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Orginal Article

Out-of-Pocket Payments in Iran Before and After the Health Transformation Plan: A Systematic Review and Meta-analysis

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Abstract

Background: Out-of-pocket (OOP) payments are among the least efficient and simplest methods of financing healthcare which prevent access to health services. In response to these challenges, reforms were made to enhance efficiency, equity, and effectiveness while reducing OOP payments. Accordingly, this systematic review and meta-analysis was conducted to analyze OOP expenditures before and after the implementation of the Health Transformation Plan (HTP) in Iran.

Methods: Relevant data were collected using specific keywords, including "Health system", "Health Transformation Plan", "Out-of-Pocket Payment", and "Iran". A comprehensive search was conducted across multiple databases, including PubMed, Scopus, SID, Google Scholar, IranMedex, and Medline. Persian and English articles were extracted and screened according to the STROBE checklist and PRISMA protocol as well as the inclusion and exclusion criteria, focusing on studies published from May 2014 to May 2021. The studies selected for meta-analysis were analyzed using Stata 13 software.

Results: A total of 758 records were identified across all databases, of which 38 were duplicates. Quality assessment led to the inclusion of 6 articles eligible for systematic review, 3 of which were included in synthesis and meta-analysis. Findings showed that OOP was 19.33% before the HTP and 6.54% post-implementation, indicating a significant reduction in OOP expenditure due to the HTP.

Conclusion: The results suggested that OOP payments in Iran were high before the HTP and decreased following its implementation. As the plan was shown to reduce the economic burden on individuals, it is recommended that policymakers continue to support the initiatives in the HTP to prevent imposing substantial costs on the population.

Keywords: Health system, Health transformation plan, Out-of-pocket payments, Iran

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Introduction

Health is one of the most fundamental blessings, desires, and needs of humanity. Every individual inherently possesses the right to enjoy health in its comprehensive sense – not merely as the absence of disease. Fulfilling this right is a crucial responsibility of health systems, which must provide the necessary resources to ensure the health of the community, as derived from their sponsorship obligations (1).

Health systems have four main functions including sponsorship, resource production, service delivery, and financing. The principal methods of healthcare financing include: 1. Government funding (taxes), 2. Social insurance, 3. Private health insurance, and 4. Out-of-pocket (OOP) payments. If governments fail to finance medical care, the financial burden often falls on people, compelling them to cover medical expenses out of their pockets (2,3).

OOP mainly includes formal or direct payments registered in hospital bills, unofficial unregistered payments, and costs incurred for goods purchased by patients (4-6). OOP is the most common and important method of financing the health system in Asian and developing countries (7). OOP is considered one of the simplest yet least efficient methods of financing in the health system. As the main method of financing, OOP has endangered the health of citizens in addition to creating problems such as lack of physical access to services and unfair distribution of facilities and resources (8). It is also a method by which the rich and the poor pay equally (9), which may increase the costs of healthcare enormously (10).

In Iran, individuals encounter high OOP expenses when seeking medical services, leading to disparities among different socio-economic groups. Therefore, the health system should design and reform payment procedures to

reduce such inequalities (11). One of the most important and strategic issues considered by all governments around the world is health system reform. It is noteworthy that health system reforms were proposed to increase efficiency, equity, and effectiveness in the health sector (12). Various countries, including the United States, are planning reforms to improve access to affordable healthcare. The UK Health and Social Care Act of 2012, for example, introduced structural reforms that changed the responsibility for the day-to-day implementation of the National Health Service (NHS) (13). Similarly, in Iran, the Health Transformation Plan (HTP) was initiated in 2014 to reduce OOP expenses and achieve universal health coverage (14).

The design of health systems greatly affects the population's access to healthcare and, consequently, their overall health status. It is estimated that globally, about 150 million people are affected by catastrophic health expenditures each year due to healthcare payments, and approximately 100 million people are impoverished as a result of OOP payments (15). Around five million people in Bangladesh, 32 million in China, and 37 million in India live below the poverty line due to OOP expenditures. Thus, countries and health systems should reform their structures to minimize OOP payments, ensuring that patients are not confronted with huge costs. Through such reforms, governments and health systems can contribute to preventing households from falling below the poverty line (16). Accordingly, this study aimed to examine OOP payments before and after the implementation of the HTP in Iran in 2021.

