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The out of pocket payments in low and middle-income countries and the affecting factors: a systematic review and meta-analysis

Esmat Nemati[1], Shirin nosratnejad[2,3*], Leila Doshmangir[4], Vahideh Zarea Gavgani[5]

[1]Department of Health Economics, School of Management and Medical Informatics, Tabriz University of Medical Sciences, Tabriz, Iran
[2]Iranian Center of Excellence in Health Services Management, School of Management and Medical Informatics, Tabriz University of Medical Sciences, Tabriz, Iran
[3]Tabriz Health Services Management Research Center, Department of Health Services Management, School of Management and Medical Informatics, Tabriz University of Medical Sciences, Tabriz, Iran
[4]Tabriz Health Services Management Research Center, Iranian Center of Excellence in Health Management, School of Management and Medical Informatics, Tabriz University of Medical Sciences, Tabriz, Iran
[5]Tabriz Health Services Management Research Center, Department of Health Services Management, Department of medical Library and Information Science, School of Management and Medical Informatics, Tabriz University of Medical Sciences, Tabriz, Iran

*Corresponding to:
Shirin Nosratnejad,
School of Management and Medical Informatics, Daneshgah Street, Tabriz, Iran
Ethical clearance number: TBZMED.REC.1394.592
Sh_nosratnejad@yahoo.com

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ABSTRACT

Introduction: The out of pocket (OOP) payment is the most important source of health system financial support in low and middle-income countries (LMICs); therefore, considering and controlling health expenses are pivotal issues. The present study aimed to determine the households OOP payments in LMICs.

Method: Electronic databases, including Web of Science, Scopus, and PubMed were searched systematically in September 2015. Relevant papers on OOP payment in LMICs were included in the study. OOP payment was estimated as a percentage of Gross Domestic Product (GDP) per capita and household final consumption expenditure per capita in every country.

Results: Seventeen papers out of 3714 were included in the study. Eight studies were conducted in low-income countries, eight in middle-income countries, and one in both low and middle-income countries. The mean OOP payment as a percentage of households final consumption expenditure in LMICs was 0.67(α= 0.000, CI: 0.35-1.003) and the mean of OOP payment as a percentage of GDP in these countries was 1.65(α=0.000, CI: 1.57-1.72).

Conclusion: The households in LMICs face high levels of OOP payment. Therefore, many challenges must be overcome in financial support of health sectors. Health system policies and strategies are necessary to reform interventions in financing resources and purchasing health care services.

Keywords: Out of pocket payment, OOP, low-middle income countries, GDP, systematic review
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INTRODUCTION

Out-of-pocket (OOP) payments are made by individuals to health care providers at the time of service use. OOP is part of the health financing system in all the countries relying on user fees and co-payments.[1] In countries in which most health care services are financed by out of pocket health expenditure (OOPHE), health expenditures can have impoverishing effects on households, specifically among the poorer socioeconomic strata.[2,3] OOP payment is an important factor in low and middle-income countries (LMICs) which consists of 84% of the total global population. LMICs carry 90% of the total disease burden but only 12% of the total resources are expended on health.[4] LMICs taxing and health insurance, as two main sources of financing, have no significant role. Thus, OOP payments are the main resource for health financing.[5,6] According to the World Health Organization (WHO) in 2000, financing is the main function of health systems and has an important role in other functions.[7] Hence, in many countries, especially LMICs, the methods of financing and the effects of the accessibility of health care services is the main challenge of health policy makers.[8]

OOP healthcare expenditures and poor health can impoverish households, which lead to reduced service utilization, selling assets and indebtedness, and may prevent households from receiving necessary health services.[9,10] Protecting households from health care costs is often an aim in many countries.[9]

According to an estimate by WHO, health care expenses caused 150 million people exposed to catastrophic expenditure and as a result of OOP payments, about 100 million people suffered from poverty.[11]

Numerous studies have been carried to estimate OOP payments and their impact on households. One of the studies showed that factors associated with higher OOP to income ratios were gender, age, residence (rural), insurance coverage, health status, and health care utilization.[12] Another study which was conducted in LMICs found that on average, 25.9% of households paid for health care

with loaned money or by selling personal items.[13]

Various studies have been carried out about OOP payments in different countries.[11,14,15] The review of these studies not only helps getting scientific proofs but also paves the way to the recognition of scientific vacuity for orienting future studies.

