Setting Health Care Services Tariffs in Iran: Half a Century Quest for a Window of Opportunity

Leila Doshmangir (doshmangirl@tbzmed.ac.ir)
Tabriz University of Medical Sciences https://orcid.org/0000-0001-5197-8437
Arash Rashidian
World Health Organization Regional Office for the Western Pacific
Farhad Kouhi
Iran Social Security Organization
Vladimir S Gordeev
London School of Hygiene and Tropical Medicine Population Studies Group

Research

Keywords: Policy making, Medical tariff, Medical payment, Medical pricing, Health policy and system research, Iran

Posted Date: February 27th, 2020

DOI: https://doi.org/10.21203/rs.2.24711/v1

Version of Record: A version of this preprint was published on July 6th, 2020. See the published version at https://doi.org/10.1186/s12939-020-01224-1.

Abstract

Background Pricing health services remains to be a contentious issue in Iran. The Universal Health Services Insurance Law of 1994 aimed at introducing structural and legal bases for pricing health services to enhance efficiency and to equate demand and supply, while referring to equity objectives. Until now, the implementation of this law has failed to meet its original objectives. This paper explores the experience of setting health care services tariffs in the Iranian health care system over the last five decades.

Methods We analyzed data collected through documentary and literature reviews of the official documents developed at the various levels of the Iranian health using inductive and deductive content analysis. 22 face-to-face semi-structured interviews supplemented the analysis. Policy triangle policy analysis model was used to guide data analysis.

Results Our comprehensive overview of changes in the medical pricing system provides valuable lessons for major stakeholders. Most changes were implemented in a sporadic, inadequate, and a non-evidence-based manner. Disparities in prices between public and private sectors make tariffs setting a contentious issue in Iran. Lack of clarity in pricing health care services makes negotiations between various stakeholders difficult and can potentially become a source of a corrupt income. Such clarity can be achieved by using adequate and technically sound pricing. Technical aspects of pricing health services should be separated from the political negotiations over the overall payment to the medical professionals. Transparency regarding a conflict of interest and establishing punitive measures against those violating the rules could help improving trust in the doctor-patient relationship.

Conclusion Evidence-based changes in medical pricing policies can help striking the right balance in the health care services provision process. A sensitive application of policy models can offer significant insights into the nature of medical price policy setting and highlight existing constraints and opportunities.

Introduction:

To prevent healthcare market failures due to possible externalities, failures of competition and market controller information asymmetry, governments may decide to intervene directly or indirectly by setting prices (or tariffs) for goods and services and introducing price ceilings and floors[1, 2]. Being a key component of the broader activity of resource allocation and purchasing in any healthcare system, costing and pricing health care services can be used to regulate the relationship between major healthcare stakeholders (i.e., providers, recipients, payers and purchasers). Theoretically, it can be applied to any type of health care service but will be contingent on existing service coverage and resource distribution in the public and private healthcare sectors. Costing and pricing health care services can potentially minimize incentives for under- or overutilization of health care services by keeping prices close to the unit costs of services. However, establishing actual unit costs could be complicated and would require detailed data on indirect costs (e.g., administrative overhead costs) - data that is not readily available in many countries[3].

Overall, pricing health care services is contingent on the existing healthcare sector's financial strategy and may impact the financial access to health services through patients' out-of-pocket expenses, as well as the availability of medical services[4, 5]. Political context and existing healthcare policies, country's high-level economic indicators (such as public sector expenditure and debt, household expenditure and inflation), social context (including religious and cultural beliefs), health sector and general regulatory power of the public sector (to implement the set prices) would also contribute towards determining the final medical prices. Setting the right price for health care services can help to strike a balance in healthcare market, fulfill society's healthcare needs, and provide maximum efficiency in resource allocation and consumption, leading to the encouraging provision of certain services and demarcating or limiting the provision of others[6, 7]. It can also be useful when determining the geographical distribution of health care providers by raising and lowering prices[8, 9].

Medical tariffs usually include prices and payment rules for purchasers and providers valid for a specified period. In many countries, medical tariffs are used as one of the essential tools of policymakers that influence equity, efficiency, quality, responsiveness and accessibility to health services[10]. In setting health care services tariffs, a unit of payment is among the most important characteristics of a payment system. Depending on the unit of the service, that is purchased, provider payment methods can be classified to fee-for-service (FFS) (e.g., Germany, Korea, Taiwan, US, and Canada), per-case (e.g., Australia, Hungary, and US), capitation (e.g., Denmark, the UK, and Thailand) and global or line item budgets (commonly implemented in many low- and middle-income countries) which can be paid directly by the patient (user charges) or by the third party payer (insurer or government). In addition to the unit of payment, it is also important whether the payment is retrospective (paid based on what is offered de factor) or prospective (paid based on what is normally expected to be offered), and the provider payment systems is variable or fixed, which allows mixing incentives for both providers and patients (further details in [3, 11-15]). Healthcare system financing rarely relies on just one basic payment system, and often several basic payment systems are combined.

Diagnostic-based per case payment methods are increasingly applied in OECD countries[16, 17], and mechanisms and policy strategies to determine resulting medical tariffs vary. For example, in Italy, since 1994, health care tariffs are used to regulate the healthcare system and

reduce direct government involvement in controlling public providers.[18] In England, the Payment by Results system (introduced in 2003/04) is used for paying the healthcare providers using a standard national price or tariff for each patient seen or treated (excluding community and mental health services covered by block contracts)[19]. In the US, in the 1970s, Resource-Based Relative Value Units represented a new way to define the number of physician services and their pricing. [20-22] In France, a new French coding system of clinical procedures with a use of the traditional consensus method was developed between 1996 and 2001[23]. Negotiation between health insurance funds and union representatives for each profession was an essential step in reaching the unit value that was applied to the schedule to determine the tariff for each procedure. In Belgium, as in most other countries, no exact costing data exist and tariffs are used as a surrogate for the real societal costs [24]. In order to determine medical tariffs, Australia and Germany also started relative value setting in their countries from 1969 and 1977, respectively.

Iran is also using a national medical tariff system (but not in a systematic manner) for provider reimbursement since 1972; however, the process of setting medical tariffs has been a contentious issue and continues to be heavily criticized by various stakeholders[10, 25]. The history of the Iranian healthcare provider payments reforms is complex, and no previous study, to the best of our knowledge, has examined in detail the complexity of changes in the medical tariffs system in terms of mechanisms, governance, and shared-decision making. Given the continuous pleas by various stakeholders for changes in pricing process of the health care services and calls for the use of an evidence-based approach[10, 26], the aim of this paper is two-fold: (1) provide a comprehensive overview of changes in the provider payment mechanisms over the last half a century in the Iranian healthcare sector by using 'policy triangle model' and (2) outline the major shortfalls and drawbacks brought by implementation of changes and the underlying causes (based on qualitative interviews and by using 'garbage can' policy analysis model) and explore suitable solutions based on local evidence and experiences of other countries.

Iran health system financing strucure

Currently, the health system funding in Iran comes from the government (23.8%), health insurance (30.6%), out-of-pocket payments (35.2%), private health insurance (6.1%), and individual donations and other sources (4.3%), based on data for 2018[27]. Overall, the Iranian government currently spends ca. 8.4% of its GDP on healthcare. Fig.1 depicts the current (2019) financial streams within the Iranian healthcare sector.

<**Fig1 about here**>

The MoHME at the national level and medical universities at the regional level are governing and steering the development of the policy programs and plans[28]. In addition to the MoHME, the healthcare sector is being overseen and regulated through several medical professional bodies, with a non-governmental IMC being the biggest among them[29]. The MoHME regulates and funds the provision and delivery of the primary healthcare services, while the secondary and tertiary health care services are being financed through the public budget, out-of-pocket payments (OOP) and one of the four basic national health insurance funds (i.e., the Social Security Organization (SSO), the Iran Health Insurance Organization (IHIO), the Armed Forces Medical Services Insurance Organization (AFMSIO) and Imam Khomeini Relief Foundation (IKRF)).[30, 31] In addition to four basic insurance funds, there are other 17 smaller institutional funds that provide health insurance coverage for their employees[32, 33]. These 17 funds are under the jurisdiction of the High Council for Health Insurance (HCHI) that was established in 1995. The HCHI is responsible for making changes to the social insurance provisions of each fund and sets the fee schedule for providers' payment. The HCHI has members from the MoHME and Ministry of Labor, Cooperation and Social Affaires (MOLSA), as well as other stakeholders such as the IMC[34].

