors on health care finance research. The collected data were analyzed and systematized by sorting, screening, summing, sub-totalling, and ranking. The data were run by the UCINET software [7]. After a series of operations, key nodes in the network of health care finance were identified and the structures developed. Finally, the co-citation analysis was used and revealed the virtual social network of health care finance. The networks were mapped to describe the knowledge distribution and "author factions" in the field of health care finance.

3 Results

A timeline was developed as outcomes of the analysis of the 72,516 citations of 2,000 articles published in SSCI and SCI journals in the health care finance field from year 2004 to year 2013. Detailed data include 34,376 citations of 1,000 articles from year 2004 to year 2008, and 38,140 citations of 1,000 articles (times-cited ranking, highly-cited ranking) from year 2009 to year 2013.

3.1 Citation Analysis and Development of Timeline

We analysed 34,376 citations of 1,000 articles (times-cited ranking) published in SSCI and SCI journals in the health care finance field from year 2009 to year 2013 (five-year interval). Table 1 shows some highly cited articles, arranged to show the historical timeline of health care finance. The most influential article is the highly-cited article (high frequency/times cited).

Table 1
Timeline of Health Care Finance Articles (citations from SSCI and SCI articles, 2009–2013)

Year	Frequency /times cited	B/J *	Author	
1999	26	J	wagstaff a	j health econ
2000	38	B	world health organization (who)	world hlth rep 2000
2000	13	J	castro-leal f	b world health organ
2001	15	J	filmer d	demograph y
2001	15	B	institute of medicine	cross qual chasm new
2001	13	J	kutzin j	health policy
2002	15	J	ranson mk	b world health organ
2003	38	J	xu k	lancet
2003	20	J	wagstaff a	health econ
2004	15	J	ekman b	health policy plann
2005	15	J	gilson l	brit med j

2005	13	J	carrin g	trop med int health
2006	23	J	van doorslaer e	lancet
2006	17	J	mcintyre d	soc sci med
2006	13	J	xu k	soc sci med
2006	11	J	james chris d	appl health econ health policy
2006	10	J	su tt	b world health organ
2007	19	B	world health organization	ev bus strength hlth
2007	18	J	van doorslaer e	health econ
2007	15	J	xu k	health affair
2007	11	J	cisse b	health policy
2008	18	J	o'donnell o	j health econ
2008	17	B	van doorslaer e.	anal hlth equity usi
2008	16	J	mcintyre d	b world health organ
2008	12	B	who	world hlth rep 2008
2008	12	J	yip w	health affair
2009	17	J	wagstaff a	j health econ
2009	12	J	samb b	lancet
2010	15	J	who	wor heat rep
2010	9	J	hogan mc	lancet
2010	6	J	lim ss	lancet
2010	6	J	who	world malaria report 2010
2010	6	B	world health organization	world hlth stat 2010
2010	6	J	atun r	health policy plann
2011	8	J	tangcharoensathie n v	lancet
2011	6	J	ridde v	health policy plann
2011	6	J	ahmed s	health

				policy plann
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*: B/J: B:Book, J:Journal

3.2 Keywords Analysis Revealed The Hot Topics

Table 2 shows the keywords analysis of 2,000 articles published in SSCI and SCI journals. We Compared the keywords between the two five-year periods (2004-2008 and 2009-2013).

Table 2: Analysis of keywords of 2,000 articles between two five-year periods

Years 2004-2008	frequency	Years 2009-2013	frequency
care	163	care	191
health-care	81	health-care	94
services	78	services	67
united-states	59	impact	57
health	49	united-states	57
insurance	48	countries	54
access	41	insurance	50
impact	40	health	46
system	39	access	45
mortality	37	mortality	44
outcomes	34	quality	43
quality	34	equity	43
experience	34	policy	41
costs	33	outcomes	35
equity	33	reform	34
countries	30	developing-countries	32
children	29	population	31
managed care	29	management	29
policy	28	system	28
reform	28	costs	26
developing-countries	27	performance	26
expenditures	26	systems	25
illness	26	lessons	24
management	26	children	22
demand	22	cost	22
cost	22	experience	22
systems	21	primary-care	20

prevalence	21	burden	20
africa	19	physicians	19
primary-care	19	women	19
people	19	program	19
medical-care	19	risk	18
cost-effectiveness	19	south-africa	18
physicians	18	expenditure	17
model	18	poor	16

3.3 Co-citation Analysis

One paper cited two different authors in the same time was called the "co-citation". There were some relationship between these two different authors. The first five-year virtual social network diagram (Figure 1) for 2004–2008 was different from the second diagram (Figure 2) for 2009–2013.

