



# Transition of Health Financing, Cost Risk-Sharing and Risk-Pooling Models in the Health Sector: A Systematic Review (1990 - 2019)

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## Abstract

**Context:** Health expenditures in the world undergo increasing growth. According to the WHO Report (2000), health financing is one of the main functions of the health system that has a significant impact on its other functions.

**Objectives:** The aim of this study is the systematic review of the changes and shifting of health care financing models and cost burden risk-sharing mechanisms in health systems over the past three decades.

**Data Sources:** In this systematic review, data sources of studies on health financing realm in different countries were investigated using a series of keywords, including “health financing”, “health expenditure”, “model”, “financing mechanism/arrangement”, and “cost risk-sharing” from the most important databases such as Google Scholar, Web of Science, Scopus, PubMed, and the Iranian databases, such as Magiran, IranMedx, SID, in 1990 - 2019.

**Study Selection:** According to PRISMA Flow Diagram, with application of inclusion and exclusion criteria (time limitations, language restrictions, lack of related title abstract, full text), among 86,611 documents, 150 studies were selected. Two pairs of review author’s independently extracted data and assessed the risk of bias.

**Results:** The systematic review of different evidence suggests that with economic growth, since 2001 to 2014, global health expenditure trend was increased from \$ 3.8 trillion (in 2001) to \$ 9.2 trillion (in 2014) and is estimated to reach \$ 24.2 trillion (in 2040). Also, all the evidence indicates a tangible change, a 10% increase in public and pre-payments health expenditures and a 16% reduction in private expenditures, in the global health financing model in the current period up to 2040.

**Conclusions:** The review of regional and global studies, across countries and during the time, shows that in the last three decades, health financing systems are in a transition towards pervasive (with high financial risk-sharing) public health policies in the world.

**Keywords:** Financing Mechanism/Resource, Health Economics, Health Expenditure/Spending, Health Financing Model, Health Policy, Health System, Risk-Pooling, Risk-Sharing, Systematic Review

## 1. Context

The health sector is one of the most important service sectors, and health is considered one of the main indicators of development and social welfare. On the other hand, over the past few years, new medical innovations and techniques, on one hand, have produced tangible and significant results for improving the health and life expectancy of communities, and on the other hand, it has cost a lot for countries and governments (1). Therefore, funding for

the establishment of a coherent health system is one of the main concerns of most governments in all countries with any level of income (1). Global organizations, such as WHO (World Health Organization), consider the right of health to be the most important social purpose of a community (2). As, one of the most important factors currently being imposed on people to pay for treatment is the rising cost of medical care, especially the costs of treatment and rehabilitation. As such, various payment

mechanisms are implemented by individuals, including direct payments, franchises, private or public (premium payment) payments, and even indirect payments (called informal payments). Therefore, as more and more costs are imposed on patients and their families, they may extend the length of stay (LOS) in hospitals, thereby increasing the share of health and medical expenses from total household expenses and even increasing them. It gives people the chance to get below the poverty line (3). Over the past five decades, population health gains have been due to the multiple-growth of health spending in various areas of prevention and treatment. According to the World Health Organization (WHO's data 2016), among health systems in the world, the US health system is the largest health market with a multi-billion-dollar turnover. In this regard, during the period 1929 - 2016, changes in the share of health expenditures from GDP increased by about 3.27 times, meaning that it grew by about 13.07% (from 4% in 1929 to 17.07% in 2016) (4). A review of related studies showed that unlike resource constraints, demand, and unlimited needs for health services, cost reduction is not only the solution but the cost-opportunity criterion of finding opportunities to increase resource efficiency as a prerequisite. In general, in different health systems (at any place and at any time), using different mechanisms such as better methods of supply and distribution of goods/services (strategic purchasing), promoting and utilizing public health services, motivating factors of supply and providers, facilitating and improving financial management processes, and so on can lead to improved health systems. According to related studies, about 20% - 40% of total health expenditure (as a percentage of GDP) is largely lost due to inefficiency in the health sector. However, without increasing health spending, assuming that previous funding sources are constant, optimal resource allocation and efficiency can lead to better health outcomes such as universal health coverage. Therefore, the need to adopt proper and efficient financing policies in the health sector as an evident issue should be taken into account. As was explained these financing policies should be adopted by applying procurement processes and strategic purchasing systems based on risk-pooling, sharing, and distributing for optimal use of financial resources in the health sector (5). Productivity and efficiency of health systems by optimizing financing structures and optimal allocation of resources based on economic evaluation criteria (risk-sharing, risk accumulation, cost-effectiveness, etc.) in all countries with any level of income and GDP. Interior is essential, which most of all are found in underdeveloped and developing countries. This is one of the key tools in achieving goals such as protecting households from overwhelming health costs

(high out-of-pocket costs), improving access to health care, and improving community health, in special out-of-pocket expenditures. Various models of health expenditure provision were introduced to address the adverse effects of direct payments to user fees in the 19th century, which nowadays appear to benefit health services in different groups, especially it controls suburban populations, but can sometimes have repercussions such as falling health costs and even falling below the poverty line of middle and lower-income earners (6). According to various World Health Reports (WHO, World Bank), health financing models based on risk-sharing and pooling such as health insurance coverage and pre-paid plans (including social insurance, private insurance) are an effective tool for the purpose of accessing the whole population to health (universal health coverage) (7). Previous studies (for example, Poullier et al., 2002) showed that OECD countries, although accounting for 19% of the world's population, account for about 85% of global health spending. However, Africa accounts for 10% of the people in the world. However, their share of total health costs worldwide is about three percent (8). World Bank (2007) showed the distribution of financial burden and burden of disease differs across the world, as well as across countries, based on income and economic levels. This means that countries with moderate and low-income levels account for more than 87 percent of the world's burden of illness, but account for about 13 percent of the world's health costs. This ratio is the opposite in high-income and developed countries, where in the world, developed-country groups face a much lower share of the burden of disease (about 13%) but a much higher share of health costs (about 87%) (9). According to WHO data (2014), the sharp difference between 17.9% of US health expenditures and 2.8% of GDP in the UAE, with the implications of pregnant mothers' deaths, was 28 and 8 per 100,000 live births in 2013, including the difference between Sustainable Health Expenditures and Health outcomes. Kuwait and the UAE have devoted less than 3 percent of GDP to health, but have the highest life expectancy of 77 and 78 years, respectively, among selected countries. Their income is like high-income countries, but their share of health expenditure is much lower than in the high-income countries (10). The importance of this issue is further enhanced by the fact that economic, social and political factors have their adverse effects mainly on health inputs (health financing patterns and risk-burden sharing of illnesses) and health outcomes (health indicators such as mortality, life expectancy). It is important that the use of resources and the sharing of health financing in different areas (such as health, medical, and paramedical) are challengeable. Therefore, it is important to raise

the efficiency and effectiveness of the health financing systems for all countries (11). Therefore, a comparative analysis of the changes and transition in health financing patterns and consequently, tracking the cost risk-sharing of illness and health care in health economics literature as a necessity and the basic priorities of the WHO and various governments. Because it is vital to assess whether the same level of input (funding sources) would produce better health outcomes or the same outcomes with less health financing resources, and there are a lot of concerns about the quality of consumption of these costs that is the level of effectiveness of health financing expenditures for achieving the outcomes of health.

## 2. Objectives

The aim of this study is the systematic review of the changes and shifting of health care financing models and cost burden risk-sharing mechanisms in health-services systems over the past three decades.