The Iranian healthcare system is a public-private partnership. Currently, public hospitals have two primary funding sources: the central government via a line-item budget (mainly through the MoHME and medical universities) and reimbursement mainly by the SSOs and the IHIO, based on FFS and per-diem payments. Additionally, patients must pay 10% towards the cost of hospitalization in public hospitals, 30% for outpatient services, 25% for para-clinical services, and 20% for non-para clinical services as a co-payment. In the private sector, the difference between medical tariffs in public and private sectors are added to this co-payment. The line-item budgets include salaries for physicians and other staff, as well as medical equipment, based on the national salary grid. FFS payments are linked to the national medical tariffs (hereafter, the tariffs) for the health care services that each physician provides and are used as an incentive for further provision of care in public hospitals[35]. Private hospitals revenues are almost entirely based on these tariffs, paid as FFS to the hospitals by the MOHME. Private hospitals use the same tariffs structure to pay physicians that provide care, although they deduct overheads and running costs from the tariff rates received[36]. Basic and supplementary insurance funds, as well as OOPs, fund private health care services, while the provision of the health care services is based on FFS payments.

The existence of multiple and dispersed insurance funds and uncoordinated decision-making system for financing the health insurance organizations, the inefficacy of health financing schemes, duplication of coverage are the main challenges of the health insurance industry in Iran[37-39].

Methods

Documentary and literature reviews and qualitative interviews were conducted to reach a comprehensive understanding of the mian historical policy-related time-events and trends, challenges, pitfalls, and drawbacks brought by the implementation of policy changes in medical tariffs and explore possible solutions

Data collection:

In first phase of the study, data were collected through documentary and literature reviews of the official documents developed at the various levels of the Iranian health system, including the Ministry of Health and Medical Education (MoHME), insurance organizations, parliament health commission, and the Iranian Medical Council (IMC). More specifically, we reviewed and analyzed the official policy documents, reports and regulations (such as five-year social, cultural, economic and political development plans), yearly published medical tariff booklets, and bylaws or the Iranian parliament's proceedings that mentioned or discussed tariffs for different medical services during the various health ministries' periods or presented empirical evidence related to changes in medical tariffs. Unpublished documents were obtained in person. Additionally, we conducted a scoping review of relevant publications in several international databases (PubMed, Embase, ScienceDirect, Scopus) and Iranian databases (Iran doc, Iran Medex, Scientific Information Database) using a combination of the following keywords - Iran, medical tariffs, medical pricing, health and the Persian equivalents of the English keywords, where necessary.

To complement this review and obtain additional information, we conducted 22 face-to-face interviews. A semi-structured interview topic guide was developed by the authors based on the information acquired from literature and documentary review. With one exception, all interviews were conducted at the participants' place of work. The interviews were conducted by the first author with different stakeholders including policymakers at the national level, health care services managers and officials, and practitioners and academics. All interviews were audio recorded and were fully transcribed verbatim. The interviewes lasted minumum 80 min. After transcription, the transcribed files were sent participants and we asked them to read the text and add or remove any information they prefer. The interviewees were selected through purposive and snowball sampling methods.

Data analysis:

A thematic framework approach was used to analyze data. Data analysis was performed in tandom with data collection. Policy triangle analysis framework [40] was used to guide analysis and interpret the collected data.

Policy triangle model focuses on four inter-related aspects of a policy: context, content, process (agenda setting, formulation, implementation, and evaluation) and actors/stakeholders.[40] It emphasizes the use of global and local evidence to produce strategies or solutions to address the problems to analyze and interpret the data. We used this model to show the complexity of historical changes in the provider payment mechanisms in Iran by using the aforementioned aspects as subsections.

We also conducted stakeholder analysis to identify and understand stakeholders in tariff setting. For stakeholder analysis, we used the four stages proposed by Mendelow, 1981[41]: determining who the stakeholders are, rating the power of each stakeholder, rating the dynamism of each stakeholder, and allocating responsibility for scanning developments relating to each stakeholder group.

To analyse the data, in the first step, two researchers(LD and AR) expert in the framework method for the analysis of qualitative data read the documents and transcribed interviews several times in order to familiarizes themselves with the acquired information. In the secod step, based on the elements of the policy analysis triangle as the predefined themes(content, context, process and actors/stakeholders), codes were grouped into each theme according to their similarities. In the third step, both experts classified all quotations or relevant information extracted from documents review that corresponded to a theme of the analysis. The researchers ensured that quotations were classified only in one single theme. In the fourth step, for each theme, all the included quotations or relevant information were syhthesied to bering out the main ideas. Descriptive results were accompanied by quotations or referece number of documents that illustrate the description of the results. Two researchers with different backgrounds (respectively PhD in health policy and PhD in health management and economy) performed the analysis.

Results

1. **Overview of changes in the provider payment mechanisms over the last half a century in the Iranian healthcare sector**

In this part, our findings are presented based on the four inter-related aspects of a policy: context, content, process (agenda setting, formulation, implementation, and evaluation) and actors/stakeholders as subsections.

Context:

- *Health care services reimbursement*

In Iran health system, the tariffs are used to reimburse both public and private providers. Public provider tariffs are set at a lower rate as they are often being received monthly as a salary and rely on public sector infrastructure and staff to provide care. The MoHME sets the tariffs in consultation with other governmental agencies, such as Parliament Health Commission, Vice-presidency for Strategic Planning and Supervision of the MoHME, the Ministry of Cooperatives, Labour and Social Welfare (MCLSW), IMC, special councils, and Basic and Supplementary Insurance funds. The tariffs are determined for hospital treatment and diagnostic service, medical in-patient care, laboratory and imaging services, and paraclinical services. *Health services delivery costs are split into three groups: outpatient doctor's visits, FFS based on the "K rate" of services, and hospital bed costs[Feb2002 Gazzete No:13753]*. The tariffs are also determined for physician's office visits and some of the ambulatory care services, although by using a much less sophisticated approach than estimation of tariffs. As stated in analyzed documents, many research interviewess also pointed out the role of private sector in setting medical tariffs:

"*Overall, despite occasional conflicts over health care services pricing, the private sector works in close cooperation with agencies determining national medical tariffs*"[Former senior policy officer].

-Mechanisms of setting medical tariffs

Since 1995, the annual revision of the tariffs follows an established formalized process. First, a technical assessment of the annual costs is done separately by the MoHME and the insurance organizations, and occasionally by the IMC. Next, several technical meetings between representatives of the MoHME and insurance organizations are being held to reach an agreement on the incremental tariffs increase. Finally, agreed tariffs are presented to the HCHI for approval. In theory, all these steps should be completed before the start of a new fiscal year. In reality, however, this never happens. [42] In the last few years, the agreement was achieved as late as a second quarter of a new fiscal year. The process is frequently halted by the private sector, large public hospitals and medical universities that are usually lobbying for higher tariffs. At the same time, insurance companies do not hesitate to delay the final agreement, so that the implementation of the new higher tariffs (and reimbursement) is also delayed for as long as possible.

Pricing medical services that are not already on the tariffs list has also proven to be complicated. The HCHI should approve all new tariffs, and each member of the Council can present their suggestions for approval including the fiscal amount. The role of lobbying, negotiating power of stakeholders in tariff setting, as well as the insurers' fiscal space for adding new service to the list play an important role in such ad hoc additions of the services. Physicians and hospitals usually initiate a request for a tariff for a new health care service; however, given the lack of corresponding medical tariffs that could act as a proxy, quite frequently the specialty groups and hospitals set their tariffs via routes that do not involve the HCHI. As a result, most such services are not included in the insurance benefit packages.

Content and process

- Establishment of the national tariff payment system during 1972-1995

Before the creation of the national tariff payment system in 1972, budgetary payments were the only mechanism for paying to public hospitals and other public health services providers (Table 1). "*In 1972, following the approval of the Act on Provision of Medical Services to Government Employees, medical services organization were required to provide health care services to the insured population also through the private sector providers"*[May 2002, Gazette No: 15146]. The same year, following an extensive review of similar costs in other countries with health insurance systems (i.e., Belgium, France, and US), a first list of the tariffs was published. [43] These tariffs remained unchanged until 1982 when the first handbook of medical tariffs or 'relative value units' (called the "California Handbook") was published in the US. When adopting the California Handbook tariffs for use in Iran, the relative value units were adjusted, disease coding was introduced to price services, with the consequential assignment of specific units to each service, and applying the Rial coefficient (the K-factor), which would be revised annually based on the cost of living index. However, the implementation of a new disease coding system led to confusion, resulting in a three-year delay with full-scale implementation of a tariff-based reimbursement system. Until the implementation of a new system was complete, most hospital and physician practices applied and charges 'old-style' fixed fees (1972), which in practice remained unchanged until 1986.

