RESEARCH ARTICLE

Influential factors of out of pocket payments for health care in Iran: A foresight approach using the cross impact analysis

Zahra Kavosi[1], Kamran Bagheri Lankarani[2], Reza Dehnavieh[3], Azimeh Ghorbanian[4],

Abstract

Objective: To identify and explain the interactions and network of the relationship between influential factors of out-of-pocket payments for health services.

Methods: This futures study was conducted in 2015 in Iran, and comprised experts of various sectors. At first, key factors and driven forces of out-of-pocket payments were detected; then, the factors were collected in the form of a square-matrix questionnaire; and completed based on impact of each factor on the occurrence probability of others, with collective agreement, so the role of any factor in forecasting out-of-pocket status in future was identified by cross-impact analysis. MicMac software was used for data analysis.

Results: As many as 35 factors were identified which affected out-of-pocket payments. The factors were categorised in four main roles, i.e. influencing, two-sided, dependent and independent. Some economic factors which had a higher impact on other system factors were influencing factors; they were the most critical components because the system changes were dependent on them. In contrast, some factors related to organising the health system were depending factors and were affected by the least changes in other factors. There are 10 factors in this group. These factors were mainly related to the utilisation of health services by a special look to the part of delivery (public or private).

Conclusion: Policymakers should consider interactions and influencing network of out-of-pocket payment factors and should understand how a change in one factor can have a series of changes.

Keywords: Cross-impact analysis, Out of pocket, Health system, Iran.

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Introduction

There is an international tendency towards reforming health systems towards fair financing to reach universal health access.[1] Although a share of household income is spent on health-related costs, the amount of this contribution and its distribution is an important issue which shows the amount of health financial burden on households.[2] In a fair health system, payments must comply with the ability to pay.[3] Out-of-pocket (OOP) payment, which is the easiest and also the least effective way of financing, can be very risky as it does not act in the risk pooling mechanism.[4]

In this method, an individual pays the money to service provider directly in service delivery time, so this method can have different consequences, including patients' negligence in treatment and gaining the required services,[5] reducing their ability to pay for providing other essential goods such as food and housing, and ultimately reducing life quality.[6] Moreover, the financial burden of paying OOP could force the households to borrow money, leading to an endless cycle of poverty and sickness.[7] The share of OOP payments paid in the financing of health services was 42.3%, according to the statistics of the year 2013 for low-income countries, 40.6% for lower-middle-income countries, 31.3% for higher-middle-income countries, and 21.2% of total costs of health sector for countries with high income.[8] This method of financing in most of developing countries is also the main source of health care financing;[6] according to the World Bank statistics, the costs for health paid by Iranian households was 47.8% in 2014.[9] OOP payments for health services in Iran, according to the report of Health National Accounts of the year 2008, have an additive process and their share increased from 46.2% in the year 2003 to 53.79% in the year 2008.[4] The reason for high OOP payments was studied in different articles. The most important reasons were socio-economic situation, type of insurance,[10] lack of formal health insurance and inadequacy of social support networks,[3] and the specific family conditions.[10] The existence of some epidemiological determinants, such as non-communicable diseases, affects the amount of OOP payments for health services in a household.[10] Low and unrealistic tariffs in Iran have been considered as one of the reasons for the high levels of OOP payments.[11] In any case, it seems that reliance on OOP payments to finance the health system in Iran can be one of the weaknesses of the system. Reducing the share of

[1]School of Management and Medical Informatics, Shiraz University of Medical Sciences, Shiraz, Iran; [2]Health Policy Research Center, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran; [3]Kerman University of Medical Sciences, Kerman, Iran; [4]Health policy Research Center, Institute of Health, Shiraz University of Medical Sciences, Shiraz, Iran.

Correspondence: Azimeh Ghorbanian. e-mail: azimehghorbanian@gmail.com

such payments to 30% was mentioned in two five-year development plans of the country, i.e. the fourth (2005-2010)[12] and the fifth (2011-2016) plans.[13] But the repetition of this issue and other evidence shows that this has not been realised.

OOP payments for health services is influenced by various factors which mutually interact with each other; thus, to predict the increasing or decreasing situation of OOP payments in the future, we should consider interactions of these factors, the interactions that show that some of these factors are more influencing and some are more depending. Accordingly, each of these factors can play a different role in explaining OOP payments that should be considered in policy and planning to reduce and modify it and put the most influential factors in priority. Therefore, in this study, cross impact analysis method was used to identify the role of the factors in the network of influence-dependence relations.

