REVIEW



Financial Protection Indexes and the Iranian Health Transformation Plan: A Systematic Review

Banafshe Darvishi^{*a*}, Masoud Behzadifar^{*a*,*}, Mahboubeh Khaton Ghanbari^{*b*}, Seyed Jafar Ehsanzadeh^{*c*}, Ahad Bakhtiari^{*d*}, Meysam Behzadifar^{*a*}, Samad Azari^{*e*}, and Nicola Luigi Bragazzi^{*f*}

^aSocial Determinants of Health Research Center, Lorestan University of Medical Sciences, Khorramabad, Iran; ^bHealth Management and Economics Research Center, Health Management Research Institute, Iran University of Medical Sciences, Tehran, Iran; ^cSchool of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran; ^dDepartment of Health Economics and Management, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran; ^eHospital Management Research Center, Iran University of Medical Sciences, Tehran, Iran; ^fDepartment of Health Sciences (DISSAL), School of Public Health, University of Genoa, Genoa, Italy

Background: On May 5, 2014, the Iranian Ministry of Health and Medical Education launched the Health Transformation Plan (HTP) as a major healthcare reform to curb out-of-pocket (OOP) expenses and protect people from catastrophic health expenditures (CHEs). Therefore, in this study, we conducted a comprehensive literature search with the aim of systematically investigating the impacts of HTP on OOP and CHE after the implementation of the plan. Method: Web of Science, PubMed, Scopus, Embase, and Iranian bibliographic thesauri and repositories such as MagIran, Elmnet, and Scientific Information Database were searched. Studies published between May 2014 and December 2020 that reported the impact of HTP on the financial indicators under investigation in this study (OOP and CHEs) that were conducted in Iran. Estimated pooled change both for OOP and CHEs was calculated as effect size utilizing meta-analytical techniques. Also, heterogeneity among studies was assessed with the I^2 statistics. **Results**: Seventeen studies were included, nine of which evaluated the OOP index, six studies assessed the CHEs index, and two studies examined both the OOP and CHEs indexes. The OOP was found to decrease after the implementation of the HTP (with an estimated decrease of 13.02% (95% CI: 9.09-16.94). Also, CHEs experienced a decrease of 5.80% (95% CI: 3.85-7.74). Conclusion: The findings show that the implementation of HTP has reduced health costs. In this regard and in order to keep reducing the costs that many people are unable to pay, the government and other organizations involved in the health system should provide sustainable financial resources in order to continue running HTP. However, there remain gaps and weaknesses that can be solved through discussion with all the actors involved.

*To whom all correspondence should be addressed: Masoud Behzadifar, Lorestan University of Medical Sciences, Khorramabad, Iran; Tel: +986633409971, Fax: +986633408176; Email: masoudbehzadifar@gmail.com

Abbreviations: OOP, Out-of-pocket; WHO, World Health Organization; EMRO, Eastern Mediterranean region; MOHME, Ministry of Health and Medical Education; HTP, Health Transformation Plan; PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses; CHEs, Catastrophic health expenditures; NOS, Newcastle-Ottawa Scale.

Keywords: Health Transformation Plan, Iran, systematic review, health policy, equity, health financing

Author Contributions: MaB, MA, BD, and SA designed the study. AB and MeB searched databases, extracted data, and performed study selection. MaB, SA, and NLB performed data analysis. MeB, AB, and NLB interpreted the results. MaB wrote the manuscript. MeB, MA, BD, SA, SJE, and NLB have been involved in drafting the manuscript or revising it critically for important intellectual content. MaB, SA, AB, MA, SJE, and NLB carried out a final revision and grammar editing. All authors read and approved the final version of the manuscript.

INTRODUCTION

Health decision- and policy-makers work to ensure equity in all aspects of healthcare, worldwide [1]. In recent years, health costs have dramatically increased; as a result, governments have been trying to reduce direct payments allocating adequate funding for health services [2-4] in order to curb out-of-pocket (OOP) expenses and protect people from catastrophic health expenditures (CHEs) [5]. OOP health expenditure refers to the payments made by households at the time they receive health services. OOP payments are the primary source of healthcare financing in many low- and middle-income countries (LMICs), resulting in an economics burden on many households each year [6].

OOP is, indeed, the most unsuitable way of financing the healthcare system and can seriously jeopardize it. Some of its negative effects include reduced access to health services, reduced equity in health, especially among poorer people [7], leading to inadequate treatment and increased burden of disease [8]. CHEs occur when OOP spending exceeds a certain proportion of a household income. Given the significant impact of the health system performance, the World Health Organization (WHO) (world health report 2000) encourages health decision- and policy-makers to provide equitable funding in order to implement profound and structural health system reforms [9]. The WHO defines expenditure as being catastrophic if a household's financial contributions to the health system exceed 40% of their income remaining after subsistence needs have been met [10].

Iran, located in the Eastern Mediterranean region (EMRO), is one of the countries where health policy- and decision-makers have been working to reduce health costs by ensuring universal coverage and access to services. On May 5, 2014, the Iranian Ministry of Health and Medical Education (MoHME) launched the Health Transformation Plan (HTP) as a major healthcare reform [11].