Additionally, in 1985, the MoHME was established which led to a revision of the physician visit costs and costs per hospital bed-day tariffs. During this period, in addition to the budget lines and tariff-based reimbursement, hospitals now also received additional reimbursed through FFS and salary payment methods, where preventive and public health services were reimbursed by salary, bonus and capitation payment methods. [44] In 1990, the tariffs were increased two-fold (compared to 1986) and remained unchanged until 1995. During the same year (1995), the Universal Medical Services Insurance (UMSI) Act was passed. The UMSI Act declared that actual medical prices should serve as a base for a medical tariff setting and should be revised annually. *This way, from 1995, tariffs became the cornerstone in regulating health care services market, financial autonomy of hospitals and setting insurance premiums per capita* [Feb 2002, Gazette No:16615].

In this year, following the passage of the Universal Medical Services Insurance (UMSI) Act, Medical Services Insurance Organization (UMIO) was established.

<Table 1 about here>

- Dynamics of changes in medical tariffs during 1972-2017

During the last half a century, tariffs for private health care services were consistently higher than those provides in public sector settings (**Figure 2**). However, the gap in tariffs for public and private services fluctuated and was not consistent. For example, from 1972 to 1982, the ratio between private and public tariffs remained stable.

Before 1992, public and private sectors had similar medical tariffs and insurance coverage were the same in both sectors. *In 1992, medical tariffs of laboratory, hoteling and radiotherapy services were divided into public and private sectors* [Jan 1993, Gazette No: 18032]. From 2000, physician visit cost tariffs were divided into private-and public-sector groups. Before that, only inpatient care had different prices in the public and private sectors. In this year, the first peak occurred with a growth rate of 36.4 percent. As a result of this decision, the gap between the public- and private-sector costs of visits became larger. The ratio of the costs of visiting general practitioners and specialists in the private sector to the same costs in the public sector increased from 1.3, 1.5, and 1.67 in 2000 to 2.06, 2.6, and 2.75 in 2014. Also, visiting tariffs rate for faculty members physicians including assistant professors, associate professors, and professors, were respectively 1.18, 1.27 and 1.45 times more than visiting tariffs for non-faculty members physicians.

In 2001, the selection of exemplary hospital beds (1000 beds) were discussed and approved by the Council of Ministers. In 2002, the building-up approach to the pricing of services to deprived regions was introduced. In 2004, the Fourth Five-Year Development Plan (2004-2009) was announced and the Comprehensive System of Social Security and Welfare Act was approved. [45] However, the most important event of this year was the passing of a new act for the IMC, whereby this council was charged with the task of determining medical services prices in the private sector. [46] In 2004, the second peak occurred with a 54.1 percent growth rate. By passing the new act for IMC, this council was charged with pricing medical services in the private sector, and subsequently, the cost of inpatient services in the private sector was announced to be seven times that in the public sector. Until 2007, the fees announced by the Medical Council were the criteria for pricing in the private sector. In 2008, a special task force was formed by the President to determine the costs of medical services in both the public and private sectors. Therefore, three pricing systems were implemented in 2008: public sector prices, private sector prices published by the special governmental taskforce, and private sector prices published by the IMC. Determining medical tariffs in the private sector was done by IMC until 2011. After this time, this duty was continued by the MoHME [46].

Until 2014, the tariff imbalance between different services grew over time and became more complicated.

" The continuing imbalance resulted in dissatisfaction among different medical specialties and in some times resulted in reducing the 'quality' of health services or other outcomes in the health system such as induced demand or overuse, prevalence of informal payment, lack of transparency in the revenues and effect on tax system and the country's economy cycle, caused to some health care providers avoid from contract with insurance organizations(Former advisor to the minister of health).

In 2014, the third peak occurred with a 50.3 percent growth rate. In that year, the Health Transformation Plan was implemented by the MoHME, and the handbook of relative values was reviewed and published, leading to the considerable increase of costs in the public sector (e.g., 50-64 percent growth in doctor visit costs, 85 percent growth in inpatient care costs, 120 percent increase in hospitalization costs).

"Therefore, it can be concluded that along with the increase in the costs of medical services, an attempt has been made to subsidize insurance companies to fulfill their commitments, mainly those companies whose revenues do not depend on the salary of the insured[Oct 2016, Gazette No. 326].

During the period after starting the Health Transformation Plan implementation, insurance organizations claimed that they cannot pay reimbursements of health care service provider organizations regularly.[47]

<**Fig 2 about here**>

In September 2015, following the implementation of HTP, the Handbook for Relative Values for Healthcare Services was published. The financial burden to the health system caused by changes in the number of relative value units was 2.2 times the previous published handbook

(2009). In practice, it led to a 120 percent increase in the cost factors of surgery, anesthesia, and internal medicine. **Figure 3** reflects more pronounced fluctuations in the growth rate of health insurance premiums per capita in 2015, as compared to 2009.

As noted earlier, since 1995, by approving MSIA and implementing hospital autonomy policy in Iran, tariffs were set to be revised annually and there was an attempt to align them with the inflation rate [35]. From 1995 to 2018, tariffs increased for all types of services to match the inflation rate (Figure 3). Overall, in public sector, medical services costs had higher annual growth than the inflation (except surgery and para clinical services); however, an average increase in health premiums was higher. In the private sector, medical services costs (except for incentive care beds and para clinical services) were higher than the average increase in health premiums. [48] For public services, the most substantial increase in tariffs was observed for hotel services in hospitals per diem and the lowest increase in tariffs was observed for clinical laboratory services (Figure 3). For private services, the most substantial increase in tariffs was observed for conversion factor and the lowest increase in tariffs was observed for clinical laboratory services.

<**Fig3 about here**>

Actors and stakeholders

-The roles and influences in setting medical tariffs

As described earlier, currently, the tariffs are revised annually and determined jointly by the vice-presidency for strategic planning and supervision of the MoHME and the MCLSW. Once approved by the HCHI and the Council of Ministers, tariffs are ready for implementation. The HCHI acts as a policy-making platform that facilitates the discussions and decisions surrounding key tariff-related issues, including insurance coverage, rate of insurance premium per capita and coinsurance, medical services costs, medical prices and supervision. [30, 49]

According to the research participants: "*One of the major criticism regarding the HCHI is that individual council members, namely physicians, may have direct or indirect conflicts of interest and may affect the decisions made by the Council*"(National policy maker).

The MoHME, HCHI, MCLSW, IMC, and the four basic health insurance organizations are the main actors in determining the tariffs. Most of these actors are governmental organizations.

To describe stakeholders, we identified four main groups, based on power and interest. Table 2 shows 11 main actors categorized by a certain group. Group 1 (high power and highly interested people) - MoHME, the IMC and basic health insurance organizations are the stakeholders that have more power and interest in defining tariffs than most. The MoHME, as the main actor in tariffs setting, should try to fully engage with other actors and make the most considerable efforts to satisfy them. Group 2 (high power and less interested people) – the MCLSW, Parliament Health Commission and the Vice-Presidency for Strategic Planning and Supervision of the MoHME are the stakeholders that MoHME should put enough effort to keep them satisfied, but not so much so that they become exhausted and bored with the messages. Group 3 (low power and highly interested people) - special councils and public/private hospitals are the stakeholders that MoHME should try to adequately inform and engage in discussion not to overlook any issues. Group 4 (low power, less interested people) – 17 supplementary insurance funds and smaller stakeholders whose activity can be monitored but without priority and excessive communication.