The cross-impact analysis (CIA), as a technique of futures research, determines the characteristic role of a variable in relation to all other variables within a system and identifies those variables that play a significant role in the development of the system in the future. Systematic explanation of all potential interactions between a given set of variables and the assessment of the strength of these interactions are the main steps of the analysis.[14] CIA displays a schema for collating and systemising expert judgments.[15] It provides a number of structured processes based on expert judgements about factors systemic interactions.[16]

The first approaches to CIA were developed in the 1960s in response to a shortcoming of Delphi surveys. In these, the experts were asked about the future chances of different technologies, but the mutual influence existing between the technologies was not taken into account. Gordon and Hayward, therefore, introduced a concept in 1968 saying that the occurrence of an event (for example the realisation of a technology) modifies the probability of the occurrence of other events. The coefficients according to which event x raises or lowers the occurrence probability of event y were called cross-impacts and have to be determined by expert judgements. Within a short time, the basic idea of CIA received great interest and in the following decade many different variants were developed and their usefulness was discussed, also partly critically.[16]

The current study was conducted to determine the role of each factor in reducing OOP in the health system, and inform policymakers about the influential factors that can lead to better planning.

Subjects and Methods

This futures study was conducted in Iran in 2015, and comprised experts of various sectors including health and economy, and from health insurance institutions in different policy, executive and academic levels. They were chosen by purposeful sampling in order to participate in the sessions of experts' panel. The initial list comprised the most active and competent experts in health financing. Then, according to the experts' opinions, other specialists were identified and invited to participate in the study. Many people and experts were called based on the initial list, but collaboration of some experts was not possible as they were busy. Some of the participants were introduced in the initial list and some others had been introduced by others through a snowball process. At first, key factors and forces driving OOP in Iran were identified and then developed in the form of a square-matrix questionnaire. Each factor was in a corresponding row and column; then, the role of each factor in the forecast of the OOP status in the future was identified by analysing cross-impacts of these factors.

The questionnaires were filled in after obtaining participants' consent. The impact of each factor in row on the occurrence probability of the other factors in the columns was determined. Zero was considered as "no impact", number 1 as "low impact", 2 as "average impact", and 3 as "high impact". After completing this matrix questionnaire, the data was entered into Matrix of Crossed Impact Multiplications Applied to a Classification (MicMac) software and analysed using CIA. Based on the scattering of all factors in the influence-dependence scatter map produced as a result, the system stability or instability situation became clear, and based on the MicMac methodology, four main roles and some subsidiary roles of factors were defined.

Results

As many as 10 experts participated in the study, Moreover, 35 factors affecting the OOP payments for health services were extracted and identified based on experts' attitudes; the factors were comprehensive and included economic factors, policy factors, social support organisations, insurance, cost of health services, tariffs, health services organisations, providers and consumers' behaviours and epidemiological conditions.

The above-mentioned factors were considered as a system (Table).

According to the experts, the network of influence and dependence relationship was established between them Different roles of each factor were identified in predicting and expressing OOP payments for health services.

Table: The role of any influential factors of OOP in Iran based on MicMac methodology.