The health system in Iran has witnessed the implementation of some effective policies; for example, the implementation of the primary health care network in rural and urban areas is one of the most important policies that have had a significant impact on improving the level of health care and other related indicators [12,13]. As a result of this policy, the mortality of infants and pregnant mothers has decreased, vaccination coverage has increased, and life expectancy has also increased in Iran. Another policy was the implementation of family physician plans in rural Iran [14]. In the rural areas, the health team was able to play an effective role in increasing access to health services. Other effective policies implemented in the health sector in Iran are as follows: establishing medical universities in all provinces in order to train medical professionals, implementing health policies, increasing insurance coverage, and granting autonomy to university hospitals to manage independently and optimize their financial system [15,16].

OOP payments reached 56% in 2011. In the same year, according to the Iran Statistics Center, about 6% of rural households and 4.5% of urban households faced CHEs, joining the poorer sections of society [17]. The HTP, which seeks to protect people from both OOP and CHEs, aims at improving quality of life and increasing access to healthcare services. The financial resources of HTP are as follows: the annual budget allocated by the government to the health system, 10% of targeted subsidies, 1% of value-added tax (VAT), and individuals' insurance [12,18].

The main packages of healthcare services and provisions are the core of the plan that include the following:

1. Reduction of out-of-pocket payments for patients admitted to government hospitals (reduction of out-of-pocket).

2. Sending specialized physicians to slums and poor areas.

Presence of specialized physicians in government hospitals.

4. Improving the quality of overnight stays in public hospitals.

5. Improving the quality of patient visit services in public hospitals.

6. Promoting natural childbirth.

7. Financial protection for incurable, special and chronic, and low-income patients.

8. Construction of in-flight medical emergency.

9. Improving the activities related to primary health care that eases the access to public healthcare services for nearly 10 million people from slum areas in Iran [19].

Meanwhile, the potential results of the above-mentioned interventions could be as following: Increasing the health system's accountability, reducing out-of-pocket payments, reducing the number of families that suffer from catastrophic expenditure, improving the outcomes of emergency patients, and increased natural childbirth [19-21]. On the other hand, together with the strengths, the HTP has also some weaknesses and limitations [10]. For example, HTP has been implemented in government hospitals across the country without conducting prior pilot projects at a smaller scale [22]. Also, little attention has been paid to the involvement and inclusion of different stakeholders, which would have instead, facilitated the implementation of several processes. Moreover, some integral and vital components of the HTP, including updating the tariff plan of nurses, improving the referral system, and enhancing the delivery of healthcare provisions to vulnerable and frail patients, have suffered from a serious delay in implementation. Furthermore, the HTP has failed to incorporate the essential pillars such as evidence-based health policy-making and strategic purchasing which would have guided and informed in a more scientific fashion the prioritization of funding and its allocation [10]. Using and monitoring financing indicators can be useful to verify whether the implementation of the health reform has contributed to more equity and access to healthcare services [23], as conducted in China [24-26], Turkey [27,28], Thailand [29], or Nigeria [30], among others. Specifically in Iran, following the implementation of the HTP, researchers have conducted various studies to assess the impact of this plan on various health-related areas and issues. An updated synthesis of the results of these studies could help Iranian health decision- and policy-makers have a better up-to-date view of the outcomes of the HTP. Therefore, in this study, we conducted a comprehensive literature search with the aim of systematically investigating the effects of HTP on OOP and CHEs after the implementation of the plan in Iran.

METHOD

This systematic review and meta-analysis follows the "Preferred Reporting Items for Systematic Reviews and Meta-Analyses" (PRISMA) guidelines [31].

Search of Literature

From May 2014 to December 2020, several scholarly databases including Web of Science (WoS), PubMed, Scopus, Embase, and Iranian bibliographic thesauri and repositories such as MagIran (https://www.magiran. com/), Elmnet (https://elmnet.ir/), and Scientific Information Database (SID) (https://www.sid.ir/en/journal/) were searched independently by two authors. The search strategy was: ("health transformation program" OR "health transformation plan" OR "health sector evolution plan" OR "health sector reform" OR "healthcare reform program") AND ("catastrophic health expenditure" OR "patient payment" OR "copayment" OR "cost sharing" OR "user fee" OR "user charge" OR "deductible" OR "coinsurance" OR "out-of-pocket" OR "OOP") AND "Iran." The reference list of included articles was also scanned to find further related studies. Gray literature was mined via Google Scholar. Also, experts and authors (MaB, BD, MKG, and SJE) working in the field were contacted by email to get their suggestions on relevant investigations and potentially unpublished studies.

Study Inclusion and Exclusion Criteria

Inclusion criteria were as following: Investigations were retained if they were studies written either in Persian or English, published between 2014 and 2020 in peer-reviewed journals that report the impact of HTP on the financial indicators under investigation in this study (OOP and CHEs) that were conducted in Iran. Studies were excluded if performed before 2014, recruited non-Iranian participants, and/or not reporting financial outcomes.