The aim of this study was to determine the percentage of GDP in LMICs which are spent for OOP payments in the healthcare sector.

METHODS

Information Sources and search strategy:

We searched electronic databases, which were PubMed, Scopus, and Web of Science in September 2015. The PRISMA checklist was used in this systematic review. Search strategy determination, title and abstract screening, as well as full text selection were done by two authors.

Study designs and date of publication were not limited, but only English articles were included. The keywords used were "expenditure", "cost", "out of pocket", "spending", "payment", "expense", "family" and "household".

Inclusion criteria

The studies were eligible for inclusion if:

1. The studies were conducted in LMICs.
2. The studies estimated individual or household OOP payment using monetary value, as a percentage of GDP or household final consumption expenditure.

Exclusion criteria

1. Studies focusing solely on primary treatment, medical interventions, surgery, chemotherapy, illness, injury, or specified health care services (e.g. dental or inpatient care).
2. Articles written in non-English languages.

Critical appraisal of studies: quality assurance process

All identified articles were entered in article management software (Endnote) and the duplicates were eliminated. The titles and abstracts were screened, those unrelated to the review were excluded. The full texts of the remaining articles which were to be included in the study were assessed by two authors. We used STROBE tool for quality appraisal.

Data extraction and data sources:

One author extracted data from the included studies and another author checked for the accuracy and completeness. The data collection table was designed by the authors and included: author (year), years of study, country, sample size, target population, study design, data collection method, effective factors, OOP as a percentage of GDP and household final consumption expenditure.

Data analysis

Data were analyzed through meta-analysis to evaluate OOP payment assisted by STATA software, and by recognizing the factors which affected OOP payment.

The meta-analysis of the studies was carried out as follows:

Estimating effect size: OOP payment value was calculated to annual value and also annual US dollar. All data were collected from the indicators of the World Bank list in the case of unreported data for conversion in the studies (16).

Next, OOP payment was estimated for each individual or household as the percentage of GDP and household final consumption expenditure per capita in each country.

The data were then converted into per capita considering the country population in that following year.

Estimating the weight of the effect size: Applying weights corresponding to the variations of the effect size for estimating the summary effect is the standard implementation in the meta-analysis. The standard error of the effect size was used as a weight and was estimated from the standard error of the OOP payment amount. It was converted using the same method for converting the effect size.

Some studies reported standard deviation or confidence interval instead of standard error; hence, all data were converted to standard error. Some authors did not report standard error, confidence interval or standard deviation in their studies; therefore, it was impossible to estimate standard error of the effect size for these studies.

Estimation of summary effect: The summary effect was calculated by achieving the mean effect sizes after using weights. To calculate the effect size, random effect meta-analysis method was used based on the heterogeneity between the studies.

Identifying the effective factors: Various variables were identified to have an effect on OOP payment.

RESULTS

The literature search identified 3714 citations; 1305 articles were duplicates. We assessed 73 full texts through screening titles and abstracts. Seventeen studies met the inclusion criteria (Figure 1). At the quality assessment stage, no study was excluded. Survey studies conducted in low and middle-