## 3. Data Sources

In this systematic review, studies on health financing realm in different countries were investigated using a series of keywords, including “Health financing”, “Health expenditure/spending”, “Health financing model/pattern”, “Financing mechanism/arrangement”, and “Cost risk-sharing” from the most important databases such as Google Scholar, Web of Science, Scopus, PubMed, and as the Iranian databases specifically as Magiran, IranMedx, SID in 1990 - 2019.

## 4. Search Method and Strategy

In this study, using PRISMA model, a structured systematic review method was used to review and evaluate studies that were eligible for inclusion. also, the search strategy was as follows: (“Health Financing” OR “Health Expenditure” OR “Health Spending” OR “Health Cost” OR “Healthcare Spending”) AND (“Mechanism” OR “System” OR “Model” OR “arrangement”).

## 5. Study Selection

According to PRISMA 2009 Flow Diagram (Figure 1), at first, 86,611 documents were found in the screening stages, later, and with application of inclusion and exclusion criteria (time limitations, English and Persian language restrictions, lack of related title, lack of relevant abstract, and lack

of relevant full text); ultimately, 150 studies related to the research purpose were selected. In this study, the following unrelated studies were excluded from the study: (1) Policy packages, comments and suggestions, short stories, suggested and analytical issues in journal editorial, abstracts of papers or lectures in seminars; (2) Micro and local level studies such as a clinic, clinic, village; (3) Multiple references from multiple databases.

### 5.1. Method of Analysis of Papers

Thematic analysis and quality synthesis were used to analyze the papers. In this way, the two groups of non-homogenous evaluators (AA, AM, AM, and SF), based on the arbitration criteria, reviewed the entire title and summary of the original studies and documentation to determine whether they can be included in the study. In the event of disagreement, it was summarized and resolved as an arbitration council. Finally, the text of the selected studies was retrieved, and the reference list of the aforementioned articles and other previous studies were identified.

## 6. Data Extraction and Synthesis

In this study, the evaluators used standard checklists to extract data from final screened studies at international (AA - AM) and national and regional levels (AM - SF). The reviewers used a data collection form to extract the relevant information from the selected studies from international (AA - AM) and the national and regional level (AM - SF). The research tool includes a standard checklist of questions related to quality aspects of the studies (such as time of publication, method and type of research, research environment, and study area), as well as quantity of studies such as biography of major research variables such as health financing models, mechanisms, target group, time period, research design) and finally, the strengths and weaknesses of the studies and the results were evaluated. In this regard, the evaluation of qualitative aspect of the studies was classified according to the following Likert spectrum: very good (A), good (B), moderate (C), weakness or inconclusive and not evaluated (D).

### 6.1. Bias Audit in the Study

In this study, the risk assessment of the bias of studies and articles extracted in different aspects such as formulation of research design, method of selection and sampling, method of data collection, analysis and reporting based on a standardized checklist in the field of health policy and

economics were implemented (12). In the following section, the main results of the research with respect to research typology, data quality, as well as the quality of studies and articles used, are explained.

### 6.2. Data Analysis

Given the heterogeneity of studies from various aspects (some descriptive-qualitative, others quantitative), in order to collect statistical data on outcomes (such as meta-analysis), consider cholera. Other factors underlying the nature of field health services and care have not been an appropriate meta-analysis. Nevertheless, a description of the results, discussion, and conclusions as necessary was conducted.

### 6.3. Quality Assessment and Judgments

The quality of studies and articles were assessed using a standard protocol (quality grading), adapted as the HFP study of Review Protocol on Health Financing, by the two groups of reviewers (12). The protocol, is available if necessary, includes 19 evaluation indicators from various aspects of non-bias, accuracy, validity and content validity, generality of studies, type of research (descriptive-analytical, quantitative or qualitative), research objectives and questions, sampling method and gathering data, and whether the findings, arguments, and conclusions are well-reasoned and generalizable? Finally, a rating of 0 to 3 was given for each question and the overall quality rating was rated from 0 to 76. The quality of the selected studies is as follows: poor quality (0 - 19 points), average quality (20 - 42), good quality (39 - 57), or very good quality ( $\geq 58$ ).

The selection of studies for evaluation by the second referee was based on a 2 to 10 ratio. This means that for every 10 studies, 2 cases were randomly selected. In the meantime, disagreements on quality reviews between different evaluators were resolved in a consultative manner. In this study, PRISMA guides were used to perform a structured systematic review.

## 7. Results

The findings of this study were categorized into three parts: (1) screening and selection of various studies and frequency distribution; (2) different approaches to the subject of the study; (3) indicators and variables used in health financing analysis.

### 7.1. The Screening Process and the Selection of Final Studies and Frequency Distribution

This review study used searching strategies to find articles and research, involving the defined keywords, namely "health financing model/pattern", "health spending", "mechanism/arrangements", and "risk-sharing". At first, 86,611 documents were collected. Considering the exclusion and inclusion criteria, a total of 150 related studies with qualitative synthesis were selected. Most studies, about 75%, were original and review articles. That is, the frequency of the selected studies published between 2010 and 2019 was 58%. The frequency of studies was as follows: analytical-quantitative (65%).

### 7.2. Models of Health Systems Financing: Approaches, Structure, Mechanisms

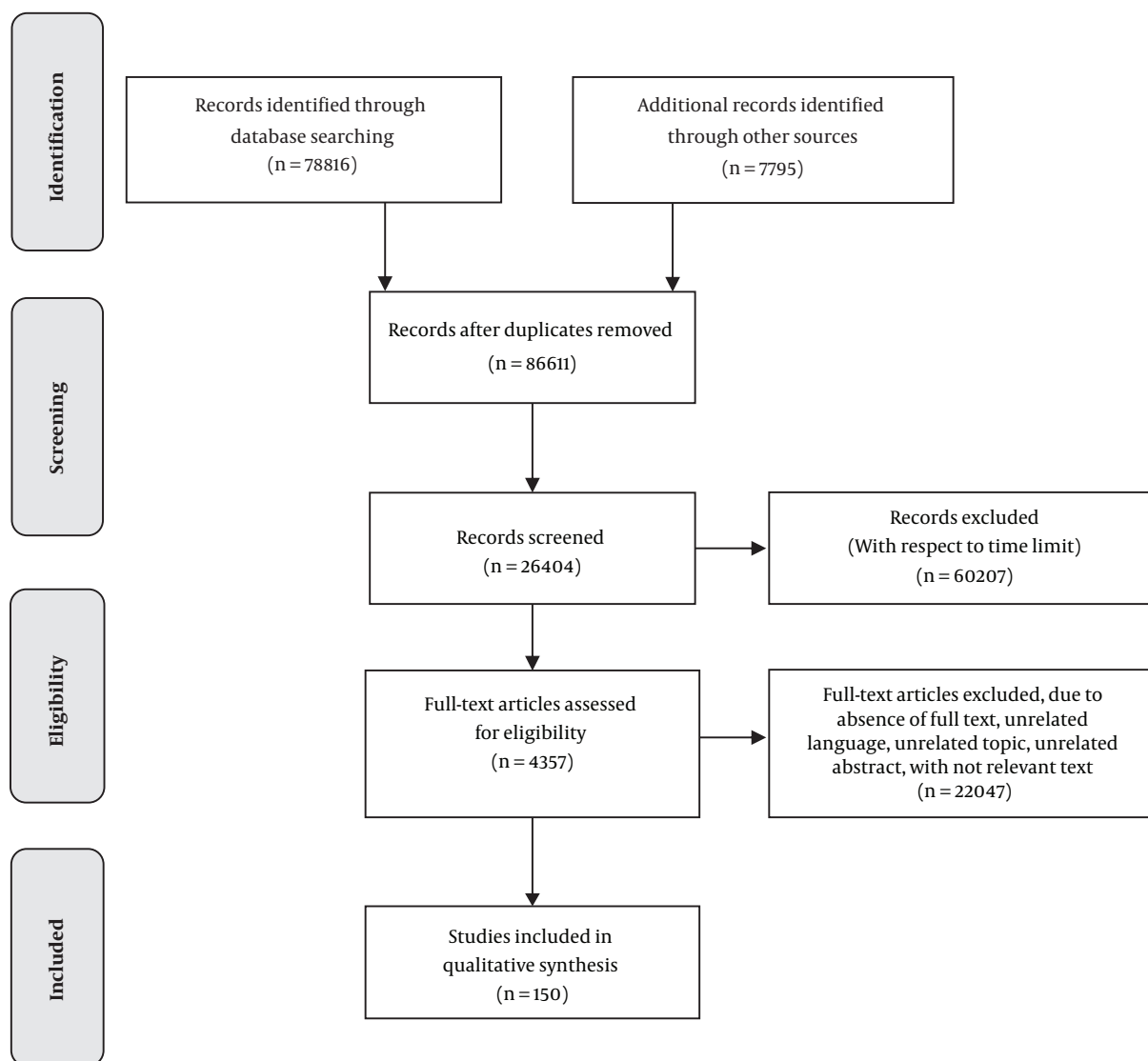
The review of related studies suggests that there are several models and approaches toward financing health systems:

#### 7.2.1. Zweifel and Breyer Financing Approach (2009)

Based on the fact that the incidence of a disease is selective or accidental, the way to finance health expenditure and protect financially the health expenditure will be different. Considering the first perspective, disease is an accidental phenomenon and there is an agreement about the responsibility of the government and the general resources to finance fully or partially the patient's financial burden. However, in the second perspective, disease is a selective phenomenon and there is no consensus about the full or partial financial support of the patient by the government or public health financial resources of the country (13).

#### 7.2.2. William C. Hsiao Financing Approach (2007)

General health financing models (health care): In this approach, there are three general models for financing healthcare and health services in the world (14): (1) Government-based financing model: The government focuses almost entirely on the financing and delivery of public health services. In this model, other forms of financing such as community-based health insurance are not so considered. (2) The market-based financing model: The government covers a large part of health expenditure, but it plays a more active role in the design and expansion of private and social insurance, such as codifying law and imposing social health insurance on employees. (3) Centralized financing model: The government emphasizes public health and disease prevention. In this model, compared to the other two models, countries typically spend less on health care by use of gross domestic product.



**Figure 1.** PRISMA Workflow Diagram of a systematic review of studies related to health financing structure and cost-risk-sharing

### 7.2.3. Getzen Thomas Financing Approach (2004)

Open-ended or close-ended health care financing system: In this approach, there are two kinds of health financing systems, nominal and other health financing systems are located between these two spectrums. (1) The open-ended finance health system: The amount and mechanism of health financing depend on the decisions of many individuals and firms; and it will be expanded if demand increases; (2) The open-ended finance health system: There is a fixed budget that is determined by the government (15).

### 7.2.4. Health Financing Models with Inclusive Coverage Approach

There are often three health financing models for comprehensive coverage of health care, including Bismarck's financing model, Burridge financing model, and private insurance financing model (2, 16). (1) Bismarck's Financing Model: Bismarck's model is based on Social Health Insurance for "total population" or "special groups". In 1883, Bismarck introduced a plan based on compulsory insurance of workers to protect them against accidents, illness, and so on. (2) Burridge Financing Model: This model is known as a universal system (National Health Insurance

or Tax-Based Regional Insurance) (2). The investigation of literature and related studies suggests the prevalence of Schieber and Maeda (1997) model to illustrate the path of resources and funds derivation from revenue collection and their allocation and distribution to health services that are presented in the following.

#### 7.2.5. Schieber G., and A. Maeda Financing Model (1997)

The main components of financing in the health sector. The flow of funding in the health system and the combination of public/private intervention are complex (Figure 2 presents a modified form of Schieber and Maedamodel, (1997). Schieber and Maedamodel (1997) introduce three main components of financing distinguishing the functions of the health system (17): (1) Revenue collection, (2) Accumulation of funds and risk sharing in larger population groups, and (3) purchasing services from private and public providers. According to the WHO report (2000), health financing includes core functions of revenue collection, stockpiling, and the purchase of goods and services (WHO, 2000) (18). McIntyre (2016) states that all health financing systems formulate on the following key functions: (1) raising or increasing revenues; (2) resource pooling: the process of pooling and managing resources and incomes so that the health risks of people-members in the integrated fund are pooled and shared; and (3) purchase: The process by which the pooled funds are paid to the recipients to provide both defined or undefined interventions and health services (19).

#### 7.3. Financing Mechanisms in Health Systems

According to Roberts et al., (2008), there are five major structural dimensions in designing a successful health system: (1) financing, (2) organization, (3) payment systems, (4) law and regulations, and (5) persuasion (7, 20, 21). Health financing system is defined as a series of related and interconnected activities for financial support and provision of health services and products (6). According to WHO (2000), the goal of health financing is “to make available funding, as well as to create an appropriate incentive for providers to ensure that everyone has access to effective public health and personal care” (18). According to different studies (such as McIntyre and Kutzin, 2014; Kutzin, 2001; Poullier, et. al., 2002; McIntyre, 2007; McIntyre, 2016; Reinhard Busse et.al., 2007) types of health financing mechanisms include two categories: (I) Public health financing: (1) Government funding; direct and indirect taxes, domestic or international loans, Donor funding. (2) Health insurance; Mandatory health insurance,

NHI, Social Health Insurance. (II) Private health financing: (3) private health insurance; community-based pre-payment schemes, (4) Direct payments; Out-of-pocket payments, User fees, co-payments), also Poullier, et al., (WHO 2002) presented a comprehensive categorization of health mechanisms (22).

#### 7.4. Economic Development and Health Financing

Considering the effects of the economic, social, and social factors, health financing systems in the world underwent significant changes during the last decades. The most important indicator of these changes is the share of total health expenditure from GDP, which has been increasing in different countries over the past two decades (Figure 3). The extent of this change is higher in high-income countries.

Moreover, Victor R. Fuchs (2013) showed that there is a strong relationship between GDP and national health expenditures, and this indicator is adjusted for population growth and general inflation. Studies have shown that the average growth rate per capita healthcare expenditure was 3.1% and real growth rate per capita GDP was 1.4% from 1995 to 2011. Thus, the average gap dropped from 2.6% (before 1995) to 1.7% (after 1995). The results of this study suggested the increase of national health expenditure share from GDP about 30% by 2040 in the United States, given the total of annual gaps (2.4% over 60 years) and in comparison to 2013 (health share from GDP = 18%). Provided that the annual gap of 1.7% (the gap between the growth of health expenditure and GDP growth) continues until 2040, the share of health expenditure from GDP is predicted to increase by about 26% (23).