Study Quality Assessment

Methodological quality of the selected studies was evaluated using the Newcastle-Ottawa Scale (NOS) [32]. The NOS checklist is a tool for assessing the quality of non-randomized studies used in systematic review and meta-analysis studies. This checklist has three items (Selection, Comparability, and Outcome). The Selection item has four questions, the Comparability item has one question, and the Outcome item has three questions. Based on this checklist, studies were classified into three groups (high quality with scores 7 to 8, moderate quality with scores 4 to 6, and low quality with scores 1 to 3). Three authors of this study (SA, NLB, and MaB) independently conducted this step of the study.

Data Extraction Strategy

Two authors (MeB, AB) independently extracted relevant information from selected studies including the surname of the first author, the geographic location of the study, the year of publication, the instrument utilized for collecting information, the measured financial protection index, and the most important findings of the study. Any disagreement was resolved by consulting a third author, who acted as a final referee.

Data Synthesis

Changes in the financial protection indexes were computed before and after the implementation of the HTP. Estimated pooled change both for OOP and CHEs was calculated as effect size (ES) utilizing meta-analytical techniques. Heterogeneity among studies was assessed with the I² statistics [33]. According to Cochrane guidelines, values of I² higher than 50% indicated substantial heterogeneity. Based on the values of I², the DerSimonian-Laird random-effect model was used with 95% confidence interval (CI) [34,35].

The Egger's linear regression test was conducted for evaluating the presence of publication bias [36]. Statistical analyses were performed using STATA[™] 14 (StataCorp. 2015. Stata Statistical Software: Release 14. College Station, TX: StataCorp LP.). For all the analyses, figures with p-values less than 0.05 were considered statistically significant.

RESULTS

In the initial search, a pool of 189 studies was found. Thirty-six studies were duplicates and were, as such,

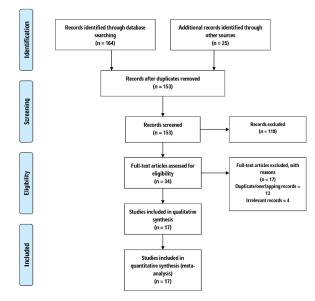


Figure 1. The process of retrieving, searching, and selecting studies adopted in the present systematic review.

removed. Titles and/or abstracts of the 153 remaining studies were evaluated. One-hundred-nineteen unrelated studies were then discarded. In the next step, the full texts of 34 studies were carefully reviewed, 17 of which were excluded with reason (13 were duplicate/overlapping records and 14 were irrelevant with respect to the review question). Finally, based on the inclusion/exclusion criteria, 17 studies were selected and retained in the present systematic review and meta-analysis [37-53]. The process of retrieving, searching and selecting studies is pictorially shown in Figure 1.

Using the NOS checklist, methodological quality of the included studies has been critically appraised. The checklist showed that 13 studies (76.47%) had high quality and four studies (23.53%) had moderate quality. None of the studies were of low quality. Table 1 shows the score obtained for each study.

Included studies were conducted between 2015 and 2018. Table 2 shows the characteristics and main findings of the studies. Selected studies examined the two financial indicators of OOP and CHEs. The first group of studies showed that, after the implementation of the HTP, direct and informal payments paid by patients tended to decrease. The second group of studies demonstrated that, for the households and patients, the rate of the CHEs index decreased after the implementation of the HTP. Also, the third group of studies showed a decrease in both of the financial indexes (OOP and CHEs).

Based on the DerSimonian-Laird random-effects model, during 2015-2018 OOP decreased after the HTP implementation (with an estimated decrease of 13.02% (95% CI: 9.09-16.94), with I²=100%, P = 0.00 (Figure 2). According to the Egger's linear regression test, publication bias was not observed (P = 0.38). Also, CHEs experienced a decrease of 5.80% during 2015-2018 (95% CI: 3.85-7.74), with I²=100%, P = 0.00 (Figure 3). Because the number of studies related to CHEs was less than 10, it was not possible to examine the presence of publication bias.

DISCUSSION

In this systematic review, we monitored and examined the implementation of the HTP in Iran with a focus on two selected financial indicators, namely the OOP and CHEs indexes. The findings of the present study showed that this plan has been able to reduce both of the indexes to some extent. Healthcare service recipients had better conditions to face with health costs, indicating the effectiveness of the plan. Findings from the meta-analysis also showed that both the OOP and CHEs indexes decreased after the HTP implementation, suggesting that implementing healthcare system reforms can have a positive effect on financial indicators that are important for patients. The dependence of the budget of health ministries on oil sales in oil-rich countries threatens their sustainability. In the case of Iran, with the Trump administration unilaterally withdrawing from the Joint Comprehensive Plan of Action (JCPOA) on May 8, 2018, and imposing sanctions on the Iranian energy sector, the country's health system suffered many severe challenges. As a result of the crippling sanctions, the pace of development of Iran's health system was slowed down, development programs were canceled, and even human life-saving medicines were not available in some cases [54]. In order to solve the problems, a specific tax-based system for the health sec-