Materials and Methods

Search strategy

This systematic review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines (17) in 2021. Articles were retrieved by systematically searching for published papers and scientific texts related to OOP expenses before and after the HTP from May 2014 to May 2021. The search included international databases such as PubMed, Google Scholar, and Scopus, as well as Iranian databases like IranMedex, SID, and Resource Finder. A manual search was also conducted to identify additional relevant studies. This search process yielded three relevant articles. The search in English-language databases used MeSH terms such as "Iran", "Health Transformation Plan", and "out-of-pocket" combined using "OR" and "AND" operators. An example of a search strategy in PubMed is as follows:

(((Health transformation plan [Title / Abstract]) OR ("health reform" [Title / Abstract])) AND ((((((cost [Title / Abstract]) OR (funds [Title / Abstract])) OR (financial [Title / Abstract])) OR (OOP [Title / Abstract])) OR ("out of pocket" [Title / Abstract]))) AND (((((Iran) OR (IR)) OR ("IR Iran ")) OR (" Islamic republic of Iran "[Title / Abstract]))

Inclusion and exclusion criteria

Original research papers on OOP expenditures before and after the HTP in Iran, with available full text, as well as studies focusing on a specific disease or even discussing OPP in general were included in the study. Letters to the editor, review articles, conference presentations, reports, and papers published in Persian for which the full text was not available were excluded.

Quality assessment and data extraction

Six articles were selected for the systematic review. The quality of the articles was assessed using the STROBE checklist for economic assessments, with a scoring range from 0 to 12. Each article was assigned a quality score based on the responses to checklist items, as "yes", "no", and "can't tell", with those scoring 50% or higher being included in the study. This study was conducted based on a specific framework, and only the articles fitting within the framework were selected and summarized in Table 1. Finally, three articles were selected for meta-analysis as illustrated in Figure 1.

Data were independently extracted by two reviewers using a standardized extraction form. The collected data included sample size, OOP expenses before HTP (%), OOP expenses after HTP (%), and the level and type of hospital. Any discrepancies between reviewers were resolved through discussion or by consulting a third reviewer. Disagreements at any stage were addressed through dialogue or referral to the third author (R. G.). The initial review of articles was conducted by examining titles and abstracts, using a pre-designed data extraction form after removing duplicates. Some articles were also excluded in this phase. The full texts of the remaining articles were then analyzed according to the inclusion and exclusion criteria, and reasons for exclusion were documented. After removing duplicates, two researchers (S. N. and M. E.) screened the titles and abstracts of the remaining articles separately using a screening tool. Disagreements raised in all the above phases were resolved through discussion or by consulting a third party (R. G.).

Data were extracted using a data extraction form that was manually designed in Microsoft Excel and later imported into Stata 13 software. The extracted data included the study author, year, mean and standard deviation of OOP expenses before the HTP, mean and standard deviation of OOP expenses after the HTP, and location of the study.

Synthesis of evidence

The results were reported using a forest plot. The heterogeneity of the studies was assessed using the I^2 index, with values below 0.50 indicating homogeneity and values above 0.50 showing heterogeneity. A fixed-effects model was employed in cases of homogeneity, while a random-