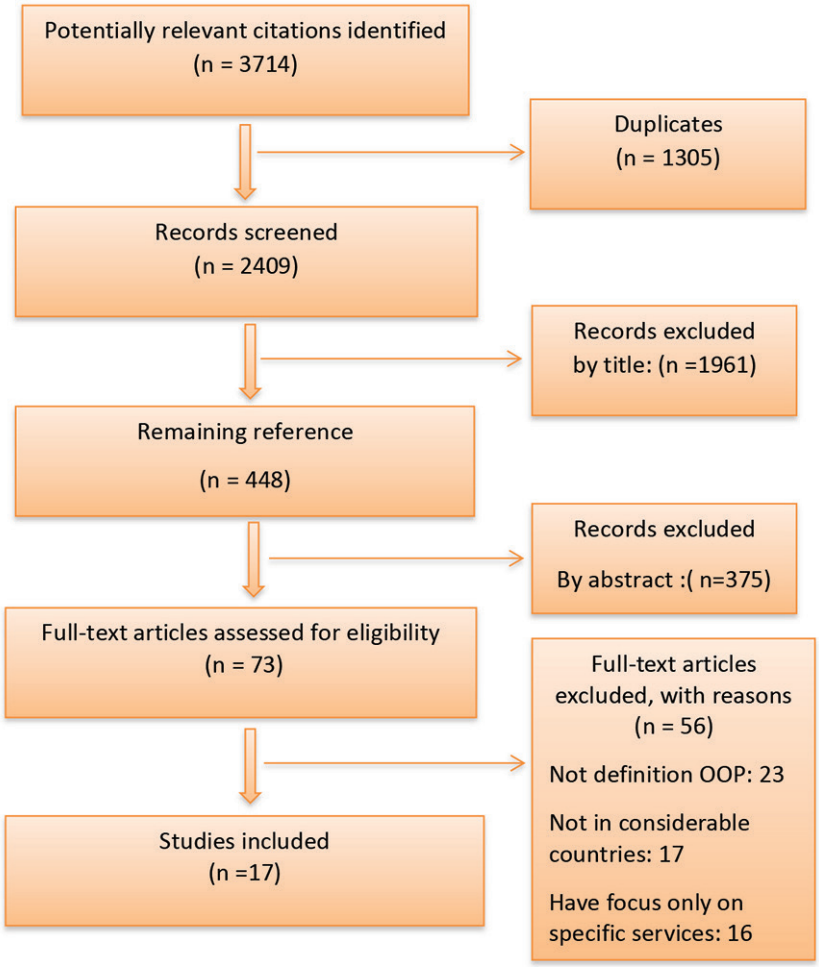

Figure 1. Flowchart for study inclusion in the systematic review

income countries were eligible for inclusion if they estimated individual or household out of pocket payments.

Studies included were dated from 1993 to 2013. The studies conducted in low income countries included: Nigeria[17], Vietnam[18], Pakistan[19], India[20], Indonesia[21], Ghana[22], Tanzania[23], Kenya[24] and middle income countries including Brazil[25], China[26-30], and Turkey[31,32]. Eight articles were conducted in low-income countries, eight in middle-income countries, and one article was conducted in Latin American and Caribbean Countries (Bolivia, Brazil, Colombia, Costa Rica, Dominican Rep, Ecuador, Guatemala, Mexico, Nicaragua, and Peru)[33].

As many as 88.23% of our study samples included households and 11.76% included individuals. Thirteen studies were cross-sectional[17-19,22,24, 25, 27-33], one of them was the National Health Survey[26], two studies were longitudinal panel surveys[21,23], and one was a prospective cohort study[20] (Table1).

Fifteen studies were conducted using questionnaires[17-22, 24, 25, 27-33] and two studies used secondary data[23,26] (Table1). For each included study, we collected data on the country-specific gross domestic product (GDP) per capita and household final consumption expenditure per capita, from the World Bank's list of indicators[16]. All of the articles demonstrated OOP as a percentage of GDP and household final consumption expenditure (Table 2). Two articles described factors which affected out of pocket payment in the Pakistan and Tanzania[19,23] (Table4).

OOP Payment for Households and Individuals

In this systematic review, OOP is calculated as a percentage of GDP and household final consumption expenditure.

Fifteen out of 17 studies gave appropriate information to calculate OOP payment as a percentage of GDP and household final consumption expenditure at the household level. The remaining studies calculated these values on the individual level. Six studies presented appropriate data to carry out a meta-analysis at the household level. The result of the meta-analysis was 1.65% of GDP per capita (95% CI: 1.57-1.72) and 0.67% of household final consumption expenditure per capita (95% CI: 0.35-1.00) were reserved to OOP in low and middle-income countries (Table3) (Figure 2). One of the six mentioned articles was carried out in 12 Latin American and Caribbean countries. Ten countries are categorized as low and middle income.[33]

The Affecting Factors on OOP Payments in Individuals and Households

Two studies explained the factors affecting direct out of pocket payment. These factors were divided into four categories of demographic variables (sex, age, marital status, BMI, having children or adult and household size), socio – economics variables (occupation statues, presence of blindness/visual and hearing and limb defect, presence of disabilities, literacy level, place of residence, unsafe water source, housing material, and unhygienic toilet facility), perceived need variables, (outpatient and inpatient care received, traditional healthier visits, and any obstetric delivery in the last three years) health service variables (health facilities distance constraint)(Table4).