Study			Selection		Comparability	V	Outcome		Score
	ð	Q2	Q3	Q4	a1	a1	Q2	Q 3	
Heydarian N	-	-	-	-	1	-	0	-	7
Maharlou HR	-	-	0	-	1	0	. 	-	9
Piroozi	~	-	-	~	+	-	-	0	7
Sarkhanlou	~	-	-	~	1	-	-	-	8
Bagheri Lankarani	-	-	-	-	1	-	. 	-	8
Fazaeli	~	-	4	~	1	4	-	-	8
Homaie Rad	~	-	-	~	+	-	-	-	8
Mohamadi	-	0	-	0	+	-	0	-	5
Piroozi	-	-		. 	1	0	. 	-	7
Reshadat	-	0		-	1	0	. 	0	5
Zahed Pasha	-	-	0	. 	1	-	0	0	5
Zarei	-	0	~	0	4	4	. 	-	7
Kavosi	-	. 	~	0	4	4	. 	-	7
Moradi	-	~	.	~	4	۲-	. 	-	80
Khammarnia	-	-	4	~	4	4	. 	-	80
Nouraei Motlagh	.	-	4	0	4	4	. 	-	7
Shojaei	-	. 	-	.	.	-	.	-	8

(**Y= 1, N=0**). Selection= (**Q1**= Is the case definition adequate, **Q2**= representativeness of the cases, **Q3**= selection of controls, **Q4**= definition of controls). Comparability= (**Q1**= Comparability of cases and controls on the basis of the design or analysis). Outcome= (**Q1**= Assessment of outcome, **Q2**= was follow-up long enough for outcomes to occur, **Q3**= adequacy of follow up of cohorts).

469

First author	Province	Tools (Instrument of data collection)	nt Research methodology Sample size Main Main findin. index studied	Sample size	Main index studied	Main finding
Heydarian N	Isfahan	Questionnaire	Data of this study were collected through the accounting and finan- cial information systems of the hospitals.	5 hospitals	00P	OOP decreased by 17.3%.
Maharlou HR	Fars	Questionnaire	Data were collected from 601 cardiovascular patients referring to Shiraz Hospital before and after the implementation of the health transformation plan.	601 patients	00P	OOP decreased from 20.2% to 5.86% (from US \$253.5 to US \$165.9.
Piroozi	Kurdistan	Questionnaire	Data of 663 households selected through a cluster sampling were 663 collected by face-to-face interviews based on the household section households of the World Health Survey questionnaire.	663 households	CHE	CHE decreased by 4.8%. CHE was due to basic health insurance, household size, presence of members under 5 years of age, or over 65 years of age in the household, presence of members with disabilities or in need of care in the household.
Sarkhanlou	Mazandaran	Questionnaire	Data of this study were collected through medical and billing records NA of leukemia patients admitted to the Sari Imam Khomeini Hospital (in two six-month periods, April-October 2013 and 2014).	sNA	00P	OOP decreased from 17.12% in 2013 to 3.02% in 2014.
Bagheri Lankarani	Fars	Questionnaire	Data were collected through discharge billing records from the hospital information system, before and after (October 2013-October 2014) implementation of HTP in one of major hospitals of the country through a matched (according to sex, age, and duration of admission and diagnosis of patients) comparative study.	All patients	00P	Mean percent of OOP for hospital services for patients who had a health insurance was 0.15±0.20 (0.10) after implementation of reform (vs. 0.27±0.6 (0.16) before reform); this change was statistically significant.
Fazaeli	All provinces	Questionnaire	In this cross-sectional retrospective study, the team of the study 17000 examined healthcare payments of households considering their eco-holds nomic characteristics and using household budget survey in urban areas of Iran during 2004-2016.	17000 house- CHEs -holds	CHEs	CHE amounted to US \$282.3) in 2012, with a significant growth to US \$381.4 in 2013 and to US \$ 453.1 in 2014. The growth rates in 2015 and 2016 were lower than in 2013.
Homaie Rad	Guilan	Questionnaire	Data on household income and expenditures in Guilan Province were gathered for the years 2013 and 2015. OOP payments for outpatient, inpatient, and drug services were calculated. Concentra- tion indices and curves were added to quantify changes in inequity before and after the reform.	ΨZ -	00P and CHEs	Overall OOP payments were US\$40.55 and US\$57.92 before and after applying HTP. Outpatient OOP payments were US\$31.34 before the reform and US\$48.84 after it. Before and after the reform, the annual inpatient OOP pay- ments were 704.26 and 619.16 dollars, respectively.
Mohamadi	llam	Questionnaire	In this research 2,178 patients (937 belonging to 2013 and 1205 belonging to 2014) under the insurance of health care organization of Iran hospitalized in the hospitals of Ilam were recruited. Out of these patients, 331 subjects have been selected through Morgan's table for sample size.	2178 patients	00P	OOP from 15.2% to 4.7%.
Piroozi	Kurdistan	Questionnaire	This study used multistage sampling method to evaluate 265 patients discharged from hospitals. The study covered 3 phases of HTP: before and after the reform plan, and its third phase. Part of the data was collected using a hospital information system form and the rest was collected using a questionnaire.	265 patients	900	Mean OOP before the HTP was US\$59.4, after HTP decreased to US\$17.6 and US\$14.3 at the end of the implementation. OOP was different in three group of hospitals. In hospitals affiliated to the MOHME, before the HTP, OOP was US\$39.6, decreasing to US\$33.7 and US\$13.7 at the end of the implementation. In hospitals affiliated to Social Security Organization (SSO), OOP was US\$153.3-US\$188.7, and US\$66.4 in private hospitals.