Table 1. The characteristics of the included studies

Author/ year	City/ region	Sample size	OOP payments before HTP (%)	OOP payments after HTP (%)	OOP payments decreased (%)	Statistical analysis	Key findings	Type of study	Analysis tools	Level	Type of hospital	Quality score
Maharlou et al, 2016 (18)	Shiraz, Iran	601 CABG (coronary artery bypass graft) patients	20.2	5.86	14.34	Mann-Whitney U test	1- Decrease in OOP payments (10649295 IRR to 6971268 IRR) 2- Increase in basic insurance coverage	Applied and descriptive-analytical	Data were recorded in statistical checklists and then entered into Excel for statistical analysis. Data analysis was performed using SPSS	NA	-	6
Hessam et al, 2017 (1)	Hashtrood, Miane, Iran	1351 inpatients	NA	-30.16		Mann-Whitney U test	The overall direct costs paid by inpatients decreased from 704286 Rials to 491815 Rials	Analytical-descriptive	SPSS-19 software Mann-Whitney U test	NA	-	8
Heydarin et al, 2015 (12)	Isfahan, Iran	Data from 5 hospitals	NA		17.43	*t* tests, ANOVA, Goodness-of-fit indices, Normality test	The average OOP payment was reduced by 17.43% when adjusted for inflation, with a mean of 18.2 and a standard deviation of 82.1	Evaluation of Healthcare Costs	SPSS software Kolmogorov-Smirnov test	NA	-	7
Abdi et al, 2020 (15)	Iran	9543 households	NA	NA	2.5	*t* tests, Population headcount ratios	OOP payments decreased by 2.5% in real terms in 2015 compared to 2014. The share of the population facing catastrophic health expenditure decreased from 2.9% to 2.1%	Descriptive analysis	Data source: Household Expenditure and Income Survey (2014 and 2015) Key indicators: Financial protection in health expenditure Index used: Kakwani index for measuring OOP health expenditure	National	-	6
Abdi et al, 2020 (15)	Iran		NA	0.9						Urban	-	6
Abdi et al, 2020 (15)	Iran		NA	-19.5						Rural	-	6
Zargar Balaye Jame et al, 2019 (7)	Shiraz, Iran	316 patients	17.78	7.46	10.32	T-tests, one-way ANOVA	Despite the increase in total costs, the percentage of patients' financial contribution to these costs decreased significantly from 17.78% to 7.46%	Descriptive-analytic	Checklist SPSS-23	Urban	-	9
Piroozi et al, 2017 (19)	Kurdistan, Iran	265	30.5	6.5	24	Fisher's exact test, logistic regression, independent samples *t* test	In MoHME hospitals, informal payments decreased from 4.5% before the HTP to 0% after the first and third phases.	Quasi-experimental	Data collection: Hospital information, System form, Questionnaire	-	Ministry of Health and Medical Education	10
Piroozi et al, 2017 (19)	Kurdistan, Iran	265	24	3.6	20.4		In SSO hospitals, informal payments decreased from 8.1% before the HTP to 7.1% after the first phase, and were eliminated after the third phase.			-	Social security hospitals	10
Piroozi et al, 2017 (19)	Kurdistan, Iran	265	15.5	3.4	12.1		In private hospitals, informal payments decreased from 12.5% before the HTP to 10.0% after the first phase, with no informal payments reported after the third phase			-	Private	10