DISCUSSION:

The aim of this systematic review was to determine the amount of OOP payment among the individuals and households, also to extract the affecting factors in low and middle-income countries.

As health share of GDP in some LMICs is low,

Table 1. Characteristics of the included studies

Number	Author (year)	period	country	Sample size	Target population	study design	Data collection method
1	Minh et al (2013) (14)	2002-2010	Vietnam	66,498	Households	cross sectional	**Questionnaire**
2	Barros et al(2008) (21)	2003	Brazil	869	Households	cross sectional	**Questionnaire**
3	Knaul et al, (2011) (29)	2002-2008	12 Latin American and Caribbean Countries	178,878	Households	cross sectional	**Questionnaire**
4	Long et al, (2013) (22)	2000–2011	China	-	Household	National Health	**Secondary data**
5	Malik et al, (2012) (15)	2004	Pakistan	91,228	Household	cross sectional	**Questionnaire**
6	Sulku et al, (2012) (27)	2002	Turkey	39,411	Household	cross- sectional	**Questionnaire**
7	RAY et al, (2002) (16)	1998	India	160	Household	prospective cohort study	**Questionnaire**
8	Aji et al, (2013) (17)	1993–2007	Indonesia	26,899	Households	longitudinal survey (panel)	**Questionnaire**
9	Brinda et al, (2014) (19)	2008	Tanzania	8297	Individual	longitudinal survey (panel)	**Secondary data**
10	Buigut et al, (2015) (20)	2012	Kenya	8171	Households	cross- sectional	**Questionnaire**
11	Xu et al, (2015) (23)	2008-2013	China	16,302	Households	cross- sectional	**Questionnaire**
12	Yardim et al, (2010) (28)	2006	Turkey	8,558	Households	cross- sectional	**Questionnaire**
13	Atellay et al, (2015) (24)	1995 - 2002	China	9,888	Households	cross- sectional	**Questionnaire**
14	Chen et al, (2014) (25)	2003-2008	China	9,371	Households	cross- sectional	**Questionnaire**
15	Kusi et al, (2015) (18)	2011	Ghana	2,430	Households	cross-sectional	**Questionnaire**
16	Onwujekwe et al, (2014) (13)	2011	Nigeria	4,873	Households	cross-sectional	**Questionnaire**
17	Liu et al, (2006) (26)	1993--1996	China	35,121	Individual	cross-sectional	**Questionnaire**

Table 2. **OOP as a percentage of GDP and household final consumption expenditure in different countries.**

country	data collection period	OOP as a percentage of GDP	OOP as a percentage of household final consumption expenditure
Bolivia(29)	2006	0.12	**0.14**
Brazil(29)	2002	0.63	**0.34**
Colombia(29)	2003	0.24	**0.17**
Costa Rica(29)	2004	0.24	**0.25**
Dominican Rep(29)	2004	1.18	**1.1**
Ecuador(29)	2005	0.38	**0.44**
Guatemala(29)	2006	0.42	**0.41**
Mexico(29)	2008	0.048	**0.074**
Nicaragua(29)	2005	0.43	**0.42**
Peru(29)	2006	0.2	**0.26**
Turkey(27)	2002	9.83	**12.28**
Indonesia(17)	1993–2007	4.18	**6.77**
Tanzania(19)	2008	3.67	**5.93**
Ghana(18)	2011	4.79	**7.34**
Nigeria(13)	2011	6.88	**10.52**
China(25)	2003-2008	22.36	**13.77**
China(26)	1993-1995	1.71	**3.70**
china(24)	1995 - 2002	26.65	**32.04**
Vietnam(14)	2002-2010	1.02	**1.15**
Brazil(21)	2003	11.45	**6.91**
Pakistan(15)	2004-2005	6.43	**5.59**
India(16)	1998-1999	0.75	**0.69**
Kenya(20)	2012-2013	4.04	**5.88**
china(23)	2008-2013	7.01	**23.83**
china(22)	2000-2011	1.99	**5.22**
turkey(28)	2006	3.15	**3.50**

it may lead to decrease in medical security quality. On the other hand, it also leads to an extremely high rate of direct payment from people. Thus, the economic and financial burden increases, this system also injects worry and there is a lack of safety and motivation to the medical community.