470

About 4.8% of households with hospitalized patients were faced with CHEs. The total mean OOP medical expenditures of being hospitalized were US\$19.5 per patient. Mean OOP in patients with catastrophic payment was US \$52.8. Major determinants of catastrophic payment were associated with surgical cost, chronic disease, household size, and economic status of households.	The mean total hospital cost and share of insurance organi- zations increased by 2.2 and 2.5-fold, respectively. Mean of the cost paid by the patients decreased by 33%.	The amount of OOP was 10.2% (9.9% formal payment, 0.2% for goods and 0.1% informal payment). Most portions of the hospital costs were related to medical supplies and pharmaceuticals, surgeries services and hosteling (32.6%, 20.6% and 17.36%, respectively).	OOP reduced significantly, by 9% for Remedial Services Insurance and by 11% for Social Security Insurance.	The headcount ratio of the exposure to CHEs in urban and rural households was 4.58% and 5.65%, respectively.	About 130 (5.4%) of the households faced health spend- ing impoverishment in Sistan and Baluchistan in 2017. Households who lived in the rural regions were faced with impoverishment more than the urban area.	Incidence rate of CHEs decreased from 6.7 to 4.34.	Exposure to CHEs in the households decreased from 81.1% to 66.7% and exposure of households to poverty, due to participation in health expenditures, decreased from 41.3% to 29.4%.
00P and CHEs	00P	00P	00P	CHE	CHE	CHEs	CHEs
544 patients	: 397 patients	405 patients	127 patients	39886 households	2400 households	1060 I households	201 households
This was a cross-sectional study. 544 patients were selected using the proportional allocation to population size technique. A translated version of the world health survey questionnaire was used to collect data.	This observational analytic study was conducted in 2015 to evaluate 397 patients the hospital records of all neonates admitted to Amirkola Children's Hospital during late 2013 (before the implementation of health sector reform in Iran) and late 2014 (after the implementation of this reform). Data were collected by reviewing the hospital records of all neonates who have been admitted in the mentioned time duration.	405 discharged patients from four public and teaching hospitals were selected using convenience sampling method. Data were collected using a researcher made checklist and investigating the hospital bills.	This descriptive research was conducted on 127 patients (50 patients before and 77 patients after the implementation of the plan) that experienced aortic valve replacement (AVR) operation. Data were obtained through the researcher's checklist and investigating the hospital bills.	Data of the Statistical Center of Iran (SCI) Survey on Rural and Urban Households Income-Expenditure from 2015 to 2016 were used. The headcount ratio of catastrophic health expenditures was calculated.	Around 2400 households were selected as the study sample using a multi-stage sampling method. The household part of the World Health Survey questionnaire was applied to obtain data. Indepen- dent variables contained households' characteristics, household income, chronic illness status, the use of health services, and health spending.	The population of present cross-sectional research was Lorestan 1060 households whose data were collected by a three-stage randomized households cluster sampling method through the Statistics Center of Iran during the period April 2012-March 2015.	CHE was measured using representative data from households getting costly interventions in the Imam Reza hospital. Data associated with treatment expenditures were collected from HIS and data associated with households' food and non-food expenditures were collected using the questionnaire in an expenditure-income survey of Iran's Statistics Center as well as telephone calls to the households.
Questionnaire	Questionnaire	Questionnaire	Questionnaire	Questionnaire	Questionnaire	Questionnaire	Khorasan razavi Questionnaire
Kermanshah	Mazandaran	Tehran	Fars	All provinces	Sistan and Baluchestan	gh Lorestan	Khorasan raza
Reshadat	Zahed Pasha	Zarei	Kavosi	Moradi	Khammarnia	Nouraei Motlagh Lorestan	Shojaei

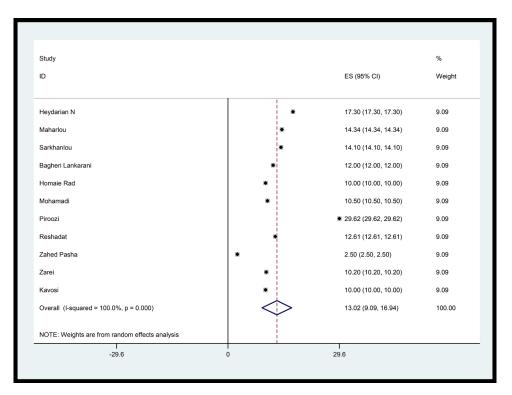


Figure 2. Forest plot indicating the changes in out-of-pocket expenditure (OOP) before and after the implementation of the Health Transformation Plan (HTP).