<Table 2 about here>

2. **Major shortfalls and drawbacks brought by implementation of medical prices and ways forward**

Analyzing interviews and documents showed significant differences between medical tariffs in public and private sectors, as well as between intra- and inter-disciplinary prices, is an important factor that led to unfavorable outcomes, that are listed below:

-Elite students being propelled toward high-paying medical professions

Imbalance among relative values of medical services tariffs in different medical specialties had an improper influence on the delivery of health services, as well as on a medical education system since there were no prices for medical education activities. Medical specialty residency programs in Iran select their candidates through a high-stake annual national exam, based on multiple-choice questions. Hence, students spend a lot of time and energy to prepare themselves for the exams to get higher marks and enter specialty routes with higher earning potentials. It also resulted in a phenomenal popularity of the specialties that had been favored in the price setting:

"*even among medical science graduates there is a tendency to continue studies in high tariffs medical services or profitable fields, such that health care professionals are warning about the lack of interest in fields such as internal medicine and pediatrics and a greater interest in*

cardiology, ophthalmology, surgery, and radiology". (Health Researcher)

-Development of private sector for medical services and undermining of the public sector

With claims about unrealistic health services expenditure and the increased profit margin of medical services provided by the public sector, physicians are becoming more inclined to operate in the private sector:

"*Moreover, the demand for less expensive services provided by private-sector institutions has increased, while resources, technologies, and management practices in the public sector have remained stagnant with the growth in demand*"(Health insurance staff).

As a result, both patients and employees (physicians and non-physicians) got dissatisfied with the public sector. Subsequently, legislators passed an amendment to Article 32 of the Fifth (2010-2016) and Sixth (2016-2020) five-year Development Plan, which based on this amendment, physicians were prevented from simultaneously working in both public and private sectors (dual practice) [50, 51]. In this amendment, legislators implied that the main reason for the tendency of physicians to leave the public sector or preference to work in a private sector is the financial incentive, but failed to provide practical solutions to incentivize participation in the public sector [52, 53].

-Governance power of actors in setting medical prices

Despite annually revised health care tariffs, there is no systematic costing process for health services, and the pricing system is still suffering from a lack of a transparent and balanced structure that can effectively manage conflicts of interest in decision making related to the medical services prices. Some experts believe that it is necessary to change actors' roles in tariff setting process. "*Unfortunately, during the last years public, non-public, private and semi-private organizations determine tariffs separately for their own side and own benefits. They set tariffs based on individual agreements between their organizations and the insurance organizations or based on statutory authorities that sometimes resulted in unilateral increases in tariffs.*" (MoHME senior officer)

The highest authority in medical price setting (i.e., HCHI) suffers from an inappropriate membership composition. Its membership includes a heterogeneous group including insurance organizations representatives, the MOCLSW, the MoHME and the IMC. It seems that it is a time for the role of the MoHME in the pricing council to be more prominent. "*One of the main critics to the tariff setting system is that in tariffs context, there is no harmony between different decision-makers and groups that have more power have the main role in price setting and get more benefits*". (Health insurance officer)

"*People's expectation from governing actors who set pricies and tariffs is to provide health services while upholding social equity, high quality of medical services and rational prices*". (Medical Council officer).

Analysis of interviewees and documents showed that the organization and governance of medical tariffs setting consists of polymorphous patterns of different philosophies of health governance. Ironically, this ambiguity contributed to making tariff-related decisions regardless of implementation outcomes; for example, through implementing Health Transformation Plan and approving the medical tariffs systems within the MoHME before even ensuring that the main insurance organizations would support such changes. Another example is the transfer of the power of setting medical tariffs for the private sector to the IMC, which occurred in 2004 as part of the Five Year National Development Plan. Within the five years that this legislation was in power, it marked continuous challenges between the IMC and the insurers, rapid increases in the private sector tariffs, and increases in the share of out-of-pocket expenditure

-Medical information systems and setting prices rationally

Despite improvements in the management of medical information systems in the hospitals, they still suffer from structural limitations that prevent detailed assessments of the health services costs. Most of the current information systems are developed based on the current pricing structure; hence, they are inadequate for assessing or modeling alternative approaches to provider payments. "*Determining the actual costs of the health services is an important input for revising and setting medical prices, but the limitations of the records and in the information system has meant that this has remained a challenge in Iran's health care system*". (A physician)

As a result, a provider that brings substantial revenue to the hospital might also produce substantial costs to the hospital because of material or human resources required for them. The latter costs, however, are not well-recorded in the system, and the hospital remains in the dark about the actual costs and benefits of the services. The limitation of the data at the local level reflects the problem at the national level where calculating and updating the relative values remains a challenge as it requires for micro-data to be available, while it is not. This also makes it difficult to compare the actual costs of delivering services in different geographical regions or different settings.

-Native model for pricing health services

Documantry analysis showed that, until now, the Iranian health system does not have a national health services tariff setting framework and evidence-based model. This issue should be addressed, as to achieve Universal Health Coverage, it is necessary to determine the actual price of health services based on scientific methods and new models. According the interviewees determining the actual fiscal value of health services is also necessary to ensure equity in reimbursement of the costs to service providers in contrast to delivery and supply of these services.

"*To balance the medical price market, it is necessary to set regulative (normative) tariffs that reflect the actual costs of service delivery and reliability in the development of health care delivery system, and use appropriate mechanisms of setting health services tariffs. Medical tariffs in public and private sectors need to be the same in order to increase the competition on increasing the quality of health care*"(Advisor to the minister of health).

Study participants also mentioned that periodic review of health care prices and revising them based on some indicators (e.g., health insurance per capita, inflation rate, and increasing index of the total cost of goods) is very important in setting those prices rationally as well.

Discussion:

The study aimed to explore the experience of setting medical tariffs in the Iranian healthcare system over the last half of the century. We discussed mechanisms for setting medical tariffs, its governance in the Iranian health system, and shared-decision making challenges, drawbacks and possible solutions.

Medical prices remain to be an increasingly debated issue in the field of health financing and medical payments in various countries and are one of the most essential tools of policymakers that influence equity, efficiency, quality, responsiveness and accessibility to health services [10]. Medical tariffs setting is a policy intervention in regulation and providers' behavior of the health system. If utilized adequately and with the right support, medical tariffs can have good potential to have an appropriate effect on providers' behavior. Governments can use medical prices or tariffs to achieve their national policy goals and objectives. Through setting a rational tariffs system, governments can provide an appropriate health financing management system.

Medical tariffs that were introduced as a policy tool in Iran became a tool for revenues manipulation in the country. Our findings imply that, unfortunately, during the last decades, Iran's health system was continuously struggling with various problems and does not have a clear policy for the use of medical tariffs as a leverage for policymaking.

Since its creation in 1972, the HSMI in Iran has paid health care providers using FFS. Inappropriate medical tariffs setting and FFS payments led to higher volume and intensity of medical cares (increasing induced demand and providing unnecessary services), increasing health services costs, increasing out-of-pocket and households catastrophic payment, receiving under the table payments and reducing patients' satisfaction in Iranian health care system during the last decades [43, 53-55].

The process of setting tariffs annually has created a vicious circle. According to the UHSI Act, the cost of medical services should be determined by considering the insurers' ability to pay or the annual premium rate, which it is determined based on the payment capacity of the insured. Thus, people's ability to pay is the most important constraint in determining the costs of medical services, which affects the tariffs of services based on the total costs of providing them. In the public sector, the difference in price rates is compensated through government subsidies, but in the private sector, this difference must be paid by individuals.

Anarchy in medical tariffs system and the Garbage Can model

The 'garbage can' [56] policy analysis model outline the major shortfalls and drawbacks brought by overall process of implementation of changes to medical tariffs and describe main underlying causes.

'Garbage can' model views decision as outcomes for four interdependent streams (problems, solutions, participants, and choice opportunities) within the sector [56, 57]. Such a model assumes that policies are shaped and developed in an idiosyncratic way. It suggests that interventions that have been formally abandoned might survive in the system, solutions that have never been adopted may appear as legitimate policy options, and the policy options that were mean to be used in the system may disappear without attention of the decision-makers. The model, however, does not assume that no formal system exists; it rather suggests that these formal systems may behave chaotically alongside the informal arrangements. Such model presents policy-making as an untidy process rather than a neat series of phases.

The 'garbage can' perspective can be useful when investigating the role of health system governance over time in setting and implementing tariffs in Iran. Some of the known characteristics of the Iranian health system are: a lack of a distinct stewardship mechanism in the tariff

system, continuous disagreements among the stakeholders, lack of a transparent approach for the management of the conflicts of interests, a high turnover of organizational settings and their technical staff, and more importantly a lack of an objective and explicit mechanism for establishing and updating medical tariffs all may have played their role [47, 58, 59]. Until now, the Iranian health system in the policy-making context does not have a unified and specific approach in policy regarding setting tariffs [47]. The existence of multiple organizations for decision-making has caused multiplicity in setting tariffs.