Lack of appropriate attention to GDP health share and allocating required finance to this part lead to low per capita health and determination of less required value for population treatment and health.

The results also showed that in the mentioned countries, OOP payment share as a percentage of household consumption expenditure is high, which decreases access to health services. Therefore, when a family member gets sick, the family has to sell house utensils and equipments because of catastrophic health expenditures and falls below the poverty line.

LMICs have the highest OOP expenditure mean. According to the reports of WHO, Guatemala, Nigeria, Pakistan, India, Bangladesh, Philippines, and Yemen are LMICs that use OOP payment for health services[34]. Nigeria and Yemen are strongly dependent on OOP payments[34]. These expenditures in medical and pharmaceutical services lead to catastrophic expenditures in households, which causes obstacles to use health services. Most OOP payments are in private sectors, because of better health infrastructure and service quality. This reason is mentioned in studies carried out in Iran[35], China and India[15]. In Iran, high inflation in health and treatment section, dissatisfaction with services in public sections, inefficiency in social health security mechanism, and lack of organized services in public hospitals are also the reasons of high OOP payment[35].

A study conducted on adult population and older participants showed that factors such as age- increase, female, obesity, the presence of hearing, sight disorder and functional disabilities, as well as employed as unskilled manual laborer and traditional healer increase OOP payments significantly. Adult participants with high disability,

Table 3. **Meta-analysis of OOP as a percentage of GDP household final consumption expenditure**

Variable	Method	Point estimate	95% confidence interval	P-value	N of studies [ref]
OOP Household (% GDP per capita)	Random model	1.65	1.57-1.72	0.000	**6(17, 21, 22, 29, 31, 33)**
OOP household (% Household final consumption expenditure per capita)	Random model	0.67	0.35-1.00	0.000	**6(17, 21, 22, 29, 31, 33)**