#### 7.5. The Combination of Health Financing and Cost Risk-Sharing Mechanisms in the World

Studies demonstrate that the roles of public and private sectors in health care financing systems are different worldwide. Meanwhile, in most countries, the private sector plays a major role in financing health. Payments from private sources for health care, including OOP payment households, pre-payments of private insurance and direct employee payments for health services and distribution of grants are called private financing (24, 25).

In a study by Poullier et al., (2002), patterns of global health expenditure were investigated in 191 countries. The results of this study showed that developed countries (in the high-income group) spend a greater share of their income on health. While health costs (per capita or total as a percentage of GDP) vary from 1.5% to 13% and the highest share of health expenditure out of GDP was seen in Europe and the United States. Africa and some Asian regions,

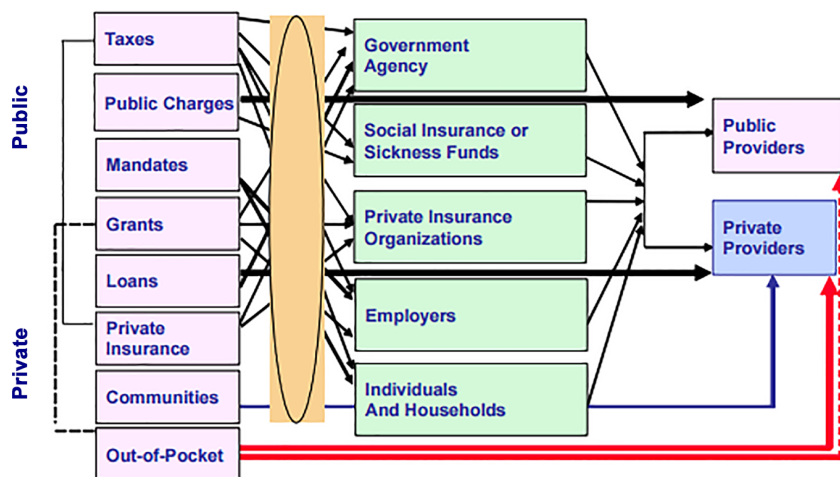


Figure 2. Interrelationship between components, functions, and financing mechanisms in the health system (Schieber G., and A. Maeda, 1997).

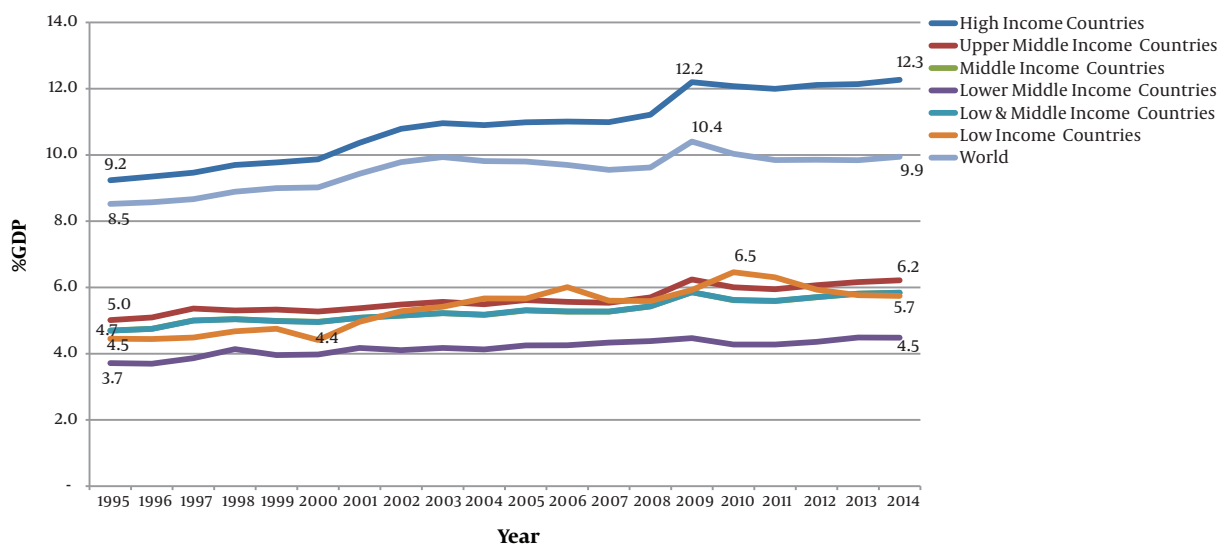


Figure 3. Trend of total health expenditure (share of GDP) from 1995 - 2014. Source: Authors' Research finding, 2019; WHO (World Health Organization) and Global Health Expenditure database.

accounted for 19% of the world's total population, had the lowest share of health expenditure out of GDP. In addition, the aforementioned study showed that the share of OECD countries was about 85% out of the world's global health expenditure. However, the African region, with 10% of the world's population, accounts for 3% of the world's health expenditures (8). According to Schieber et al., (2006), high-income countries spent about 7.7% of GDP, and middle-income countries spent 5.8% of GDP, and low-income countries spent 4.7% of GDP on health. The comparison of the

income level trend with the share of public and private expenditures out of global health expenditure represents a large difference in the composition of health expenditures. With the increase of revenues, both shares of OOP and the private sector out of global health expenditure are reduced. In low-income countries, private spending and OOP are the main body of global health expenditure (26).

### 7.6. Transitional Financing Process in Health Systems

Thomas Bodenheimer and Kevin Grumbach (2009) stated that the health care financing system historically began with the mechanism of “direct payment” (OOP) and then continued with the financing mechanism of “individual private insurance”, followed by “employment-based insurance” and finally, continued by “general financing by the government”, including social security and public assistance such as Medicare and Medicaid in the United States (16). Evidence reported by Schieber (2006) showed that as countries move toward different income levels, their health financing characteristics are also transmitted. These results describe the transfers in the world’s health systems the same as the movement of countries from (LI) low-income to (MI) middle-income levels and then to (HI) high-income status. In low-income countries, almost half of private health care expenditure is paid OOP and mainly as private payments for healthcare and pharmaceutical services. In low-income countries, the government acts generally such as National Health System through the Ministry of Health. In the middle-income countries, however, the ratio of private health expenditure to global health expenditure is still about two to five ( $\frac{2}{5}$ ), and this is worrying, but the share of OOP payment is reduced due to the development of the private health insurance market. In developed countries, share of health public and government expenditure is high. In this group of countries, the Ministry of Health is responsible for public health, survival, and general monitoring. Pooling of risk through the NHS (e.g. Italy and the UK) is conducted through either individual insurance mechanism or group insurance mechanism (as in France and Germany countries) (26).

Evidence presented by Schieber (2006) and Pablo Gotre (2008) showed that the structure (how to combine different mechanisms) of health financing varies from country to country, with factors such as social, economic and political conditions being the most important factors affecting this structure. The combination of health financing in different countries based on income levels is presented in Figure 4. In the group of low-income countries, the structure of health financing includes direct out-of-pocket payments about 67%, public health resources in the health sector about 26%, and private health prepayments about 7%. As countries grow, there is a shift to higher income levels. In this way, low-income countries move to middle-income levels and subsequently, move to higher income levels (HICs) as they continue. In addition, this trend is changing the composition of health financing: reducing the share of OOP by about 31% (to 36%), increasing the share of private prepayments by about 3% (to 10%), and increasing public health resources about 28% (up to 54%). It

also shifted from middle-income to high-income countries by reducing the share of direct payments out of pocket by about 22% (up to 14%), increasing the share of private health prepayments by about 14% (up to 24%), and increasing the share of government health resources by about 9% (up to 63%) (7, 26).