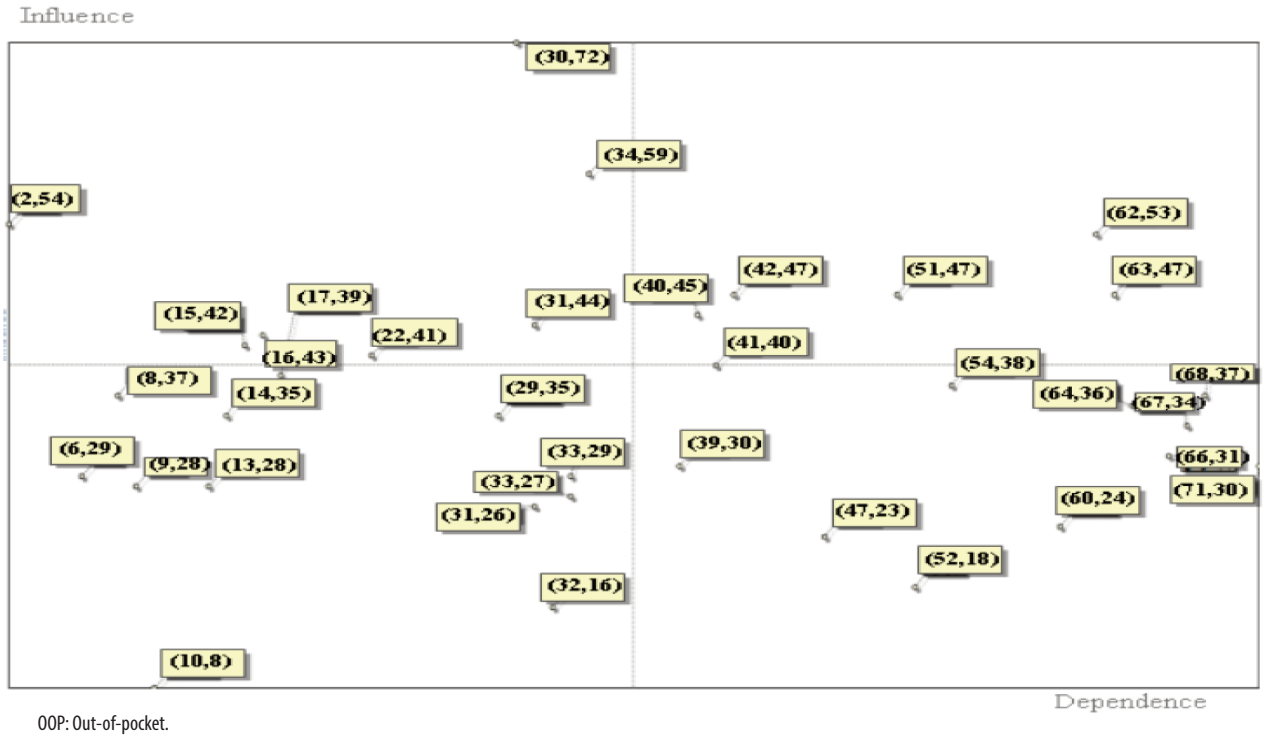
Variable role based on MICMAC methodology		OOP Factor Affecting	The factor positioning coordinates in the scatter map	
			Sum of Column Scores (Dependence Degree) X	Sum of Row Scores (Influencing Degree) Y
Group 1: Influencing factor	1.1. Context factors	Health Sector Inflation	30	72
		Exchange Rate	2	54
		The aging population and life expectancy increase	16	43
	-	Diseases Pattern Change	15	42
		Diseases Outbreaks	17	39
		Clinical Guidelines (compilation, application for monitoring and establishing basic benefits package)	34	59
		The Tariff Growth Rate	31	44
		Population Coverage	22	41
Group 2: Two-sided factors	2.1. Risk Factors	Service Coverage	40	45
		Cost Coverage	42	47
	2.2.Target Factors	Referral path system	41	40
		The use of expensive services	62	53
		Under-the-Table Fees And Informal Payments	51	47
		Induced Demand due to information asymmetry between patient and doctor	63	47
Group 3: Dependent factors	-	Supplementary Insurance	39	30
		Quality of health care	47	23
		Private sector outpatient services consumption	68	37
		Use of outpatient services of public sector (public-armed-charity)	64	36
		Private inpatient services consumption	67	34
		Use of public inpatient services	66	31
		Access to health services	71	30
		Privatization and amount of private sector activity development	60	24
		Rational Prescription of medicines and services	52	18
		Medicine prices (internal - external)	54	38
Group 4: Independent factors	4.1. Discrete Factors	Monitoring and ensuring the implementation of policies	33	29
		The willingness of people to use special service or the taste of people	33	27
		Medical education policies	31	26
		Health services tariff (process and base of tariffs)	32	16
		State social support organizations.	10	8
	4.2. Second lever and Discrete factors	Lifestyle and self-care behaviour	29	35
		Different tariffs of private and public sectors	8	37
		Aggregation of Insurance Institutions	6	29
		The allocation of resources to the health sector (budgeting)	14	35
		Increase in Iran population	13	28
		High tariffs of dental services	9	28

OOP: Out- of- pocket

The initial results showed that the matrix filling degree was 54.86%, showing that selected factors had an average impact on each other. Out of the 1,225(35*35) measurable relationships in this matrix, 553(45.14%) relationships were equal to zero, which showed the factors had not affected each other.

Eight factors were in the second quarter and had a high influence and low dependence. Besides, 10 factors were in the fourth quarter and had high dependence and low influence. Six factors were in the first quarter and 12 were in the third quarter. Of course, some of these factors were centred around the diameter axis, which showed that they had similar dependence and influence.