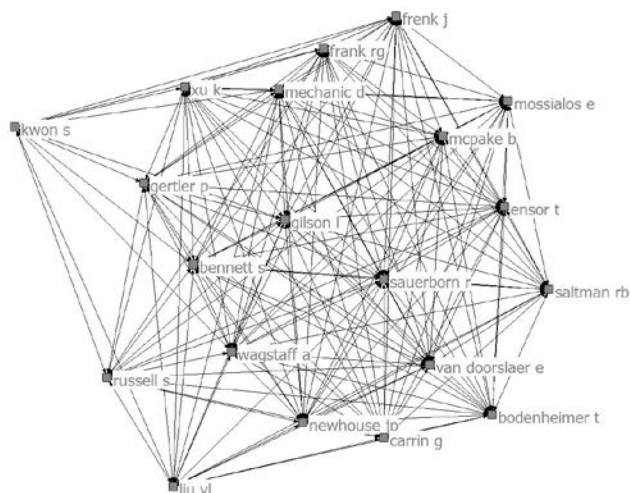


Figure 1. Key research themes of authors in health care finance (2004–2008): virtual social network diagram

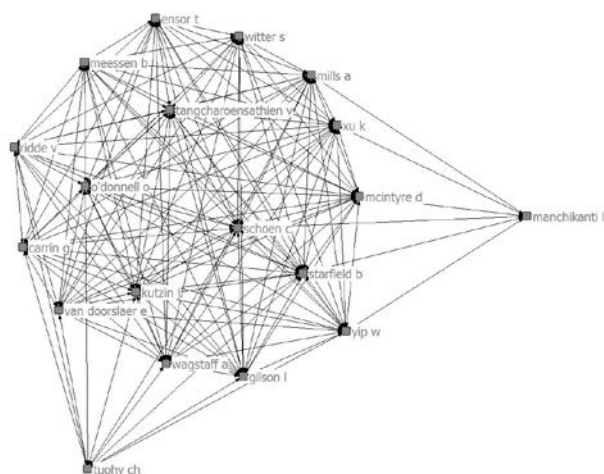


Figure 2. Key research themes of authors in health care finance (2009–2013): virtual social network diagram

Virtual social network analysis techniques were adopted to plot the relationships in the co-citation matrix. We identified the strongest links and the core areas of the authors. Figure 1 and Figure 2 show the research themes of authors in health care finance studies. Different shapes of the nodes would appear after performing a "faction study" of these authors [8]. This method seeks to group elements in a network based on the sharing of common links to each other. The few scholars in Figure 1 and 2 with the most links (co-citation) are the important persons in health care finance field. There were heavy and dense links, the core authors pointed out advantageous position in health care financial field. While the diagrams in Figure 1 and Figure 2 provide a clear picture, their foci are only on the core areas. The important authors are in the core of the network. Figure 1 represents the first five-year interval, and Figure 2 represents the next five-year interval. We compared the cores of both networks and found the paradigm shift of authors between the two periods. Between 2004 and 2008, Wagstaff, Gilson, and Sauerborn were located at the core of the network. From 2009 to 2013, however, Kutzin, Schoen, O'Donnell and Tangcharoensathien appeared in the core of network along with Wagstaff and Gilson. The paradigm shift of health care finance revealed Kutzin, Schoen, O'Donnell and Tangcharoensathie joined the evolving trend of this field.

We adopted factor analysis to distinguish the groups of authors between different faction. By taking co-citation matrix and using factor analysis, the correlation between the authors were analyzed. When authors are grouped together, there are common elements between the grouped authors. According to this analysis, the closeness of these authors revealed their algorithmically similar perception perceived by citers [8]. The co-citation correlation matrix was factor-analysed with varimax rotation, a commonly used procedure that attempts to fit (or load) the maximum number of authors on the minimum number of factors [9].