In the World Health Report (2016) by Joseph Kutzin and Diane McIntyre, the combination of health financing mechanisms in OECD countries and some middle-income countries is depicted (Figure 5) (19). According to Figure 5, the combination of the health financing system in OECD countries is predominantly based on compulsory prepayments (on average about 70%) and then on private prepayments (about 5% - 10%) and OOP (about 15% - 20%). The largest OOP share and the lowest share of compulsory prepayments were observed in Korea; however, the lowest share of OOP and the largest share of compulsory prepayments were found in Cuba.

Asante et al., (2016) conducted a systematic review in low and middle-income countries and showed that financing healthcare in low- and middle-income countries is more beneficial for rich people (compared to poor people); however, it imposes more financial burden on poor people (27). According to Figure 6, the results of the aforementioned study showed that all health financing mechanisms (sources) in the majority of studies conducted in Asia-Pacific had progressive distribution in terms of financial burden. However, in Sub-Saharan Africa, the financing mechanism of OOP and private/voluntary health insurance had a regressive trend. In general, policymakers in the middle-income countries (MICs) and low-income groups (LICs), especially in the African regions, should focus their efforts on shifting government resources to poor people to meet the goal of increasing public health coverage (PHC) (27).

### 7.7. The Status of Health Financing System in the World and Its Comparison with Iran

Recently, in several studies (Joseph L Dieleman, 2017, 2016), the World Health Financing Pattern was represented in 184 countries during 1995 - 2014 and 2015 - 2040. It predicts that the global health expenditure will increase from \$ 7.83 trillion in 2013 to \$ 18.28 trillion in 2040 that comprises 133%. Furthermore, the total percentage of health expenditure from GDP is predicted to reach from 6.0% (in 1995) and 7.1% (in 2013) to 9.0% in 2040. Such an increasing process in the percentage of GDP for health expects an increase from 6.4% (1995) to 9.8% (2040) for the high-income countries, from 5.4% (1995) to 7.9% (2040) for countries with above the average income, from 4.7% (1995) to 7.2% (2040) for countries with lower than average income,



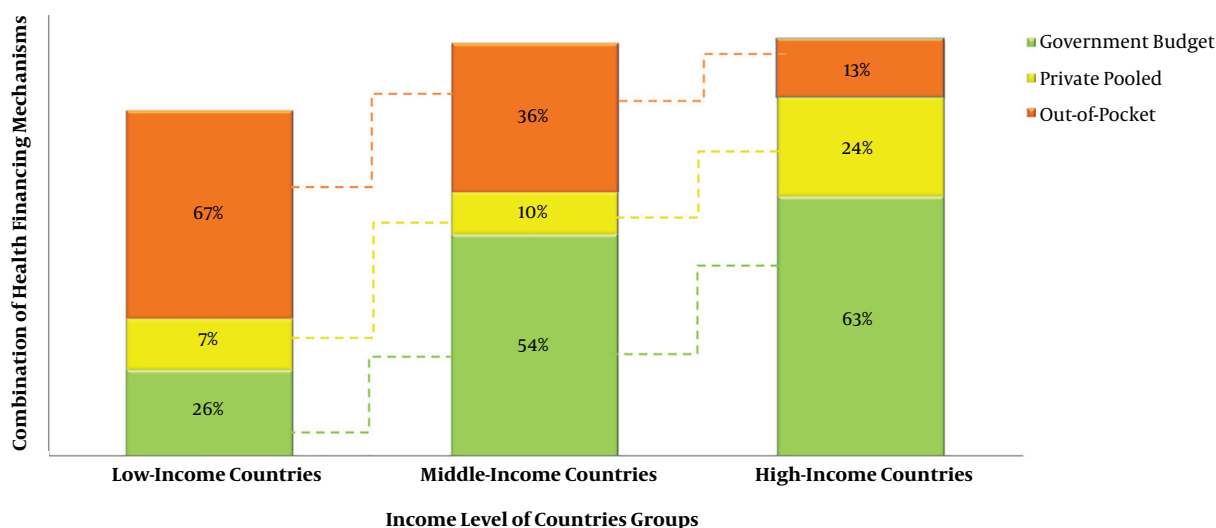


Figure 4. Transition of health financing systems (parallel to the countries' growth income) (World Bank, 2008).

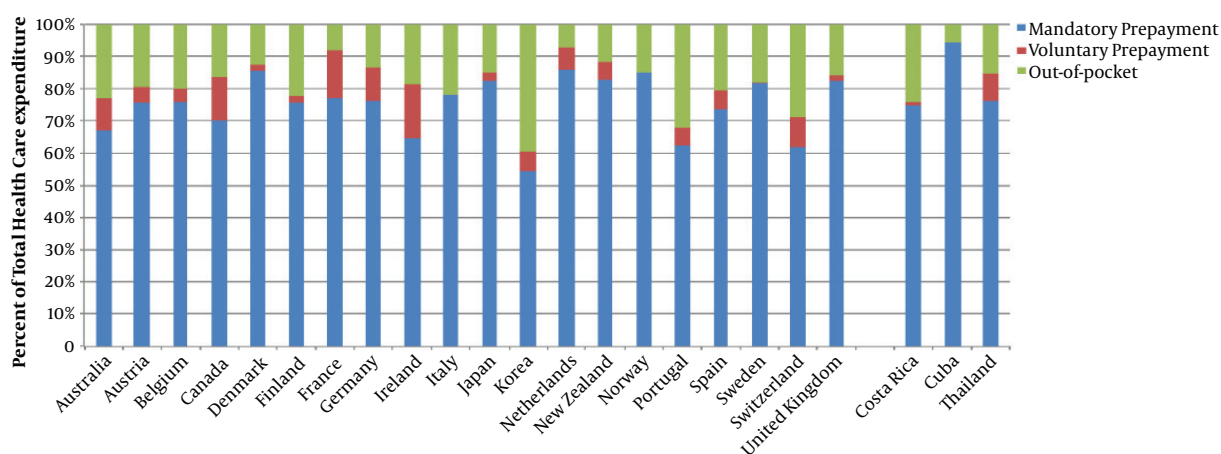


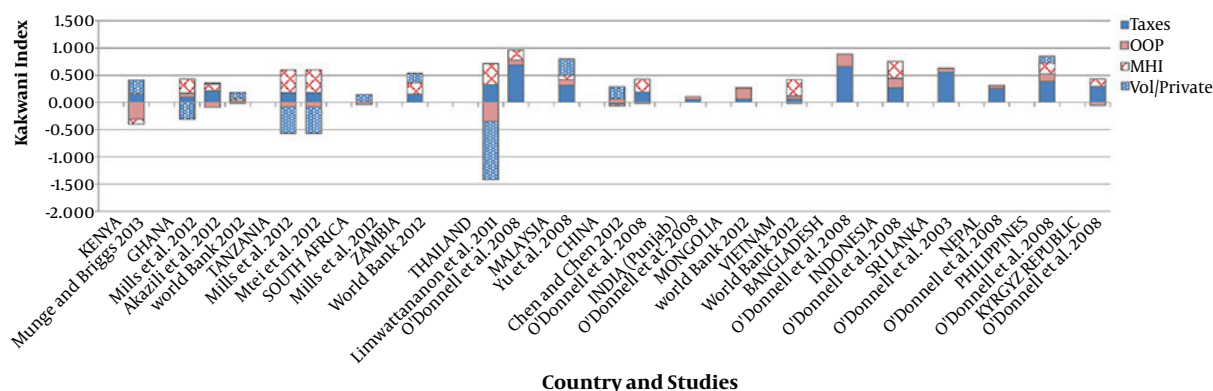
Figure 5. The combination of health financing mechanisms in OECD countries and some of the middle-income countries (with universal population entitlements), 2012.

and from 4.6% (1995) to 5.7% (2040) for low-income countries (28, 29).