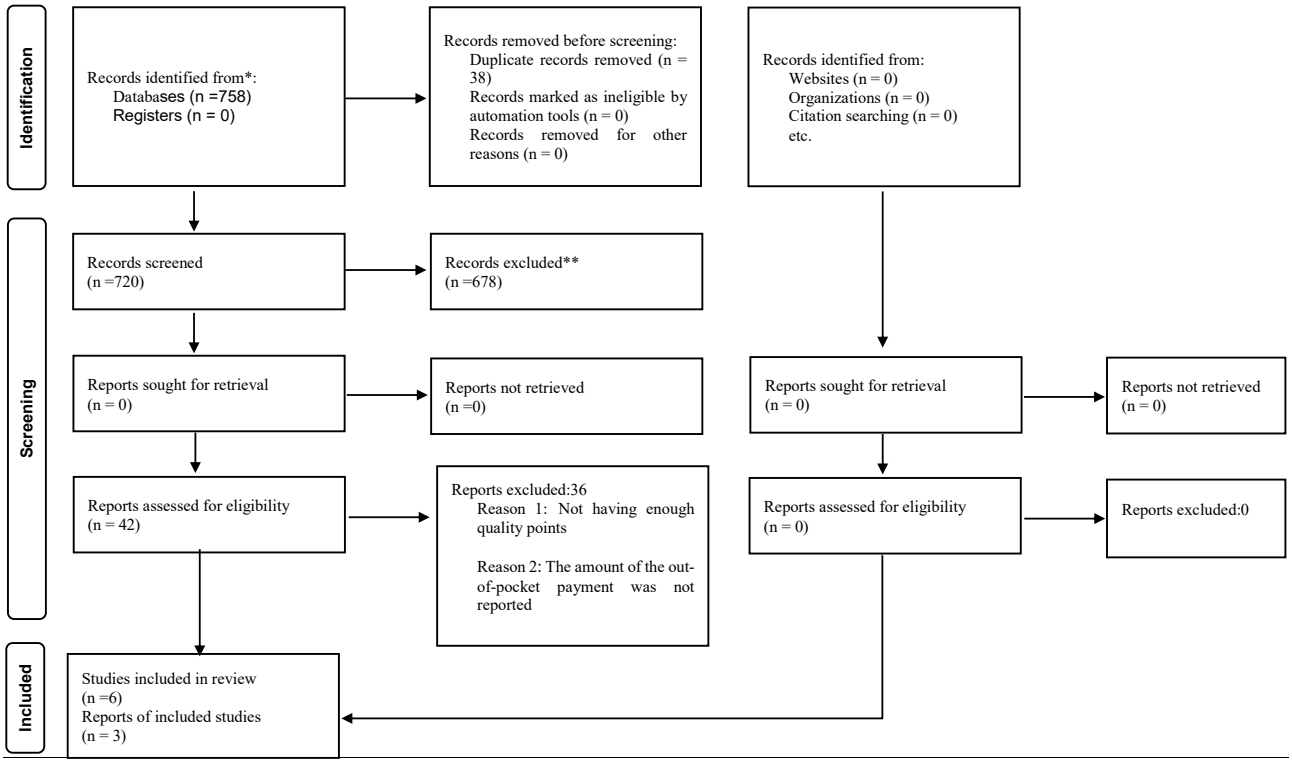

Figure 1. PRISMA flow diagram for the selection of articles in the systematic review

effects model was utilized for heterogeneous studies. All analyses were performed using Stata 13 software.

Results

A comprehensive search across various databases, complemented by a manual search, resulted in the identification of 758 records. After the removal of 38 duplicates, the titles of the remaining 720 articles were reviewed. Of these, 678 were excluded due to irrelevance to the study question, leaving 42 articles for further evaluation. After reviewing the abstracts of the remaining 42 articles, an additional 20 studies were excluded, and 22 papers were selected for full-text screening. In the last phase, 6 articles were selected for the systematic review, of which 3 entered the meta-analysis and synthesis phase. The rest of the articles were excluded from the meta-analysis due to the lack of desired parameters after a thorough assessment of full texts and based on the established inclusion and exclusion criteria. The selection process followed PRISMA guidelines as depicted in Figure 1.

Table 1 presents the general characteristics of the included studies. Some studies reported results at the national level, while others focused on specific cities and villages. Moreover, one study examined the type of ownership of service providers (private hospitals, social security hospitals, and public hospitals). Table 1 summarizes the bibliographic features of the studies, including the author/year, city/region, sample size, OOP payments before the HTP, OOP payments after the HTP, level, type of hospital, and the quality score assigned to each study based on the authors' desired information criteria. According to the analyses, OOP payment was 19.33% before the HTP and 6.54% after it, indicating that the implementation of the HTP reduced the OOP payments by 12.37% (Table 1).

The results of the meta-analysis of OOP expenditures before the HTP are depicted in Figure 2. The I^2 index for the studies was zero, indicating homogeneity. As a result, a fixed-effects model was utilized. In this analysis, the first three studies categorized hospitals into private hospitals, social security hospitals, and hospitals affiliated with the Ministry of Health and Medical Education. The first study, focusing on public hospitals, reported OOP payments before the HTP as 30.50% with a weight of 5.29% and a confidence interval (CI) of -64.36 to 125.36. The second study, examining social security hospitals, reported OOP payments before the HTP at 24% with a weight of 3.04% and a CI of -101.24 to 149.24. The third study, conducted at the level of private hospitals, noted OOP before the HTP as 15.80%, with a weight of 1.90% and a CI of -142.57 to 174.17. The fourth study by Maharlou et al (18) indicated OOP before the HTP at 20.20%, with a weight of 29.93% and a CI of -19.69 to 60.09. The fifth study, conducted by Zargar Balaye Jame et al (7), reported OOP before the HTP at 17.78%, with a weight of 59.58% and a CI of -10.42 to 45.98. According to the pooled mean effect size for all studies in the meta-analysis phase, OOP before the HTP was 19.33% with a CI of -2.49 to 41.15. A 95% confidence level was considered in all the above phases (Figure 2).