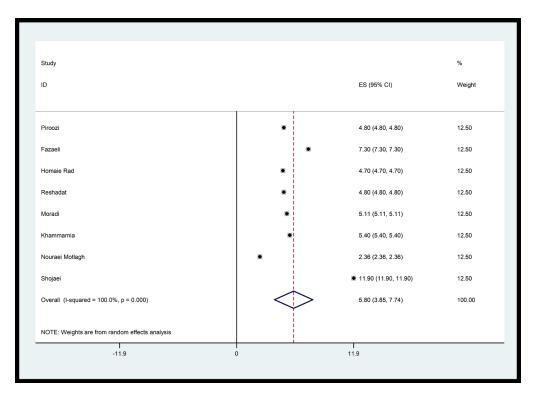


Figure 3. Forest plot indicating the changes in catastrophic health expenditures (CHEs) before and after the implementation of the HTP.

tor was put on the agenda, and budgets from the targeted subsidies and the country's national development fund were allocated for the Iranian health system. Meanwhile, the two main insurance companies financed a significant portion of the cost of providing services in the HTP [18].

Health reform aims at improving the conditions in the health sector and at modifying the indicators that can affect the delivery of and/or access to healthcare services [23,55]. The Iranian HTP has proved to be an effective health system approach for reforming the health sector [11]. Although the HTP has its strengths and weaknesses, the HTP is anticipated to become even more effective [22] if health decision- and policy-makers in Iran manage to solve its limitations.

These findings are comparable with those of other countries. Similar health system reforms in some countries have also shown a decrease in these indexes [23-30]. Although there still remains a gap to reach the optimal situation, efforts are ongoing [56-58]. In recent years, health policy- and decision-makers in Iran have been working to reduce people's direct payments and have been able to create a downward trend, even though the desirable situation is still far [59].

In recent years, the bad economic situation in many countries has led to severe inflation and a decline in health sector funding [60,61]. For instance, the decline in oil prices in the global market for Iran, one of the world's leading oil producers, has significantly reduced health resources to protect people from OOP and CHEs, making the full implementation of many health-related programs difficult [62].

With the implementation of the HTP in Iran, health has become a more central and prominent public issue, has been seriously considered by the Parliament (Majlis) and put on the political agenda as a priority. In this regard, new funds were provided for this project and 1% of the value added tax was specifically allocated to the health sector [63]. The Iranian government provided further ad hoc subsidies, and the new funding allowed the MoHME to reduce direct and informal payments to people, at least to some extent.

The MoHME's goal was to help achieve universal health coverage (UHC) in addition to reducing direct health costs [64]. By allocating new funding, the MoHME has increased the country's insurance umbrella of insured subjects up to 10 million people. The MoHME has also provided new service packages to improve services and the general health status [11]. Indicators of access to health services in marginal areas, physicians' stay in poor areas, the promotion of natural childbirth [65,66], and access to emergency services improved due to the implementation of HTP [18,67].

LIMITATIONS

Our manuscript has several strengths, including its methodological rigor and the broad and comprehensive literature search. Concerning the limitations of the present study, the impact of the HTP has not yet been studied in many Iranian provinces. Some amounts of heterogeneity among studies, including methodological differences, data collection, and tools utilized for monitoring financial indicators, could also affect the outcomes. Social and economic differences, insurance conditions of the participants, and the types of services offered can affect the outcomes, as well.

CONCLUSION

The findings of this study show that the implementation of HTP has reduced health costs. Creating sustainable financial resources, developing insurance plans, and supporting more people with low economic status can provide financial protection for individuals and ease access to healthcare services. Health policy- and decision-makers in Iran can help reduce the costs of HTP by fully implementing it and resolve the challenges of the HTP. Having a good economic situation can, indeed, ensure that all people in the community utilize health-related services. However, there remain gaps and weakness that can be solved through dialogue with all the actors involved. In fact, improving health indicators requires the cooperation and involvement of all the organizations, institutions, and stakeholders of a country.

REFERENCES

- Aregbeshola BS, Khan SM. Out-of-Pocket Payments, Catastrophic Health Expenditure and Poverty Among Households in Nigeria 2010. Int J Health Policy Manag. 2018 Sep;7(9):798–806.
- Obama B. United States health care reform progress to date and next steps. JAMA. 2016 Aug;316(5):525–32.
- McGlynn EA, Asch SM, Adams J, Keesey J, Hicks J, DeCristofaro A, et al. The quality of health care delivered to adults in the United States. N Engl J Med. 2003 Jun;348(26):2635–45.
- Behzadifar M, Ghanbari MK, Bakhtiari A, Behzadifar M, Bragazzi NL. Ensuring adequate health financing to prevent and control the COVID-19 in Iran. Int J Equity Health. 2020 May;19(1):61.
- Sharma S, Verma PB, Viramgami AP, Vala MC, Lodhiya KK. Analysis of out-of-pocket expenditure in utilization of maternity care services in urban slums of Rajkot City, Gujarat. Indian J Community Med. 2018 Jul-Sep;43(3):215–9.
- Shikuro D, Yitayal M, Kebede A, Debie A. Catastrophic Out-of-Pocket Health Expenditure Among Rural Households in the Semi-Pastoral Community, Western Ethiopia: A Community-Based Cross-Sectional Study. Clinicoecon Outcomes Res. 2020 Dec;12:761–9.