In addition, a review of the results of these studies reflects the shaping process of the health financing system (based on the contributions of various financing mechanisms) in the world from 1995 to 2040. Thus, with economic growth and increase in the share of GDP for health, changes in average per capita as indicators of global health expenditure were from \$ 1,279 (in 1995 - 2014) to \$ 2,167 (in 2040) and the share of government's public health expenditures from the global health expenditures was from 59.2% (in 2014) to 65.3% (in 2040). In this regard, the share of private prepayments from the global health expendi-

tures was from 17.4% (in 2014) to 12.9% (in 2040), the share of direct OOP payments from the total health expenditures was from 22.8% (in 2014) to 20.6% (in 2040), and the share of development assistance from the total health expenditure was from 0.6% (in 2014) to 0.9% (in 2040) (28-30) (Table 1).

The review of these studies shows that global health expenditures are increasing over time among various sources and in all areas. The increase of global health costs per capita up to 2.4% is expected from 2013 to 2040 annually. This trend with a milder increase of 1.8% is expected for GDP per capita. Estimates indicate that the growth in health expenses has the highest rate in countries with



**Figure 6.** Kakwani indices for the key health financing mechanisms reported by financing incidence analysis (FIA) studies in Asia-Pacific and Sub-Saharan Africa. Source: Authors' Research finding, 2019; WHO (World Health Organization) and Global Health Expenditure database.

above the average income (3.4%); Southeast Asia, East Asia, and the Pacific (3.4%). On the contrary, the lowest growth of health expenditure is expected in African sub-tropical region with 1.9% of annual growth from 2013 to 2040 (30).

**Health financing situation in Iran:** According to the World Health Report (2014) and the study conducted by Joseph L. Dieleman (2017), the state of the health financing system in Iran has been alarming over the last two decades (1995 - 2014). The share of public resources in health financing was 43.8% in Iran (21.7% of general government budget and 22.1% of social insurance). This is while the average of this indicator for the Eastern Mediterranean region is more than 50% (39% of the general government budget and 12% of social insurances) and its global average is close to 59% (23% of the general government budget and 35.5% of social insurances). Moreover, the share of private resources in Iran's health financing is about 59.1% (50.8% OOP payment) from the global health expenditures, with the global and low-income countries average rates (with average OOP direct expenditure of 29.1%). This shows Iran's critical situation in terms of equity assessment indicators in health financing (21, 28, 31). Figure 7 depicts the health financing status in Iran and compares it with the average rates in the Eastern Mediterranean region and the World (32).

Therefore, to improve the health financing system's performance in Iran, particular attention has been paid to reduction of direct payments from people's pockets in health financing policies. Implementation of the "Health Reform Plan" (since 2014) is the most important example of this idea that seeks to pave the way for realization of public health coverage (32).

### 7.8. Evaluation Criteria for the Healthcare Financing Systems

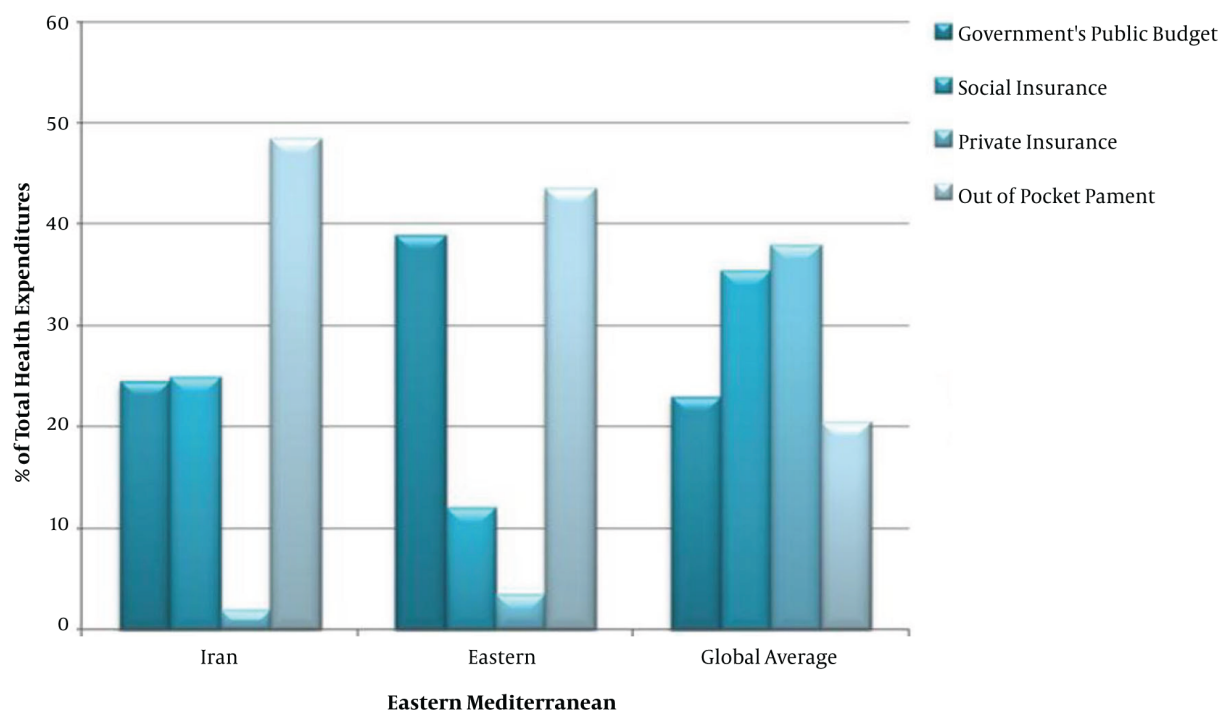
Reviewing relevant studies (Roberts, M., et al. 2008, McIntyre Di, 2014, Kutzin Joseph; Diane McIntyre, 2007; McIntyre Di, Kutzin Joseph, 2016), we can find that there are several key criteria to be considered in each country's healthcare financing policies in order to evaluate and judge healthcare financing systems. These criteria are specifically: feasibility, equity, efficiency, sustainability, risk pooling and risk-sharing, economic effects, and quality of health care (19, 20, 33).

#### 7.8.1. The Equity Criterion in Assessing the Healthcare Financing System

Murray et al. (2003) stated that the following three issues are essential in studying the concept of equity in the fair healthcare financing system. (1) Avoiding payments by households; (2) Giving horizontal equity (equal payment for same people for same healthcare services) and somewhat progressive contribution; (3) Determining the amount of contribution in payments independently from the health level of individuals or households and use of health services (34).

#### 7.8.2. The Risk-Sharing of Financial Health Care Services Burden

Health financing systems are divided into three categories according to the distribution of the burden (19): (1) Progressive financing: The percentage of payment is proportional to the increase in income (shown by the positive Kakwani index); (2) Regressive financing: With regressive payments and higher income level, a smaller share of income will be attracted to the financial system (this financing system will be shown with a negative Kakwani index); (3) Proportional financing: This type of financing system is



**Figure 7.** Comparison of different health financing mechanisms' contributions in the world, the Eastern Mediterranean region, and Iran (32)

displayed with a zero Kakwani index. Individuals at different levels of income allocate the same proportion of their income to health care (16). The assessment and analysis distribution of how households contribute to health care financing can be examined mainly from two perspectives: (1) income and (2) financial burden of disease (35) (Table 2).