The meta-analysis of OOP expenditures after the HTP is shown in Figure 3. Similar to the previous meta-analysis, the I^2 index for studies was zero, indicating homogeneity. As a result, the fixed-effect model was utilized. This meta-analysis included the studies by Zargar Balaye Jame et al (7), Maharlou et al (18), and Piroozi et al (20). The first study on public hospitals reported OOP after the HTP as 6.50%, with a weight of 0.10% and a CI of -318.85 to 331.85. The second study focused on social security hospitals, showing OOP after the HTP at 3.60%, with a weight of 12.39% and a CI of -25.21 to 32.41. The third study analyzed private hospitals and reported OOP after the HTP as 3.40%, with a weight of 7.49% and a CI of -33.64 to 40.44. The fourth study by Maharlou et al (18) indicated OOP after the HTP as 5.86%, with a weight of 8.80% and a CI of -28.32 to 40.04. The fifth study by Zargar Balaye Jame et al (7) showed OOP after the HTP at 7.46%, with a weight of 71.23% and a CI of -4.55 to 19.47. According to the pooled mean effect size for all studies in the meta-analysis phase, OOP After the HTP was 6.54% with a CI of -3.60 to 16.68. A 95% confidence level was considered in all the above phases, indicating that OOP decreased after the HTP (Figure 3).

Discussion

This systematic review analyzed 6 eligible studies, some of which reported OOP payments for villages, towns, and the country, while others focused only on the study area in its entirety. The findings indicated that patients covered high costs for healthcare services before the HTP, leading to most households falling below the poverty line.

The results of the present study suggested that the average OOP expenses were relatively high before the HTP and the plan was successful in reducing these expenses. However, sustainable financial resources are crucial for the ongoing implementation of the plan, presenting serious challenges for health officials and policymakers in developing countries. The results also showed that the implementation of this plan can increase the welfare and purchasing power of patients and their families. The government must pursue equitable financing mechanisms for this project; options such as incremental taxes may offer viable funding sources, whereas declining taxes could impose excessive financial burdens on people, ultimately leading to failure. Although the HTP is beneficial for the people, the government should avoid ineffective policies that could hinder its success (3,19).