According to the MicMac methodology, based on the location of each factor in the scatter map of influence-dependence, the role of each factor on OOP payments for health services in Iran was found. The first group includes determinant or influential factors which are in the second quarter, up close the vertical axis and included the exchange rate, health sector inflation, aging population, increase in life expectancy, changing patterns of disease, disease outbreaks, clinical guidelines (compilation used for monitoring and establishing a base package), the growth rate of tariff and population coverage. In more accurate classification of this group, exchange rates, health inflation, aging population and increase in life expectancy could be



OOP: Out-of-pocket.

Figure-1: Influence- dependence scatter map of 35 influential factors of OOP in Iran (Based on the coordinates of each factor listed in Table).

considered as influential variables on the system that are context factors.

The second group was composed of two-sided or relay factors which were in the first quarter. There were 6(17.14%) factors in this group; these factors were divided into two subsets of stake (risk) and target variables. The risk factors were in the map around the diameter line of the first quarter and included two factors of the service coverage and the cost coverage by insurance. The other four factors that were below the diagonal line and in the first quarter consisted of the referral path system, the use of expensive services, under-the-table fees and informal payments, and induced demand of information asymmetry between the patient and doctor which were considered as the target factors.

The third group was dependent or results factors which were in the fourth quarter, including supplementary insurance, quality of care, utilisation of outpatient services of private sector, use of outpatient services of public sector, use of inpatient services of private sector, use of inpatient services of public sector, access to health services, privatisation and degree of private sector development, rational prescription of medicines and services, and the prices of medicines (internal - external).

The fourth category was autonomous or excluded factors; they were in the third quarter and included the secondary levers and disconnected factors. Disconnected factors were close to the coordinate source of the map and included monitoring and ensuring the implementation of policies, desire of people to use a particular service – people taste, medical education politics, the process health services tariff and the tariff basis and government social support organisations. Lifestyle and self-care behaviour, different tariffs of public and private sectors, integration of insurance institutions, resource allocation to the health sector (budgeting) of government's share, increase in Iranian population, and high tariffs of dentistry services are also as leverage factors which are in the third quarter on the top of diagonal line (Figure-1).

In addition, there were cross effects of the factors on each other; the flash output of the factor represented the influence and flash entrance represented its dependence; impacts intensity was also shown through thickness and colour of the arrows.

Based on direct influences between variables, for example about cost coverage factor, five red arrows came out of it, indicating that this factor had strong effects on the other five factors, and two arrows entered it, showing it was itself affected by the other two factors. And based on the indirect influences, 10 thin and thick blue arrows came out of cost coverage factor which shows relatively strong and average