It has been argued that the political ideologies might also play a role in forming a 'garbage can' via pushing a topic to fore to demonstrate political dissatisfaction with the policymaking process [60]. While this might have played a role in Iran, especially after a period of presidential and parliamentary elections that resulted in different parties obtaining political power, we did not find clear evidence of such influence. Instead, we found that influential clinicians and clinical groups were pressuring politicians and policymakers to ensure the changes in the medical tariff system did not reduce their peers' potential income. Tariff-based pricing of health services (initially based on the California handbook) was a good starting point in the Iranian health care financing. However, improper adaptation of the tariffs, manipulating and involving some intentional changes in the relative values of healthcare services, caused moving tariff values away from the actual fiscal values of the health services. During the last years, irrational medical tariffs have caused some health professionals requesting informal patients payments or attempts to get high revenues [61, 62]. In November 2014, following the implementation of Health Transformation Plan by the MoHME, yet another tariff revision started in order to rationalize the prices of health care services and decrease or remove unethical activities like informal or under the table payments. Although this policy intervention was deemed a success, mainly because it achieved increasing access to health care services, extending health insurance coverage, increasing government spending on health, it did not achieve certain goals, such as decreasing out-of-pocket payments and making medical tariffs rational.

Payment mechanisims and financing system and pricing medical services

The tariff system requires constant updating in response to new changes and innovations. As there are thousands of tariff codes, implementation is a complex process and calculation of the adequate payment rates is challenging. Such systems are also difficult to monitor and, hence, can become subject to abuse and fraud [63]. Also, if they are used in conjunction with the FFS payments, all negative characteristics of FFS payment method need to be controlled [64]. On the positive side, because of linking service delivery to payments, such systems can generate data that can be used for assessment of a health system's micro performance at the facility level and potentially by individual providers.

All the challenges in health care system contribute to decision making based on individual, group or institutional interests and the dominance of bargaining power and non-technical views in the process of policymaking [40]. Regarding the unresolved issues in the medical tariffs setting system in the Iranian health care system, it can be argued that the current situation has rooted in a lack of accountability and transparency in decisions made in the medical tariffs system. Although there seem to be equity and quality concerns over the continuation of the current system that has developed in more than four decades, the challenges in the Iranian health system context does not allow establishing appropriate payment mechanisms and financing in the health care system.

The findings of this study suggest that major problems in the Iranian health system are due to flawed medical services tariff setting systems, which in turn are caused by underlying factors such as lack of transparency, conflicts of interest, incorrect pricing of medical services, and the complex nature of the health care system.

Therefore, due to the inelasticity of medical services costs and the pressure on consumers to pay the medical services costs, insurance coverage must be expanded in such a way as to reduce the household expenditures and to cut the direct payment line between patients and healthcare providers. The common ground in most studies is highlighting the vital role of prices in the balanced functioning of the healthcare market[3, 65].

The appropriate function of the medical pricing system or the tariffs system has a useful role in the success of other policy interventions such as health care providers' payments and financing in the healthcare system. Paying to health care providers based on the FFS is one of the other challenges that need to be considered. In Korea, implementing supply-side incentive systems such as Resource-Based Relative Value (RBRV) [66] and DRG-based payment showed different effects. In this country, the DRG-based prospective payment system has proven to have positive effects in the health system, including being effective in containing cost with a little adverse effect on quality, although, there is little evidence of a negative impact on patient outcomes in the US [67, 68]. Implementing RBRV-based payment in Korea in 2001 failed to neutralize the tendency toward overprovision under the FFS payment [69]. In the US, introducing a prospective payment system for hospitals led to delineating general admissions, falling average lengths of stay, as well as declining quality of health service or health outcomes [70]. China and Taiwan have also moved toward mixed payment systems aiming to provide equal access to healthcare, ensuring quality and efficiency, and controlling healthcare expenditure [70].

Out findings suggest the need for the payment system reform in Iran by evaluating distortions such as length of stay, use of health care facilities and services, and overall health care costs in different levels of the health system that the FFS reimbursement has induced. It seems to transition from FFS reimbursement to the DRG-based prospective payment system for inpatient care or other prospective payment systems should be a priority of health policymakers in Iran. Establishing any forms of provider payment requires robust administrative and appropriate services delivery infrastructure.

Tariffs setting based on an optimal payment system that involves mixed levels of both demand-side and supply-side cost-sharing is the main step in rationalizing health services. It is widely believed that financial incentives of health care providers affect their care delivery behavior and efficiency of health care [71-73], so any change in the medical tariffs should be determined using evidence-based and transparent criteria, imposed by fair pricing laws to ensure providers are given the right motivations and incentives for effective delivery of services [71]. Also in setting tariffs, the input costs of the services (including physical standards and expertise), the complexity of the services and the time required, risk of adverse outcomes, long term follow up requirements, geographical location and setting of care are among other factors that should be considered [74].

Using healthcare tariffs for financing healthcare is an important policy decision. It has a vast influence on behaviors of health providers and users of health services and it may determine the accessibility, service coverage, and equity and efficacy objectives (36). Although tariffs are one of the ways for financing, it should not be the primary means of financing, and should not be applied uniformly; else, the wealthy will benefit and the poor will suffer (24).

Based on Health Transformation Plan, specialist medical prices increased significantly. It needs to be considered that even a significant increase in funding in a health system will not be enough unless a country has an appropriate organization and infrastructure for the effective use of all types of resources[75].

Failing to observe a trade-off between the fee-changes and efficiency gains in health care may be surprising. Our results generally imply that providers alter their care behaviors in response to medical price changes in ways that can have an impact on patient outcomes[72].

Limitations And Strengths:

In the process of data collection, access to some documents was not possible for researchers. For example, the provisions of approved directives and circulars relative to the medical tariffs before 1995 are not in access or reliable. As such, we could not identify the exact separation time of medical tariffs, such as costs of hospitalization (hoteling costs) or medical laboratory and medical imaging services for both the public and private sectors. We could not zoom our study into the micro-level and explore or focus in great detail on changes in volumes/shares of finances and how it affected interconnected elements of the health system. In this study, we did not use dynamic modeling. However, we managed to complement our findings from literature with face to face interviews that reflected micro-level views.

To our knowledge, this is the first study on medical tariffs setting that comprehensively explored the historical trend of medical tariffs setting, the influential factors, challenges, causes, and solutions. More studies are needed and we recommend proper before and after policy evaluation and ongoing monitoring of any reforms.

Conclusion:

Setting fair and justified prices for health care services is a complex task given interconnectedness and complexity of major stakeholders' relationships, cultural aspects, and the legacy of laws. More definite plans and strategy, stricter division of the roles in power matrix, with delineating roles and funding streams, revision of the insurance plans are needed to have a productive way forward.

Medical tariffs policy in Iran has substantially changed over the last half of a decade and consequentially has had a substantial impact on most critical functions of the health system, including health care providers' behavior, payments, organization, regulation, and financing. To help informing the policy debate, this paper profiled experiences (challenges, causes and solutions) of the Iranian health care system on the setting tariffs of health care services. Evidence should be used for any efforts to rectify the medical tariffs system in Iran.

Many of the challenges and problems in setting medical tariffs relate to political governance, power and surveillance, structural organization of medical tariff system, methods, and principles of setting tariffs, medical costs recording systems and conflict of interest in the medical tariff system. To improve medical tariffs system in the country, one needs to have a deep understanding of the current challenges and potential solutions at different levels of the health system. Overall, the creation of national tariffs setting framework and application of scientific methodology and methods to the decision analysis in setting medical tariffs is necessary to ensure improvement in health sector performance.

Declarations

Acknowledgements

We acknowledge helpful discussions with experts over the two years this paper has been in preparation. The authors would also thank all interviewees who participated in this reseach.

Availability of supporting data

All data are available from the corresponding author on reasonable request.

Authors' contributions

LD conceived the study, participated in data collection and data analysis, as well as preparation of the manuscript. AR contributed to the development of data collection, carried out data analysis, and contributed to the writing the manuscript. FK carried out part of data collection and data analysis, and contributed to the writing of the manuscript. VSG participated in writing and several editing of the manuscript and analysing some parts of data. All authors read and approved the final manuscript.