Table 3: Author Factor Loadings: Years 2009-2013

	Name of group		Name of group
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factor1	variance	Equity and catastrophic payment	factor2	variance	Health expenditure
Van doorslaere	0.931		Mills a	0.937	
Yip w	0.879		Mcintyre d	0.842	
Carrin g	0.638		Ridde v	0.813	
Tangcharoensathien v	0.609		Witte r s	0.746	
Xu k	0.552		Mees sen b	0.712	
			Kutzi n j	0.586	
factor3	variance	Cost of health	factor4	variance	Health system performance
Tuohy ch	0.901		Manc hikan ti l	0.632	
Starfield b	0.825		Scho en c	0.614	
O'Donne ll o	0.743				
Wagstaff a	0.678				
factor5	variance	Fee exemption policy			
Gilson l	0.875				
Ensor t	0.627				

Studies on health care finance also clustered on different research themes between 2009 and 2013; together they explained over 76.8% of the variance in the correlation matrix of the five years, as diagrammed in Figure 2. Table 3 lists the 5 most important factors along with the authors that had a factor loading of at least 0.5. We also tentatively assigned names to the factors on the basis of our own interpretation of the authors with high associated loadings. Our interpretation of the analysis results is that health care finance research between year 2009 and 2013 was composed of at least 5 key subfields: equity and catastrophic payment, health expenditure, cost of health, health system performance and fee exemption policy. We

made no attempt to interpret the remaining factors due to their small eigenvalues.

4 Discussion

4.1 Timeline, Key Words Analysis and Co-Citation Analysis

The timeline reveals the paradigm shift and evolution in health care finance researches:

1992 – Wagstaff and van Doorslaer: Equity in the finance of health care.

1997 – Gilson: User fee experience.

1999 – Wagstaff et al.: Equity in the finance of health care in some further international comparisons.

2002 – Ransom: Reduction of catastrophic health care expenditures by community-based health insurance.

2003 – Xu: Household catastrophic health expenditure.

2003 – Wagstaff: Catastrophe and impoverishment in paying for health care; the impact of OOP.

2006 – van Doorslaer: The effect on poverty of payments for health care; interpretation of how out-of-pocket health payments exacerbate poverty.

2006 – McIntyre: The economic consequences for households of illness and of paying for health care in low- and middle-income country contexts.

2007 – van Doorslaer: Catastrophic payments for health care in Asia.

2007 - Cisse: Progressivity and horizontal equity in health care finance and delivery in Africa.

2008 - O'Donnell: Who pays for health care in Asia?

2009 - Wagstaff: Extending health insurance to the rural population: An impact evaluation of China's new cooperative medical scheme

2011, Tangcharoensathien: Health-financing reforms in southeast Asia: challenges in achieving universal coverage

The timeline of citation analysis reveals the development and implications of health care finance. McIntyre (2006) focused on the economic consequences for households of illness and of paying for health care in low- and middle-income country contexts [10]. In 2007, Cisse focused on equity of health finance and delivery. Lower income groups bearing an higher burden of health spending [11]. In 2008, O'Donnell's research results revealed higher-income households contribute more to the financing of medical care [12]. In 2009, Wagstaff's

research results revealed China health insurance program did not reduce out-of-pocket expenses per outpatient visit or inpatient spell. [13]. In 2011, Tangcharoensathien focused on health reform. They reviewed seven countries health-financing reforms in southeast Asia that have sought to reduce OOP, increase pooled health finance, and expand service use as steps towards universal coverage [14].

Based on key words analysis, we found catastrophic medical expenses and out-of-pocket payments were related to the following popular keywords, such as impact, insurance, access, equity, developing countries, costs, burden and poor.

After co-citation analysis of "health care finance", we found that, from 2009 to 2013, Kutzin, Schoen, O'Donnell and Tangcharoensathien appeared in the core of virtual social network. The paradigm shift happened. The new important researchers are Kutzin, Schoen, O'Donnell and Tangcharoensathien. In 2007, Schoen et al. compared adults' health care experiences in different countries. There were differences between countries, such as access, after-hours care, and coordination. [15]. In 2008, Kutzine focused on that key messages for decision-makers are to identify and resolve the harmful consequences of the fragmentation of financing arrangements [16]. O'donnell (2008) had interest in the distribution of health financing, potential redistributive effect and equity. Progressive taxation takes proportionately more from the rich than the poor and equalizes the post-tax distribution of income. [12]. Tangcharoensathien et al (2011) focused on responsibility of governments, governments should protect their citizens from catastrophic health expenditure and poverty, or welfare loss from inability to use health services. [14].

We found that improving access to health care and financial protection of the poor is a key concern for policymakers in low- and middle-income countries. Therefore, in low-income countries, the government must pay attention to whether people can afford the health care costs. Reducing catastrophic payment and OOP attracted many scholars' attention.