As indicated in the reviewed studies, Kurdistan Public

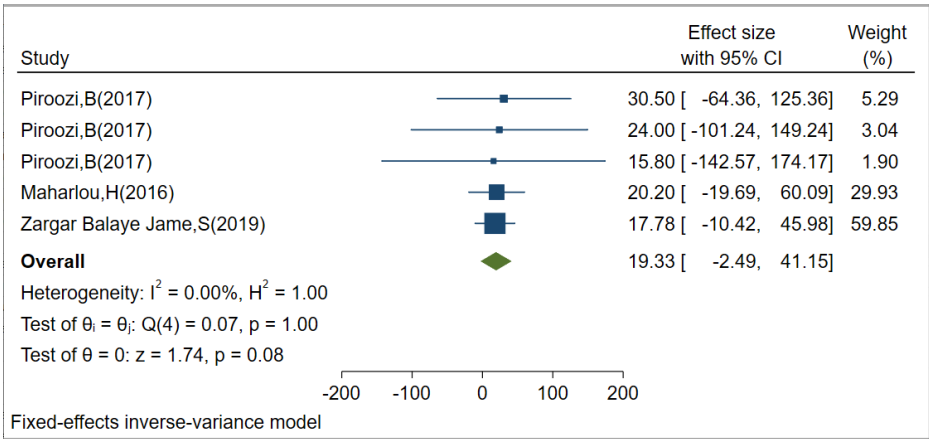

Figure 2. Fixed-effect meta-analysis of OOP before HTP

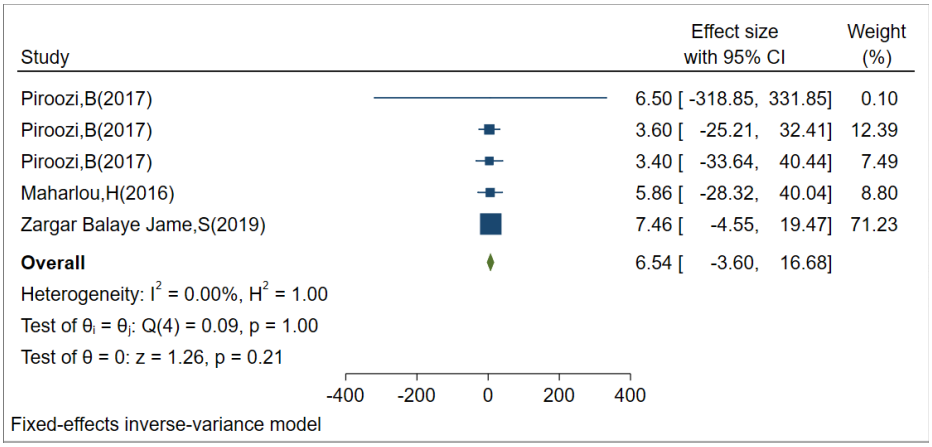

Figure 3. Fixed-effect meta-analysis of OOP After HTP

Hospital reported the highest OOP payments before the HPT, while Mianeh and Hashtrood experienced the most significant reductions in OOP expenditures after the HPT. Specifically, the plan reduced OOP in Hashtrood by 30.16%. Among the analyzed studies, the study by Zargar Balaye Jame et al. carried the highest weight (7), while the study by Piroozi et al had the lowest (19). The results from the meta-analysis of the studies conducted by Piroozi et al and Zargar Balaye Jame et al (7,19) revealed that the average OOP was 19.33% before the HTP and 6.54% after its implementation, indicating that the plan reduced OOP by 12.79%.

In their study utilizing two rounds of household expenditure and income survey data, Abdi et al (15) argued that the HTP achieved one of its main objectives, which was to reduce OOP. Besides, the HTP led to a relative decrease in total OOP per capita at the national level by 2.5% (from 2 099 569 Rials to 2 047 120 Rials), a 19.5% reduction in rural areas, and a relative increase in total OOP per capita by 0.9% for the urban population. The results showed that all subgroups of the population benefited from the HTP to reduce OOP, except for the richest quintuplets and those living in cities.

Among the studies reviewed, the most considerable decrease in OOP after the HTP was observed in the study by Piroozi et al (19). Heydarian and Vahdat (12) selected five out of eleven hospitals in Isfahan province using purposive sampling. Their findings demonstrated that the implementation of the HTP reduced OOP by 17.43% and increased patient satisfaction with public hospitals. These results are in line with those of the present study.

The results of a study titled, "The comparison of direct costs paid by inpatients before and after implementing health system transformation plan in Hashtrood and Mianeh hospitals" by Hessam et al (1) on 1351 patients showed that the HTP reduced the OOP payments of inpatients by 30.16% from 704 286 Rials before the HTP to 491 815 Rials after it, proving a significant relationship between the implementation of the HTP and the reduction of OOP. The results also showed that the implementation of the HTP reduced OOP further in male inpatients.

Piroozi et al (19) conducted a study titled, "Out-of-pocket and informal payment before and after the health transformation plan in iran: evidence from hospitals located in Kurdistan, Iran". This meta-analysis examined 265 patients discharged from hospitals in Kurdistan Province and found that the HTP reduced OOP in public hospitals more than in social security and private hospitals. According to the results, there was a significant difference between the mean OOP before and after the HTP. The implementation of the HTP reduced OOP for inpatient services and eliminated informal payments to physicians. The results of this study are consistent with those of the present study in terms of reducing OOP after the implementation of the HTP. The authors also argued that the reduction in OOP after the HTP in public hospitals was greater than in social security and private hospitals. It should be noted that the highest OOP before the implementation of the HTP was recorded in public hospitals.