- Riggs KR, Ubel PA. Overcoming barriers to discussing out-of-pocket costs with patients. JAMA Intern Med. 2014 Jun;174(6):849–50.
- Wang Q, Fu AZ, Brenner S, Kalmus O, Banda HT, De Allegri M. Out-of-pocket expenditure on chronic non-communicable diseases in sub-Saharan Africa: the case of rural Malawi. PLoS One. 2015 Jan;10(1):e0116897.
- World Health Organization. The world health report 2000

 Health systems: improving performance 2000. Available from: https://www.who.int/whr/2000/en/ (Last access 3 Jan 2019).
- Xu K, Evans DB, Kawabata K, Zeramdini R, Klavus J, Murray CJ. Household catastrophic health expenditure: a multicountry analysis. Lancet. 2003 Jul;362(9378):111–7.
- Moradi-Lakeh M, Vosoogh-Moghaddam A. Health sector evolution plan in Iran; equity and sustainability concerns. Int J Health Policy Manag. 2015 Aug;4(10):637–40.
- Danaei G, Farzadfar F, Kelishadi R, Rashidian A, Rouhani OM, Ahmadnia S, et al. Iran in transition. Lancet. 2019 May;393(10184):1984–2005.
- Galehdar N, Toulabi T, Kamran A, Heydari H. Exploring nurses' perception of taking care of patients with coronavirus disease (COVID-19): A qualitative study. Nurs Open. 2020 Sep;8(1):171–9.
- 14. Doshmangir L, Bazyar M, Rashidian A, Gordeev VS. Iran health insurance system in transition: equity concerns and steps to achieve universal health coverage. Int J Equity Health. 2021 Jan;20(1):37.
- Jafari Sirizi M, Rashidian A, Abolhasani F, Mohammad K, Yazdani S, Parkerton P, et al. Qualitative assessment of dimensions and degree of autonomy granting to university hospitals. Hakim Research Journal. 2008;11(2):59–71.
- Galehdar N, Toulabi T, Kamran A, Heydari H. Exploring nurses' perception about the care needs of patients with COVID-19: a qualitative study. BMC Nurs. 2020 Dec;19(1):119.
- Aeenparast A, Rezaie Yazdeli M, Zandian H, Haeri Mehrizi AA. Catastrophic health expenditures in Iran: A review of the literature. Payesh. 2016;15(1):7–17.
- Doshmangir L, Bazyar M, Najafi B, Haghparast-Bidgoli H. Health Financing Consequences of Implementing Health Transformation Plan in Iran: achievements and Challenges. Int J Health Policy Manag. 2019 Jun;8(6):384–6.
- Behzadifar M, Saran M, Behzadifar M, Martini M, Bragazzi NL. The 'Health Transformation Plan' in Iran: A policy to achieve universal health coverage in slums and informal settlement areas. Int J Health Plann Manage. 2021 Mar;36(2):267–72.
- 20. Karami Matin B, Hajizadeh M, Najafi F, Homaie Rad E, Piroozi B, Rezaei S. The impact of health sector evolution plan on hospitalization and cesarean section rates in Iran: an interrupted time series analysis. Int J Qual Health Care. 2018 Feb;30(1):75–9.
- Beiranvand S, Saki M, Behzadifar M, Bakhtiari A, Behzadifar M, Keshvari M, et al. The effect of the Iranian health transformation plan on hospitalization rate: insights from an interrupted time series analysis. BMC Health Serv Res. 2020 Apr;20(1):327.
- 22. Olyaeemanesh A, Behzadifar M, Mousavinejhad N, Behzadifar M, Heydarvand S, Azari S, et al. Iran's health system

transformation plan: a SWOT analysis. Med J Islam Repub Iran. 2018 May;32(1):39.