Funding

There is no funding source for this study.

Ethics approva l and consent to participate

The study was approved by the ethics committee of Tehran University of Medical Sciences, Tehran, Iran(Approval No: B 32688 IR). Additional permissions and written consent were also acquired from the research participants prior to each interview. We assured participants that all collected information would be treated confidentially.

Consent for publication

All authors consent for publication of this study.

Competing interests

The authors declare that they do not have any conflict of interest.

References

1. McLean, T.R., *Using the market to regulate health care price: why heart hospitals will have a competitive advantage in the world of post-diagnostic related group pricing.* Am Heart Hosp J, 2004. **2**(3): p. 165-9.
2. Sweeney, R.E. and S.P. Franklin, *Pricing health care services: applications to the health maintenance organization.* Health Mark Q, 1986. **4**(1): p. 47-64.
3. Waters, H.R. and P. Hussey, *Pricing health services for purchasers—a review of methods and experiences.* Health Policy, 2004. **70**(2): p. 175-184.
4. Sun, X., et al., *Measurement and analysis of equity in health: a case study conducted in Zhejiang Province, China.* Int J Equity Health, 2018. **17**(1): p. 36.
5. Kumar, A., et al., *Pricing and competition in Specialist Medical Services.* 2014.
6. Getzen, T.E., *Medical care price indexes: theory, construction & empirical analysis of the US series 1927-1990.* Adv Health Econ Health Serv Res, 1992. **13**: p. 83-128.
7. Barber, S.L., L. Lorenzoni, and P. Ong, *Institutions for health care price setting and regulation: A comparative review of eight settings.* Int J Health Plann Manage, 2019.
8. Zuckerman, S., *Reconsidering geographic adjustments to Medicare physician fees.* 2004.
9. Dowd, B., et al., *Setting physicians' prices in FFS medicare: an economic perspective.* Health Care Financ Rev, 2006. **28**(2): p. 97-111.
10. Russo, G. and B. McPake, *Medicine prices in urban Mozambique: a public health and economic study of pharmaceutical markets and price determinants in low-income settings.* Health Policy Plan, 2010. **25**(1): p. 70-84.
11. Kutzin, J. and W.H. Organization, *Experience with organizational and financing reform of the health sector.* 1995, Geneva: World Health Organization.

12. Bitran, R. and W.C. Yip, *A review of health care provider payment reform in selected countries in Asia and Latin America.* 1998.
13. Jegers, M., et al., *A typology for provider payment systems in health care.* Health policy, 2002. **60**(3): p. 255-273.
14. Langenbrunner, J.C. and M.M. Wiley, *Hospital payment mechanisms: theory and practice in transition countries.* Hospitals in a changing Europe, 2002: p. 150.
15. Barnum, H., J. Kutzin, and H. Saxenian, *Incentives and provider payment methods.* The International journal of health planning and management, 1995. **10**(1): p. 23-45.
16. Imai, Y., *Health care reform in Japan.* 2002.
17. Organization, W.H., *OECD Reviews of Health Systems OECD Reviews of Health Systems: Switzerland 2006*. Vol. 2006. 2006: OECD Publishing.
18. Fattore, G. and A. Torbica, *Inpatient reimbursement system in Italy: How do tariffs relate to costs?* Health Care Management Science, 2006. **9**(3): p. 251-258.
19. Mason, A., P. Ward, and A. Street, *England: the healthcare resource group system.* Diagnosis-related groups in Europe—moving towards transparency, efficiency and quality in hospitals, 2011. **24**.
20. Hsiao, W.C., et al., *Resource-based relative values. An overview.* Jama, 1988. **260**(16): p. 2347-53.
21. Hsiao, W.C., et al., *Resource-based relative values: an overview.* JaMa, 1988. **260**(16): p. 2347-2353.
22. Hsiao, W.C., et al., *An overview of the development and refinement of the Resource-Based Relative Value Scale: the foundation for reform of US physician payment.* Medical Care, 1992: p. NS1-NS12.
23. Trombert-Paviot, B., et al., *The development of CCAM: the new French coding system of clinical procedures.* HIM J, 2003. **31**(1): p. 1-11.
24. Westhovens, R., et al., *Healthcare consumption and direct costs of rheumatoid arthritis in Belgium.* Clinical rheumatology, 2005. **24**(6): p. 615-619.
25. Hasanzadeh A and F.A. S., *Setting Medical Tariffs in Iran: A review* Social Security, 2000. **8**(28).
26. Davari, M., A. Haycox, and T. Walley, *Health care financing in iran; is privatization a good solution?* Iranian journal of public health, 2012. **41**(7): p. 14.
27. Ministry of Health and Medical Education. Budjet and Financing Office. Tehran, I.
28. Zare, H., *Health Care Systems around the World.* Tehran: Medical Services Insurance Organization, 2005.
29. Nekoeimoghadam, M., et al., *Informal payments in healthcare: a case study of Kerman province in Iran.* International journal of health policy and management, 2013. **1**(2): p. 157.
30. Davari, M., A. Haycox, and T. Walley, *The Iranian health insurance system; past experiences, present challenges and future strategies.* Iranian journal of public health, 2012. **41**(9): p. 1.
31. Zare, H., et al., *Health inequalities and development plans in Iran; an analysis of the past three decades (1984–2010).* International journal for equity in health, 2014. **13**(1): p. 42.
32. Bazyar, M., et al., *Combining health insurance funds in a fragmented context: what kind of challenges should be considered?* BMC Health Serv Res, 2020. **20**(1): p. 26.
33. Bazyar, M., et al., *Policy options to reduce fragmentation in the pooling of health insurance funds in Iran.* International journal of health policy and management, 2016. **5**(4): p. 253.
34. Jahangir, M., *Provision and Regulations of Social security and Welfare.* Tehran: Dowran Publication, 2006.
35. Doshmangir, L., et al., *Fail to prepare and you can prepare to fail: the experience of financing path changes in teaching hospitals in Iran.* BMC Health Serv Res, 2016. **16**: p. 138.
36. Organization, W.H., *Health system profile, Islamic Republic of Iran.* Regional health systems observatory, WHO eastern Mediterranean regional office, 2006.
37. Ibrahimipour, H., et al., *A qualitative study of the difficulties in reaching sustainable universal health insurance coverage in Iran.* Health policy and planning, 2011. **26**(6): p. 485-495.
38. Maher, A., M. Bahadori, and R. Ravangard, *The Integration of Health Insurance Funds as a Reform Approach in Iran.* Shiraz E-Medical Journal, 2017. **18**(2).
39. Daneshkohan, A., et al., *Household catastrophic health expenditure.* Iranian journal of public health, 2011. **40**(1): p. 94.
40. Buse, K., N. Mays, and G. Walt, *Making health policy*. 2012: McGraw-Hill Education (UK).
41. Mendelow, A.L. *Environmental Scanning-The Impact of the Stakeholder Concept*. in *ICIS*. 1981.
42. Doshmangir, L., et al., *Effect of proposed changes of relative values of different specialists medical tariffs on payment weight of specialties and health system costs.* 2011.