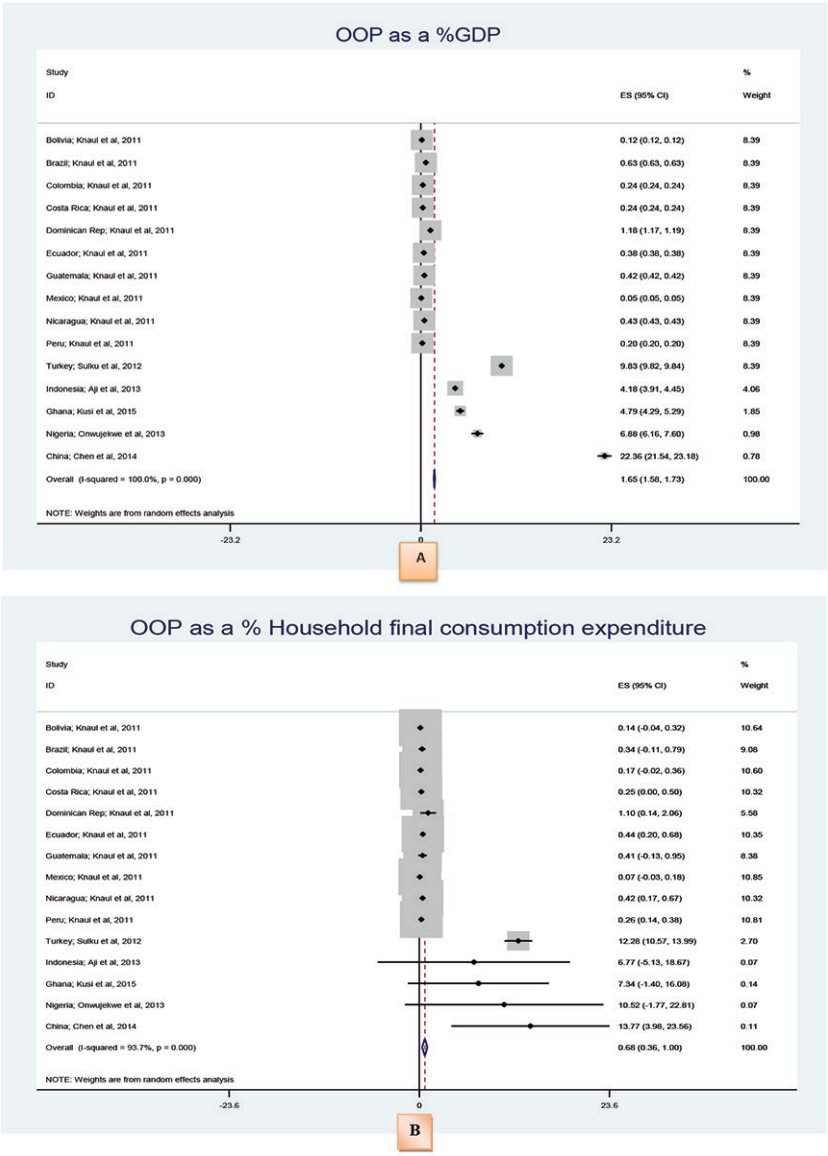

Figure 2. Forest plot of OOP as a percentage of GDP per capita (A) and household final consumption expenditure per capita(B).

no formal certificate, who are unemployed or earn less spend less money on health. Older participants with more disabilities but who are working pays OOP less[23].

Other factors are mentioned in some studies, which are the literacy level of the heads of the family, urban households, unhealthy water source, unhygienic toilets in houses, and having one child and one elderly person in the house. Households far from the health services pay higher OOP payments than nearer households. It is expressed that literacy of spouses, urbanity of households, and households with at least one delivery during the last three years have reported higher OOP payments[19]. In China and India, OOPHE increase causes much of the population to fall below the poverty line. In China, other factors that affect falling below the poverty line because of OOPHE: having at least one child aged less than five years, living in suburbs, and low education level of heads of the family. Similarly, the factors that affect falling below poverty line caused by OOPHE in India are: having at least one child less than five in the family, not having health insurance and living in suburbs[15].

In Tanzania, there are some suggestions to reduce direct OOP payment: legislating curing medical aspects as well as social one; teaching traditional healers to prevent illnesses; promoting health levels and patients' referral for special cares; supporting financially and giving services to vulnerable layers of the society such as women and disabled; providing financial support through pre-payment proposals; and presenting hygienic sensitive sexual systems[23].

In various studies in Vietnam[18], India-china[15] and Kenya[24], it is health insurance systems are developed to support the households financially in OOP payment for health services. In Vietnam[18], payment method reformation is recommended. In Turkey[32] and Ghana[36], pre-payment mechanism is

Table 4. Influential Variables on OOP

	Demographic						Socio-economic								Perceived need		Health service
Author (year)	Sex	Age	Marital status	BMI	Children (< 5 years) and Elderly (> 60 years)	Household Size	Occupation status	Presence of blindness/ Visual, hearing and limb defect	Presence of disabilities	Literacy level	Place of residence	Unsafe water source	Housing material (bricks)	Unhygienic toilet facility	Traditional healer visits	Any obstetric delivery in last 3 years in the household	Health facilities distance constraint
Brinda et al, 2014 (23)	✓	✓	✓	✓			✓	✓	✓	✓					✓		
Malik et al, (2012) (19)	✓				✓	✓				✓	✓	✓	✓	✓		✓	✓

suggested to be developed to support the citizens financially in order to prevent OOP expenditures.

The limitation of this study is only including articles in the English language.

CONCLUSION

According to the results of the study, households in low and middle-income countries face many challenges in providing health expenditures due to high OOP payment. This limits households' access to health services. The results emphasize the importance of supporting households in health expenditures. Financial support of health system is conducted by public (government tax revenue, social insurance premium) and private (private insurance, OOP payment, charities, foreign sources) sectors. Therefore, it is essential to improve the collective processes of financial sources, service purchase, and systematic review in financial support of countries.

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