4.2 Catastrophic Payment and Out-of-Pocket Payments (OOP)

Catastrophic payment and out-of-pocket payments (OOP) may cause households to incur catastrophic health expenditures. Out-of-pocket health payments exacerbate poverty was found by many authors. Ransom (2002) focused on reducing catastrophic health care expenditures by a community-based

health insurance plans [17]. Xu (2003) focused on household catastrophic health expenditure. Especially in poor families, people can be protected from catastrophic health expenditures by reducing OOP and providing more financial risk protection. Increase the availability of health care services is essential to improving health in poor countries. [18]. Wagstaff and van Doorslaer (2003) focused on catastrophe and impoverishment in paying for health care. They found that the poverty impact of OOP was mainly due to poor people becoming even poorer, rather than the non-poor getting into poorer [19].

Van Doorslaer et al. (2006) focused on that OOP exacerbated poverty. They concluded that policies should reduce OOP, especially for Asian people living on less than \$ 1 per day [20]. Van Doorslaer et al. (2007) focused on the poorest of the poor could not divert resources from other basic needs [21]. In 2007, Xu's research results revealed that many countries' health system rely heavily on patients' OOP [22]. In Africa, user fees constitute a financial barrier to access to health services. More and more international aid agencies were supporting the cancellation of these costs. Ridde & Morestin (2011) showed that abolition of user fees had generally positive effects on the utilization of services [23].

Reforms of health care finance have occurred in a number of countries and have been influenced by politics as well as several previously mentioned factors. By executing the citation and co-citation analyses, we were able to identify the development path of health care finance. Catastrophic payment and out-of-pocket payment were the hot issues in low- and middle-income countries. Catastrophic payment could make the poor sick people become poorer. Reducing OOP is a good way to reduce the poor people's burden.

4.1 Limitations and Future Research Directions

The citations used in this study are the voting behavior measurements of authors. But the citations are of old articles. Citation analysis can find the previous paradigm and paradigm shift, but some authors are too new to be cited. We cannot therefore identify the future important authors, but we can follow the research trend.

5 Conclusion

This study applies bibliometrics to find out hot topics for health care finance, and provides solutions for catastrophic payment. We analyze the citation data of health care finance of various papers, identify the same themes of various researchers, and find hot topics to be discussed in qualitative method. We adopted bibliometric methods to generate quantitative data, then identified important issues of health care finance through subjective judgement. Finally, we adopted critical qualitative literature review to explore these important issues. This is a mixed method of quantification and qualitative research. The qualitative literature review of highly cited papers provokes critical thinking of about health care finance.

Each country's government should modify health insurance policies to help the poor. Between the year 2009 and 2013, citation analysis revealed catastrophic payments and fee exemption policies became more important. Many researchers of health care finance focused on health insurance, access, equity, developing countries, burden and the poor. The OOP was one method of funding health care system. Funding health care system is usually done by five main methods: (a) general taxation by the state, county, or municipality; (b) social health insurance; (c) voluntary or private health insurance; (d) OOP; (e) donations to health charities.

Our interpretation of the analysis is that health care finance research between 2009-2013 is composed of virtual social networks and at least five subfields: equity and catastrophic payment, health expenditure, cost of health, health system performance and fee exemption policy. Health equity is to study the differences in the quality of health and healthcare between different populations. Catastrophic payment and OOP will hurt the poor. Health expenditure must take into account whether patients can afford. Cost of health is related to the stability of health system. Performance of health system is measured by many different indicators. Fee exemption policy will reduce the burden of the patient. We found that catastrophic payments and fee exemption policy were the emerging topics that may mark the trend of research.

There are several methods can withstand the economic risk of the disease: (a) community health insurance; (b) social health insurance; (c) health system reform; (d) government subsidies. The government can effectively design health system by considering the following factors: reducing OOP, setting the limitation of health care service, providing free services for poor people, establishing primary health care teams in poor areas, purchasing insurance for the poor. If designed system did not

work, it's because that a variety of constraint factors interfered with the system and let the system leave the initial goal.

Uninsured population had poorer health and life expectancy is shorter. The poor need some bills to get funds in the primary health-care services and chronic disease care. Bills should fight against the social and economic inequality in health care. Fee waiver policy can help the poor. The qualitative literature review provokes critical thinking of about health care finance. Each country's government should modify health insurance policies to help the poor and maintain medical system operation. The poor people often got poorer because of illness, and got sick because of poorer living. Many scholars suggested the government must take strategy to reduce catastrophic payments and provide fee exemption policy.

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