According to the World Health Report (2013, 2016), in order to examine and measure the financial risk protection in the health sector, two factors are used: direct indicator (CHE) or indirect indicator (OOP). Although these indicators are different, the results are the same. The data from both indicators revealed that when the share of OOP payments out of global health expenditure is equal to or less than 15% to 20%, the possibility of CHE is negligible (19, 35). According to the World Health Report (2013), the statistical analysis of 92 countries, about 40% of these examined countries had financial catastrophes up to 2%, and in 16% countries CHE was higher than 2%. Nevertheless, it is estimated that (WHO, 2010) 150 million suffer from financial catastrophe and 100 million people are pulled below the poverty line because of significant OOP payments for health care (5).

### 7.8.3. Indicators of Equity Assessment in Health Financing

To evaluate the state of equity in financing the health system in different countries, simple and complex indicators (measurement methods) are used: (A) Simple measurement methods: Out of Pocket (OOP), Catastrophic Expenditure (CE), Medical Impoverishment (MI); (B) Sophisticated measurement methods: Fairness in Financial Contribution Index (FFCI), Kakwani Progressively Index (KPI), Suits Progressively Index (SPI), and Gini coefficients (37).

### 7.8.4. Evaluation of Health Financing System Progressive/Regressive

William Hsiao (1998) states that key criteria, including justice (in three areas of pervasive coverage, Equal access and equity in financing), efficiency, cost control, consumer choice are used in order to assess the health financing system (38).

### 7.8.5. Evaluation/Assessment of Health Financing System Based on Risk-Pooling and Risk-Sharing Criteria

Ahangar and et al. (2018, 2019) have conducted various studies on health financing systems in many countries of the WHO subsidiary over a period of 1990 to 2018 years. In that study, health financing systems were classi-

fied and evaluated based on risk-pooling and risk-sharing criteria. The world's health financing systems are classified into three main groups: low, medium and advanced risk-sharing. Overall, in this study, they showed countries with any level of economic development and income/GDP per capita that combine the mechanisms of health financing structure mainly rely on public resources (government, taxation, etc.) and appropriate contexts prepayment schemes (such as social insurance and private insurers) are considered in one of the categories medium or advanced risk-sharing. Conversely, countries, where the health financing system relies on direct payments (out-of-pocket payments), are considered at low risk-sharing and pooling group (21, 25, 39-42).

### 8. Discussion

The review of related studies suggests that health financing national patterns are heavily influenced by available government resources, social and private insurance schemes, foreign donors, employers, NGOs, communities, and families. All countries, with any level of income and economic development, have a serious challenge and concern in establishing an efficient and fair healthcare financing system. The results of various studies (including the World Health Report in 2010) indicate that one of the key policies for fair financing of healthcare in most countries is the progressive health financing system (based on high-risk pooling and sharing), which health insurance coverage plan is one of its main example (43). Therefore, all countries should adopt the strategy to achieve and implement public health coverage in line with health financing policies based on high-risk pooling (44). Although the structure and sources of health financing vary from country to country, the economic status of countries does not seem to be the only determinant factor for the realization of public health coverage. Other factors, such as political, cultural, social, etc., are also effective. The review of related studies indicates that most financial systems are not pure in practice (it means that they do not simply use a particular method of financing). Instead, most countries choose the mixing and matching approach; in fact, they combine two or more mechanisms with complex methods to reflect the exchange of goals that health systems seek to achieve them (20). In general, the results of the review of studies related to health financing and cost risk-sharing models in the world (developed and developing countries) reveal that with economic development and GDP growth in the last three decades, the average per capita of health had positive changes (the annual change in average per capita of health expenditure was 3.3% in 1990 -2014). However, this is

**Table 1.** Global Health Expenditures (by Various Sources) Based on Countries' Income in the World

Region/Country	Total Health Financing(% of GDP)			Health Expenditure per Capita <sup>a</sup>			Public Health Financing <sup>b</sup>			Private Health Financing <sup>b</sup>			Out of Pocket <sup>b</sup>			External Resource <sup>b</sup>			Private Prepaid Plans <sup>b</sup>		
	Time Period, y		Change (%)	Time Period, y		Change (%)	Time Period, y		Change (%)	Time Period, y		Change (%)	Time Period, y		Change (%)	Time Period, y		Change (%)	Time Period, y		Change (%)
	2000	2014		2000	2014		2000	2014		2000	2014		2000	2014		2000	2014		2000	2014	
World average	9	9.9	0.9	606.7	1271.3	664.6	57.7	60.1	-0.5	42.3	39.9	-2.4	18.6	18.1	-0.5	0.1	0.2	0.1	17	18.8	1.8
EMRO (Eastern Mediterranean region)	4.1	4.8	0.7	267.9	597.5	329.6	49.2	56.8	-10	50.8	43.2	-7.6	45.1	35.1	-10	0.8	1.2	0.4	41.5	3.05	-11
Iran	4.5	6.9	2.4	427.2	1081.7	654.5	41.6	44.2	-8.4	58.4	55.8	-2.6	56.2	47.8	-8.4	0.05	0.03	-0.02	2.1	3.9	1.8
High-income countries	9.9	12.3	2.4	2290.4	4608.3	2317.9	59.2	61.9	-1.5	40.8	38.1	-2.7	15.8	14.3	-1.5	0	0	0	191	20	0.9
Upper middle-income countries	5.2	6.1	0.9	253.2	869.1	615.9	46.2	56.2	-13.5	53.8	43.8	-10	43.5	30	-13.5	0.7	0.2	-0.5	9	8.3	-0.7
Lower middle-income countries	4	5.9	1.9	100.7	271.9	171.2	34.2	36.2	-3	65.8	63.8	-2	58.9	55.9	-3	3.1	3.3	0.2	2.3	1.8	-0.5
Low-income countries	3.4	5.9	2.5	38.9	92.1	53.2	34.4	41.2	7.7	65.6	58.8	-6.8	38.5	46.2	7.7	14.5	28.3	13.8	1.4	2	0.6

<sup>a</sup>Values are expressed as 2011 Int. \$  
<sup>b</sup>Values are expressed as % of THE.