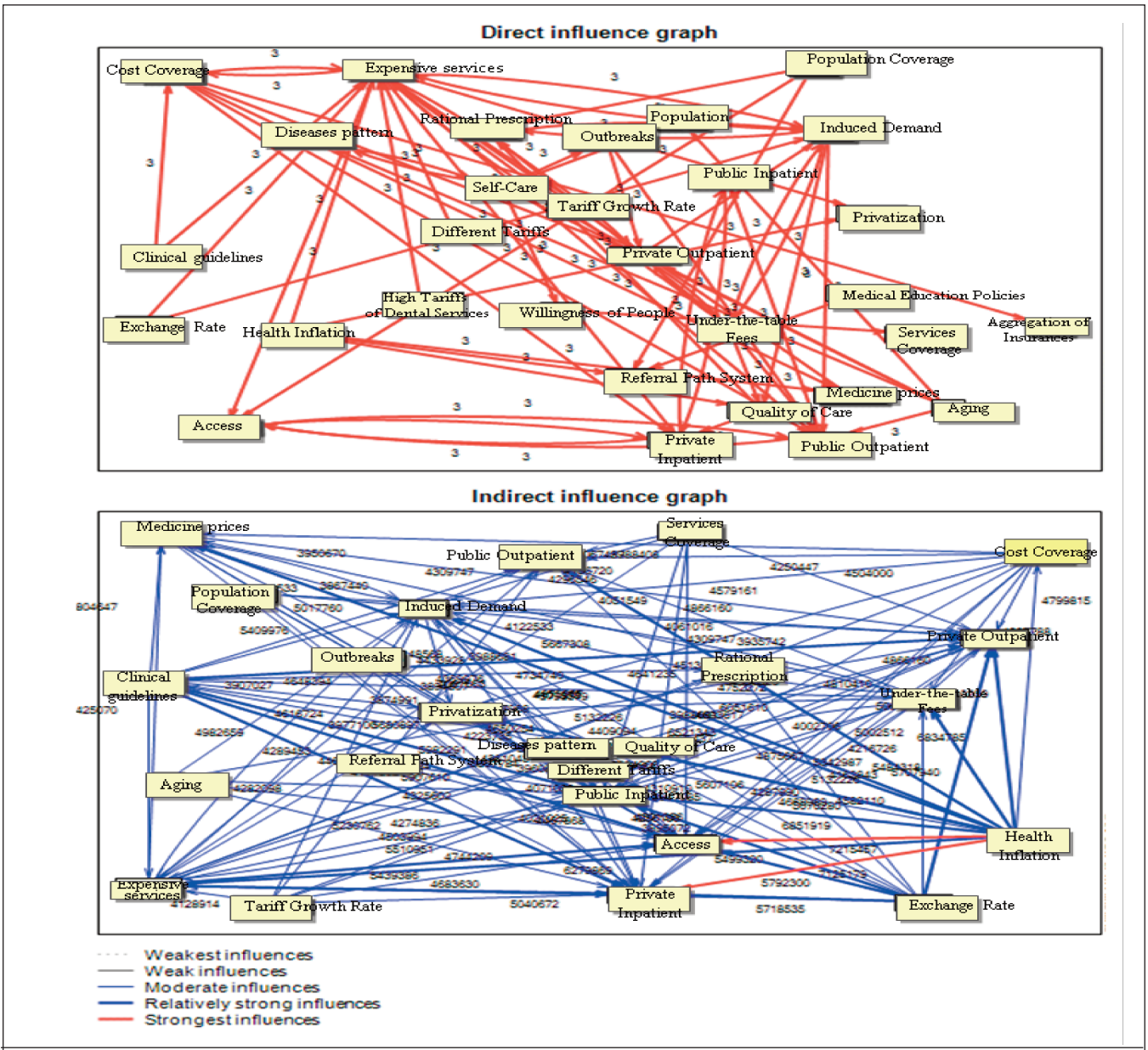


Figure-2: Direct and Indirect Influence Graph.

influences; one arrow entered it which indicates that cost coverage indirectly affected 10 factors and influenced by one factor (Figure-2).

Discussion

In the cross-impact matrix, the sum of scores per row was an influencing degree of this factor and the sum of scores per column was also its dependence degree; these are coordinates of each factor in the scatter map of influence-dependence. The current study could determine the role of the factor in the studied system based on location of each factor in this distribution map. In the stable systems, the scattering of factors in influence-dependence scatter map is so that some factors have high influence and some other have high dependence. In unstable systems, the factors show mostly an interstitial position of influence and dependence.[17] In the present study, the system had a relatively stable situation.

Based on the interactions and cross effects of factors affecting OOP payment for health services in Iran, we can classify the factors in four groups. The first group includes influential factors that are the most critical components and the system is more dependent on these variables

because the system changes are dependent on them. In this study, it seems that only the factor of exchange rate has high influencing degree. Among the influencing variables, we can also find context factors which are not controllable by our considered system and are outside of the system, i.e. in addition to exchange rates, health sector inflation, the aging population, and increasing life expectancy can be one of the variables affecting the system and are as the context variables. Based on studying national health accounts of Iran, there are three main sources for financing health expenditures in the country including public budgets, social insurance organisations and household's payment as OOP.[18] On average, 60 per cent of government revenues come from oil and gas sources, and this fluctuates with political issues.[19] The fluctuations affect the government revenues and economic growth,[20] reduction of oil prices, and the Iran's oil exports sanction has led to a reduction in the currency supply in the country and rising exchange rate.[21] This shows that the exchange rate is one of those factors influencing the OOP which is not affected by another 34 factors of this system. On the other hand, the population age pyramid suggests that Iran is faced with the phenomenon of population aging in the near future.[22] According to a study on health service utilisation conducted in Iran in 2015, the age group over 66 years has had the most visit for outpatient services and the inpatient services consumption,[23] and this evidence confirms the experts' comments in this research.