43. Doshmangir, L., et al., *Opening the Black Box: The Experiences and Lessons From the Public Hospitals Autonomy Policy in Iran.* Arch Iran Med, 2015. **18**(7): p. 416-24.
44. Mehrdad, R., *Health system in Iran.* JMAJ, 2009. **52**(1): p. 69-73.
45. Iranian Parliament (Majles-e Shoraye Eslami) Fourth Social, E.a.C.N.D.P.-I.T.I.P.M.R.C., Iranian Parliament (Majles-e Shoraye Eslami); 2004.
46. Parliament, I., *The Regulations of Fourth Development Plan.* Tehran, Iran: Iranian Parliament. Avalable from: www. parliran. ir, 2004.
47. Doshmangir, L., et al., *So Near, So Far: Four Decades of Health Policy Reforms in Iran, Achievements and Challenges.* Arch Iran Med, 2019. **22**(10): p. 592-605.
48. Rasidian, A. and L. Doshmangir, *Substitution of 'California'book, the First Clinical and Diagnosis Tariff Reference book in Iran: Expert's View Points.* Medicine and cultivation Research Journal, 2013. **22**(3): p. 59-78.
49. Heydari, M., et al., *Stakeholder analysis of Iran's health insurance system.* Journal of Education and Health Promotion, 2018. **7**.
50. Bayat, M., et al., *Extent and nature of dual practice engagement among Iran medical specialists.* Hum Resour Health, 2018. **16**(1): p. 61.
51. Bazyar, M., et al., *Prohibiting physicians' dual practice in Iran: Policy options for implementation.* Int J Health Plann Manage, 2018.
52. Bayat, M., et al., *Factors influencing medical specialists' dual practice in the Islamic Republic of Iran.* East Mediterr Health J, 2018. **24**(9): p. 877-887.
53. Palesh, M., et al., *"We noticed that suddenly the country has become full of MRI". Policy makers' views on diffusion and use of health technologies in Iran.* Health Res Policy Syst, 2010. **8**: p. 9.
54. Khorasani, E., et al., *Views of health system experts on macro factors of induced demand.* International journal of preventive medicine, 2014. **5**(10): p. 1286.
55. Doshmangir, L., et al., *The experience of implementing the board of trustees' policy in teaching hospitals in Iran: an example of health system decentralization.* Int J Health Policy Manag, 2015. **4**(4): p. 207-16.
56. Cohen, M.D., J.G. March, and J.P. Olsen, *A garbage can model of organizational choice.* Administrative science quarterly, 1972. **17**(1): p. 1-25.
57. Mucciaroni, G., *The garbage can model & the study of policy making: A critique.* Polity, 1992. **24**(3): p. 459-482.
58. Nazari, A., et al., *Interaction between stewardship and social health insurances: A comparative and document analysis.* Med J Islam Repub Iran, 2018. **32**: p. 77.
59. Ghoddoosi-Nejad, D., et al., *Stewardship as a Fundamental Challenge in Strategic Purchasing of Health Services: A Case Study of Iran.* Value Health Reg Issues, 2019. **18**: p. 54-58.
60. Howlett, M., A. McConnell, and A. Perl, *Streams and stages: R econciling K ingdon and policy process theory.* European Journal of Political Research, 2015. **54**(3): p. 419-434.
61. Parsa, M., et al., *Informal payments for health care in Iran: results of a qualitative study.* Iranian journal of public health, 2015. **44**(1): p. 79.
62. Zarei, E., et al., *Informal Payments for Inpatient Services and Related Factors: A Cross-Sectional Study in Tehran, Iran.* Health Scope, 2018(In Press).
63. Gilson, L., et al., *The SAZA study: implementing health financing reform in South Africa and Zambia.* Health Policy and Planning, 2003. **18**(1): p. 31.
64. Jegers, M., et al., *A typology for provider payment systems in health care.* Health Policy, 2002. **60**(3): p. 255-73.
65. Barber, S.L., L. Lorenzoni, and P. Ong, *Price setting and price regulation in health care: lessons for advancing universal health coverage*. 2019, World Health Organization.
66. Maloney, J.V., *A critical analysis of the resource-based relative value scale.* Jama, 1991. **266**(24): p. 3453-3458.
67. Rogers, W.H., et al., *Quality of care before and after implementation of the DRG-based prospective payment system: a summary of effects.* Jama, 1990. **264**(15): p. 1989-1994.
68. Coulam, R.F. and G.L. Gaumer, *Medicare's prospective payment system: a critical appraisal.* Health Care Financing Review, 1992. **1991**(Suppl): p. 45.
69. Kwon, S., *Payment system reform for health care providers in Korea.* Health Policy Plan, 2003. **18**(1): p. 84-92.
70. Eggleston, K. and C.R. Hsieh, *Healthcare payment incentives: a comparative analysis of reforms in Taiwan, South Korea and China.* Appl Health Econ Health Policy, 2004. **3**(1): p. 47-56.
71. Batty, M. and B. Ippolito, *Financial incentives, hospital care, and health outcomes: Evidence from fair pricing laws.* American Economic Journal: Economic Policy, 2017. **9**(2): p. 28-56.
72. Clemens, J. and J.D. Gottlieb, *Do physicians' financial incentives affect medical treatment and patient health?* American Economic Review, 2014. **104**(4): p. 1320-49.

73. Mikkola, H., *Hospital pricing reform in the public health care system–an empirical case study from Finland.* Int J Health Care Finance Econ, 2003. **3**(4): p. 267-86.
74. Dowd, B., et al., *Setting physicians' prices in FFS Medicare: an economic perspective.* Health care financing review, 2006. **28**(2): p. 97.
75. Doshmangir, L., et al., *Health financing consequences of implementing health transformation plan in Iran: achievements and challenges.* International journal of health policy and management, 2019. **8**(6): p. 384.

Tables

Table 1: Key milestones in the establishment of the national tariff payment system (1972-1995)

Period	Milestone	Provider reimbursement	Controlled by
<1972	1956: IMC created	Public: a line-item budget	Ministry of Work and Social Services
1972-1981	1972: first list of the tariffs	Public: a line item budget + tariffs-based reimbursement// Private: not clear	Ministry of Work and Social Services; SSO
1982-1985	1982: K-tariffs	idem + partially implemented new same tariffs for Private and public	Ministry of Work and Social Services; SSO
1985-1990	1985: MoHME created	idem + Introduced additional methods of reimbursement: K-tariffs + FFS + salary +capitation + bonus	MoHME
1990-1994	1990: UMSI introduced	idem, but the tariff is the primary method of reimbursement and shift towards evidence-based tariff setting	MoHME, IMC
1995	1995: UMIO created	idem, tariffs are now revised annually based on total costs that is included. Return on invested capital and depreciation	MoHME

Table 2: Role of stakeholders in the policy process of setting medical tariffs

	Actor	Role in setting medical tariffs	Activity Level	Activity Area	Position	Power	Influence	Agenda setting	Formulation	Implementation	Monitoring & Evaluation	Group N
Governance side	Parliament Health Commission	Approving macro policies such as five-year development plan and approving the basic health insurance yearly budgets for policy implementation.	National	Governmental	-	High	-	+	+	+	+	2
	Planning and budgetary organization	Approving proposed medical tariff revision and proposing to government, approving budget proposed by insurance organization, MoHME, and MCLSW.	National	Governmental	+	High	Moderate	++	+	+	+	2
	MoHME	Proposing policy of relative value revision and providing its implementation infrastructure.	National	Governmental	+++	Very high	High	+++	+++	+++	++	1
	MCLSW	Head of Insurance High Council and responsible for holding meetings and making related decisions.	National	Governmental	+	High	High	++	++	++	+	2
	Medical Council organization	Member of Insurance High Council, attendance in the meeting.	National	Non-Governmental	+++	Very high	Very high	+++	+++	+++	+	3
Supply Side (Health care Providers)	Private hospitals and clinics/para clinic	Health care provider and implementing and executing new tariff book.	Regional/local	Private	++	Moderate	Very high	+	+	++	+	3
	Public hospitals and clinics/ para clinic	Health care provider and implementing and executing new tariff book.	Regional/local	Governmental	++	Moderate	Very high	+	+	++	+	3
	Special Councils	Health care provider and implementing	National/provincial	Governmental	+++	Moderate	High	+++	+++	++	+	3

		and executing new tariff book.										
Demand Side (Health care purchasers or health care giver)	Basic Insurance organizations	Member of Insurance High Council, attendance in meetings and executer of tariff book.	National/provincial	Governmental	+	Very high	—	++	++	++	++	1
	Private/ supplementary insurance organizations	Member of the secretariat of Insurance High Council, attending in meeting and executer of tariffs.	National/provincial	Governmental	-	Moderate	–	+	+	++	+	4
	People/insured people	Health care givers and paying health care expenditures.	Regional/local	-	-	Low	—	–	-	-	+	4

Note: MoHME: Ministry of Health& Medical Education; MCLSW: Ministry of Cooperatives, Labor, and Social Welfare. + implies the participation role of the related organization in various stages of medical tariff setting