**Table 2.** Approaches for Analyzing the Financial Contribution of Households in the Health System<sup>a</sup>

Criteria	Sub Criteria
1) Research/analytical question(s)	Does the study have a clear and well-defined analytical/ research question?
2) Rationale	Does The study motivate its research question?
3) Methodology	a) Does the study clearly describe the methods used to answer the analytical question(s)?
	b) Does the study make use of cross-sectional or time series statistical (descriptive/non-parametric) analysis, including significance levels in relevant sections?
	c) Does the study make use of statistical regress on analysis?
	d) Does the study use any kind of controls or alternative Comparisons?
	e) Is the type of information used in the study in terms of source, sample size, time period, levels etc. clearly described?
4) Data	a) Does the study make use of primary data for its key analyses?
	b) Does the study make use of household or provider level data?
5) Goal achievement	Does the study answer (all of) the research/sub-question(s)?
6) Findings and results	a) Are all of the stated findings & results the outcome of the particular methods used in the current study?
	b) Are the results/findings credible with respect to method and data?
7) Discussion and conclusions	Does the study critically discuss the robustness of findings, potential sources of bias, and possible limitations of the approaches of choice?
<b>Quality judgment (total points: quality rating: total points possible: 25)</b>	Two points are credited if the paper conforms fully to the question.
	One point is credited if the paper conforms partially to the question.
	Zero points are credited if the paper does not conform at all to the question.
	Three points are credited if the paper uses statistical regressions analysis under question 3(iii), consequently precluding a score on 3(ii).
	Grading scale: 22 - 25 points: 3 stars (***), 17 - 21 points: 2 stars (**), 0 - 16 points: 1 star (*)

<sup>a</sup>Source: Modified from references (36) and (12).

not an indicator of the effectiveness of the health financing system. In contrast, when health financing mechanisms are based on high-risk pooling and ascending health insurance system (based on public financing and social and private insurance pre-payments), financial health risk is less for households, and health financing system is more equitable and efficient. On the other hand, with more descending health financing mechanisms that rely on direct payments, financial health risks are more for households and healthcare financing system is more descending, unfair, and inefficient. Thus, this systematic review of scientific and empirical evidence suggests that the implementation of key health financing policies, such as the adoption of financing mechanisms based on the accumulation and sharing of risk and financial burden on health care, and the development of prepaid plans such as private insurance and social health insurance is recommended in all countries with any level of income. Note that this issue in underdeveloped countries and developing (middle-income countries and low-income groups) is one of the key strategies. It means that all financing policies through public resources and pre-payment schemes with high share of health pooled funds (% of total health expenditures), such as universal health coverage in high-income countries, including United Kingdom, Germany, Sweden (in ordered 90%, 89%, 85%) (WHO, data 2009; (43)), have a progres-

sive health financing system and equitable health system, lower financial risk burden and lower health catastrophic expenditure (HCE) for people. On the other hand, health financing mechanisms that are directly implemented by people when receiving health care services such as OOP are regressive. That is, by increasing the share of these mechanisms, the system of unequal health financing, health burdensome expenditures and key health indicators will worsen. Accordingly, health financing reforms have become necessary that financing arrangements through pre-payment and high pooled fund schemes, particularly social health insurance needs to be seen as a key strategy in achieving UHC in low and middle-income countries. However, reviewed the literature expressed concerns with designs and implementation of the insurance schemes in these countries. Heavy disease burden, burden of poverty, remote rural settings, and variability in insurance provision across the country make it a daunting task to achieve universal coverage through insurance schemes in the near future.

### 8.1. Strong and Weak Points/Limitations of the Review

The main strength of this systematic review is the inclusion of a wide range of qualitative and quantitative studies (included 150 papers) that investigate different aspects of health financing policy that increase the qual-

ity of our findings. Also, in this study, the quality protocol checklist of evidence (12) was used for the assessment and judgment of the quality of studies. In addition, this study explores, in a more structured and comprehensive way, the key issues and challenges of health insurance policies, emphasizing financing patterns, accumulation, risk-sharing and interactions with countries' health status and economic growth. This study allows this approach to be examined and described how health spending functions in both public financing (such as government spending that is domestically generated) and private health financing (such as prepaid private insurance and out-of-pocket health spending) as well as the evolutionary process of health financing and development patterns on key health outcomes such as average life expectancy rates, types of death rates, and mortality (infants, mothers, children) and fertility rates.

### 8.2. Limitations of the Study

This study has several limitations, mainly related to quantity (availability) and quality (information accuracy). Initially, a range of key frameworks and benchmarks for studies of health financing and risk-sharing models in the health sector were extracted using systematic reviews, and it is very difficult to assess the transition of health financing patterns over the past three decades. According to various WHO reports and databases, in the area of health financing, key indicators such as government health spending, private prepayments, and OOP health spending are critical, but a significant portion of these payments is informal payments. Limitations on data deficiencies for each country, as well as overtime, especially for informal direct payments, require the reassessment of data validation and resolving these problems. Second, this research only concerns the transition of health financing patterns in past decades and does not focus on relationship/impact between health spending and health outcomes such as mortality, life expectancy. Third, problem formulation may be difficult, and the common quantitative approaches for meta-analysis may not be applicable. Therefore, this limitation suggests additional research in the future.

### 8.3. Conclusions

The review of studies shows that in the last three decades, health financing systems are in transition in different countries. In addition, while reviewing the studies, significant changes in health financing patterns over the past few decades show that not only time and economic growth do not guarantee optimal financing structure and adequate payments for the health sector but also

it is necessary to achieve global health coverage, an efficient financing system based on high resource accumulation and optimal risk-sharing. Health spending in the world varies from country to country and from time to time. These differences are largely influenced by the political, economic, and social conditions of the countries. Developed countries have better economic, social, and even political contexts, with advanced and efficient health financing systems. The effectiveness of the health financing system is mainly concerned with several aspects: (1) How resources are pooled and the various financing mechanisms combined, (2) How resources are allocated and distributed (subject to equity and efficiency), and (3) Criteria to achieve health outcomes; which are mainly the concepts of economic evaluation of health projects and interventions based on cost-effectiveness, cost-utility, and cost-quality criteria. The basic premise of an efficient health system, as well as a health financing system, is to achieve universal health coverage, meaning any amount of health systems and especially financing systems based on high-resource accumulation mechanisms (such as public payment mechanisms and private ones, i.e., social insurance and private insurance); in fact, the probability of disease risk or health risk crossover between the three different groups of society (from poor to rich, from old to young, and from sick to healthy) is moderated and this causes more population access to health services. On the other hand, sustainable resource-based financing patterns (such as public resources and tax types, accumulated health prepayments), mainly reduce direct costs and even indirect costs when providing services to all individuals. This is particularly true for groups with low and moderate-income levels. This reduces the incidence of poverty due to illness or lack of access to basic health services and the consequent poverty-disease cycle.

It is also worth pointing out that by improving the health status of societies mainly due to key underlying factors such as efficient and sustainable financing system, appropriate social, political contexts as well as economic development, the necessary conditions for a healthier workforce and provides more empowerment. In line with this, the powerful workforce, along with other parameters, will drive economic growth, increase GDP per capita, and increase purchasing power and the desire of households to allocate more per capita for health care. Therefore, identifying and examining the mechanisms, structures, and patterns of health financing, how this pattern transitions over time, and its interactions with other social, economic, and political factors and key health outcomes are crucial. Furthermore, during this transition (with varying degrees in different countries), the shares of public expenditure

(through government and taxes) and pre-payment plans are increasing; whereas, the share of out-of-pocket payments is reducing. This transitional period is indicative of a move towards pervasive public health policies (with greater financial risk-sharing and greater pooling) in the world that is determined by factors such as political will and policymakers' economic performance. In conclusion, the availability of pooled resources for health care's such as public financing, in special health government spending and prepaid schemes, is at the core of the achievement for universal health coverage and one of the most important factors affecting people's access to health care and improving community health outcomes. The results of this study are useful for health policymakers, planners, and decision-makers. This study can also be helpful in explaining the status of trends in health financing structures, different approaches, problems and challenges of future financing policies.

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## Footnotes

**Authors' Contribution:** Ali Ahangar designed and implemented the basic idea of the study. Samaneh Safarani participated in various stages of data collection and analysis. Ali Mohammad Ahmadi, Amir Hossein Mozayani, and Sajjad Faraji Dizaji participated in overseeing the various stages of research and drafting the manuscript.

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