The second group is two-sided or relay factors which simultaneously act as very effective and very dependent ones. The nature of the variables is mixed with instability because every action and change in them changes the other factors. These factors can be considered in two groups of risk factors and target factors, so the two factors of services coverage and costs coverage by insurance are among the risk factors and due to their unstable nature, they have a high capacity to become key players in the system. In Iran, there are some defects in services coverage, i.e. some essential services are not covered by insurance, and insurance companies have failed to protect people from exposure to catastrophic health expenditures.[24,11] In addition, the financial strength of insurance funds is not enough to cover the costs and is also affected by insurance management inefficiency.[18] This evidence also confirms the results of this study and clearly shows that the two-sided variables have a capacity to be modified and can be very effective.

The four other two-sided factors are referral path system, the use of expensive services such as procedure services consumption and invasive surgical services, under the table fees and informal payments, and induced demand of information asymmetry between patient and doctor. These factors are of target variables, which are dependent rather than influential. These variables can be recognised by a reasonable certainty, as the result of the system evolution, i.e. by making changes in these variables, we can attain changes and evolution of the system in accordance with its programme and purpose. The implementation field of the referral path system in Iran in 2005 was provided with the adoption of family physician programme and its incorporation into the body of the health network of the country,[25] but despite this, its proper implementation depends on various factors, including political commitment of the policymakers about referral path system organising and implementing.[26] Also, the study results of health care utilisation of Iran in 2015 showed that in the per capita cost paid by each person for health care, the largest share has been for payments to specialist physicians.[23] In general, non-compliance with referral path system leads to over-utilisation of health care services.[27] In addition, according to the documentations, under the table fees are one of the main reasons for high levels of out-of-pocket payments for health services in Iran.[27] In addition to the induced demand of financial incentives and more profit, uncertainty in the mechanism of tariff can be effective in creating informal payments. Because some people believe that the tariff determined in many cases is lower than its real costs, the providers only recoup the costs through informal payments of under the table fees.[11,25,27]

The third category is dependent factors or result variables which have very high dependence and low influence. Thus, they are highly sensitive to evolution of influential and two-sided variables and are output variables of the system.

There are 10 factors in this category which are mostly related to the utilisation amount of health services with special attention to the provision sector of these services (public-private). In Iran, the share of private sector in providing health services has increased compared to the public sector. This issue is important because 95% of payments to the private sector are done as OOP.[18] According to studies, health services in the world are increasing, and this increase is due to increased consumption and price of services, advances in medical science and technology and methods of application, equipment and expensive drugs.[28]

We can say that the existence of supplementary insurance, different qualities of health services delivered in the public and private sectors, access to health services and the expansion of the private sector activity affect utilisation of health services provided by the public and private sectors. Rational prescription of medicines and services and the cost of medicines and the difference between domestic

and foreign medicine prices are those variables that determine the health services utilisation.

The fourth category is of autonomous variables, which have low influence and dependence. Maybe they do not have any relationship with the system because they do not stop a main variable and do not cause its evolution in the system. These variables are in two categories of secondary lever and disconnected factors. It seems that discrete variables development is not related to the current system and they can be removed. Monitoring and ensuring the implementation of policies, willingness of people to use a special service, the taste of people, medicine education politics, health care tariff, tariff process, and base and state social support organisations are in this category. Although the secondary lever factors are completely independent, they are more influential than dependence and can be used as benchmarks for measurement. Lifestyle and self-care behaviour, different tariffs of private and public sectors, aggregation of insurances, resources allocation to the health sector (budgeting) share of the state, increase in Iranian population, and high tariffs of dental services are in this category.

The results showed that the reviewed variables in this system are a set of different groups of factors influencing the OOP payment for health services, i.e. organising the health system, insurance system and tariffs, but more indicators related to insurance are among the category of variables; this shows their role in creating balance in the system, and also shows that according to the position of these indicators, we can design their reform and strength with the aim of reducing OOP payment for health services in Iran.

Finally, we can say that the key factors and main propulsion are comprehensive factors that determine the OOP payments for Iranian health services.

One limitation of the study was that coordination to invite experts took more time as it was a difficult process.

Conclusion

Policymakers need to consider complex interactions and influence network of OOP factors, and understand how a change in one factor, due to the influence network, can make a series of changes and they must avoid one dimensional policy. Therefore, in policymaking to modify the OOP payments through control of health service utilisation, they should consider utilisation as a dependent factor, and to revise it, they must act through clinical guidelines development and implementation of referral path system, because these two factors had influencing and two-sided roles in this system. Moreover, acting on these factors affects the system by controlling the behaviour of service providers and increasing costs coverage effectiveness of insurance institutions. Thus, this is better to put the most influential factors in the first priority.

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