Figures

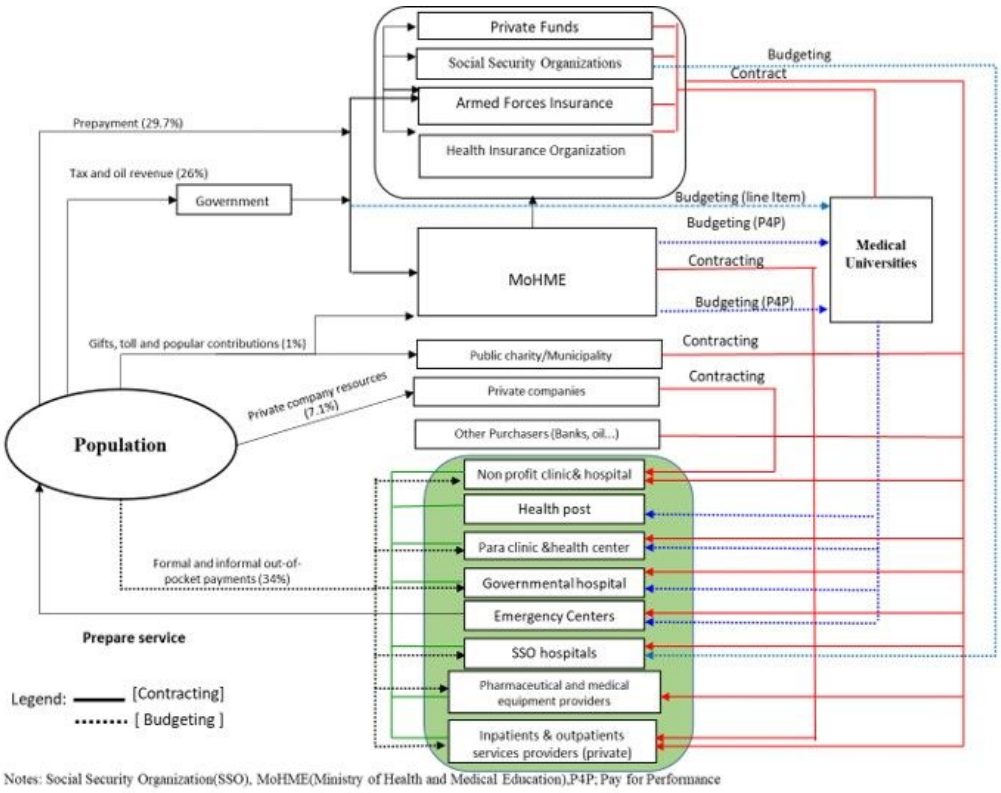
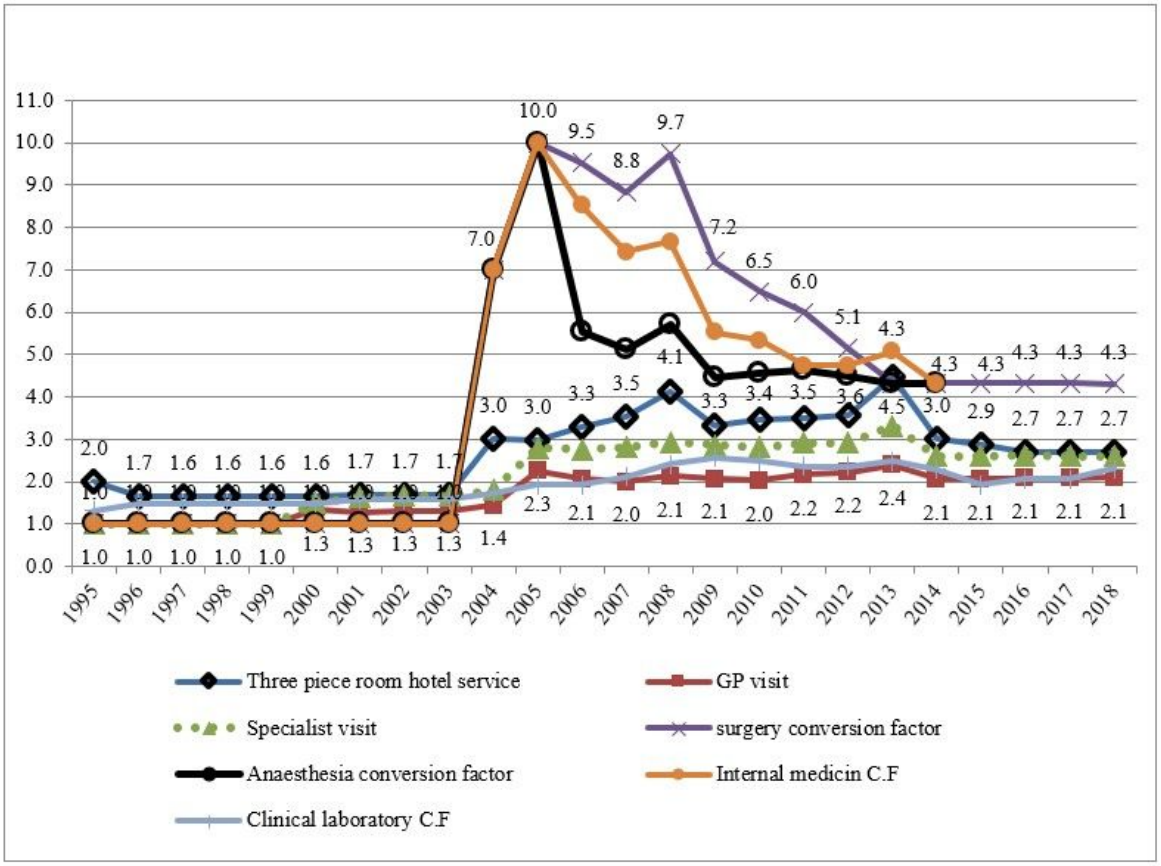


Figure 1

Financial streams within the Iranian healthcare sector

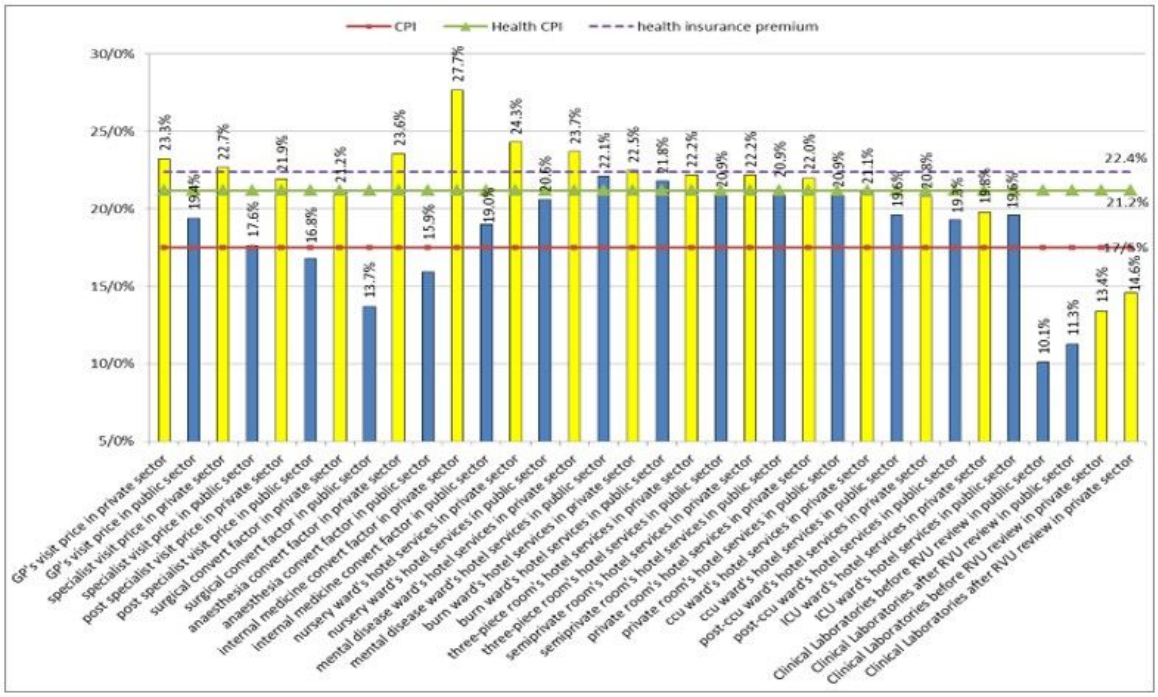


Notes: C.F – Conversion Factor; GP –general practitioner

Figure 2

The trend of the ratio of private tariffs to the public since the year 1995 till 2018

Figure 3: Growth rate of medical tariffs (1995 til 2018)



Note: yellow - public health care services and blue - private health care services

Figure 3

Growth rate of medical tariffs (1995 til 2018)

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- ISSMCOREQChecklist.pdf