In another study titled, "An analysis of financial protection before and after the Iranian Health Transformation Plan", Abdi et al indicated that OOP decreased after the HTP in rural areas more than in cities. The results showed that inpatients in the private sector and social security hospitals paid informally to physicians about 4.5 times more than those in public hospitals. This may be one of the reasons for the high OOP payments in these two types of hospitals than in public hospitals. One of the reasons for the significant difference between the reduction of OOP in public hospitals compared to private and social security hospitals before and after the HTP is fewer informal payments to physicians in public hospitals than in private and social security hospitals. The results of this study are consistent with the results of the study by Maharlou et al (18).

In their study titled, "The study of inpatient services costs provided to cardiovascular patients referred to Al-Zahra heart hospital in Shiraz during 2nd half of 2013 and compare to the same time after Iranian health transformation plan implementation", Maharlou et al (18) found that the total OOP payments after the implementation of the HTP for coronary artery bypass surgery decreased significantly from 10 649 295 to 6 071 268 Rials and that the average share of basic insurance increased after the implementation of the HTP. According to the results, OOP was 20.2% before the HTP and 5.86% in the first six months after the implementation of the HTP. These results are consistent with those of the present study. The results also showed that the share of basic private insurance did not change after HTP, while the Ministry of Health and Medical Education's share of spending increased by 13.63% due to government subsidies to cover patient costs. Despite the reduction in OOP, patient dissatisfaction persisted.

Seyedin et al (4) conducted a study titled, "Out of pocket payment by patients after health sector evolution plan and its affecting factors: a report of Iran". They examined 277 patients from five Iranian universities of medical sciences who were selected using simple random sampling. The results showed that OOP accounted for 18.71% of the total hospital costs, with the OOP of inpatients not meeting the HTP goal. It was also reported that variables such as insurance status and geographic location affected OOP, with uninsured patients facing higher OOP costs than the insured. The results also suggested that 72.6% of patients did not have supplementary insurance and that most payments in all hospitals were made during the winter months. Overall, the results of this study are not consistent with those of the present study.

The environments of the studies reviewed in this analysis differed, and the sample sizes and standard deviations from some studies before and after the HTP were not available. One of the important limitations in the synthesis phase was that there were not enough eligible articles for the meta-synthesis phase. Consequently, only three articles meeting the inclusion criteria for the synthesis phase (based on predetermined parameters) could be included in the study, as other articles did not meet the necessary data reporting or quality assessment standards. Studies reporting OOP for certain diseases before and after the HTP were excluded. A strength of this review was its assessment of studies reporting OOP across various administrative levels including cities, villages, and provinces separately. However, a limitation of the included studies was that most did not report sample sizes and OOP before and after the HTP and only reported a decrease in OOP after the HTP.

Conclusion

As healthcare costs contribute to household spending and can push families closer to the poverty line, policymakers must support the initiatives in the HTP to prevent excessive costs from falling upon people. This study examined whether the HTP significantly reduced OOP expenditures for healthcare services. According to the reviewed studies, OOP was significantly reduced after the implementation of the HTP, indicating that the plan has largely achieved its objectives of reducing OOP payments. Therefore, it is recommended that the government sustain its efforts to further reduce OOP under the HTP, as this will alleviate the economic burden on people.

Authors' Contribution

Conceptualization: Saman Najafi, Reza Goudarzi, Mahdiyeh Eskandarikia.
Data curation: Saman Najafi, Reza Goudarzi, Zeinab Shaker, Mahdiyeh Eskandarikia.
Formal analysis: Saman Najafi, Reza Goudarzi, Mahdiyeh Eskandarikia.
Investigation: Saman Najafi, Reza Goudarzi, Zeinab Shaker, Mahdiyeh Eskandarikia.
Methodology: Saman Najafi, Reza Goudarzi, Mahdiyeh Eskandarikia.
Project administration: Reza Goudarzi.
Resources: Reza Goudarzi.
Supervision: Reza Goudarzi.
Validation: Reza Goudarzi.
Writing–original draft: Saman Najafi, Reza Goudarzi, Mahdiyeh Eskandarikia.
Writing–review & editing: Saman Najafi, Reza Goudarzi, Mahdiyeh Eskandarikia.

Competing Interests

The authors declare no conflict of interest.

Ethical Approval

Not Applicable.

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