- Bagheri Lankaran K, Khankeh HR, Zarei N, Fararouei M, Saboori Z, Joulaei H. Toward equity under health system reform; a systematic review. Shiraz E Med J. 2017;18(11):e57724.
- 24. Chen M, Chen W, Zhao Y. New evidence on financing equity in China's health care reform—a case study on Gansu province, China. BMC Health Serv Res. 2012 Dec;12(1):466.
- 25. Chen M, Palmer AJ, Si L. Improving equity in health care financing in China during the progression towards Universal Health Coverage. BMC Health Serv Res. 2017 Dec;17(1):852.
- Zhang L, Liu N. Health reform and out-of-pocket payments: lessons from China. Health Policy Plan. 2014 Mar;29(2):217–26.
- Yıldırım HH, Yıldırım T. Healthcare financing reform in Turkey: context and salient features. J Eur Soc Policy. 2011;21(2):178–93.
- Yardim MS, Cilingiroglu N, Yardim N. Financial protection in health in Turkey: the effects of the Health Transformation Programme. Health Policy Plan. 2014 Mar;29(2):177–92.
- Towse A, Mills A, Tangcharoensathien V. Learning from Thailand's health reforms. BMJ. 2004 Jan;328(7431):103– 5.
- Uzochukwu BS, Ughasoro MD, Etiaba E, Okwuosa C, Envuladu E, Onwujekwe OE. Health care financing in Nigeria: implications for achieving universal health coverage. Niger J Clin Pract. 2015 Jul-Aug;18(4):437–44.
- Moher D, Liberati A, Tetzlaff J, Altman DG; PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. PLoS Med. 2009 Jul;6(7):e1000097.
- Stang A. Critical evaluation of the Newcastle-Ottawa scale for the assessment of the quality of nonrandomized studies in meta-analyses. Eur J Epidemiol. 2010 Sep;25(9):603–5.
- Higgins JP, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. BMJ. 2003 Sep;327(7414):557–60.
- DerSimonian R, Laird N. Meta-analysis in clinical trials. Control Clin Trials. 1986 Sep;7(3):177–88.
- 35. Barili F, Parolari A, Kappetein PA, Freemantle N. Statistical Primer: heterogeneity, random- or fixed-effects model analyses? Interact Cardiovasc Thorac Surg. 2018 Sep;27(3):317–21.
- Egger M, Davey Smith G, Schneider M, Minder C. Bias in meta-analysis detected by a simple, graphical test. BMJ. 1997 Sep;315(7109):629–34.
- Heydarian N, Shaghayegh V. The impact of implementing the health transformation plan on pocket payments patients in state hospitals in Isfahan. J Med Council Iran. 2015;33(3):187-94.
- 38. Maharlou HR, Barati O, Maher MH. 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. J Health Manag. 2016;7(2):32–9.

- 39. Piroozi B, Moradi G, Nouri B, Mohamadi Bolbanabad A, Safari H. Catastrophic health expenditure after the implementation of health sector evolution plan: a case study in the West of Iran. Int J Health Policy Manag. 2016 Jul;5(7):417–23.
- 40. Sarkhanlou F, Saeedi M, Janbabai G, Nikfar S, Morteza-Semnani K, Zaboli P. Comparative study of direct patient and drug costs before and after the implication of healthcare reform program in Sari, Iran. J Mazandaran Univ Med Sci. 2016;26(142):228–32.
- 41. Bagheri Lankarani K, Ghahramani S, Honarvar B. A study on hospitalized patients' payment in South of Iran after the first round of health sector reform. Iran J Public Health. 2017 Feb;46(2):276–7.
- 42. Fazaeli AA. Financial contri-bution of Iranian urban households in the health system (2004-2016): with an emphasis on the health transformation plan. J Educ Community Health. 2017;4(1):43–50.
- 43. Homaie Rad E, Yazdi-Feyzabad V, Yousefzadeh-Chabok S, Afkar A, Naghibzadeh A. Pros and cons of the health transformation program in Iran: evidence from financial outcomes at the household level. Epidemiol Health. 2017 Jul;39:e2017029.
- 44. Mohammadi E, Zareie G. Investigating the effect of health care improvement plan on the payment of the insured in Iranian health insurance organization (Case study: hospitalized patients in collegiate hospitals of Ilam city in December 2013 and 2014). J Ilam Univ Med Sci. 2017;24(6):178–88.
- 45. Piroozi B, Rashidian A, Moradi G, Takian A, Ghasri H, Ghadimi T. Out-of-pocket and informal payment before and after the health transformation plan in Iran: evidence from hospitals located in Kurdistan, Iran. Int J Health Policy Manag. 2017 Oct;6(10):573–86.
- 46. Reshadat S, Najafi F, Karami-Matin B, Soofi M, Barfar E, Rajabi-Gilan N, et al. Measuring financial protection in hospitalized patients after the health sector evolution plan in Iran. Health Scope. 2017;6(4):e63163.
- 47. Zahed Pasha Y, Mouodi S, Ahmadpour Kacho M, Hajitabar Z, Jahangir T, Bijani A. Comparing the hospital costs of the neonates admitted to nicu of Amirkola children's hospital before and after the implementation of the health sector reform in Iran. Iran J Neonat. 2017;8(3):1–6.
- Zarei E, Pouragha B, Khodakarim S, Moosazadeh Nasrabadi AR. Out of pocket payment by inpatients of public hospitals after health sector evolution plan. Jpn Hosp. 2017;16(3):9–17.
- 49. Kavosi Z, Ghodrati J, Yusefi RA. Comparison of Paying Out of Pocket for Aortic Valve Replacement (AVR) Surgery Before and After the Implementation of Healthcare Reform in Shiraz Namazi Hospital in 2017. Majallah-i Ilmi-i Danishgah-i Ulum-i Pizishki-i Rafsanjan. 2018;17(7):657–68.
- 50. Khammarnia M, Barfar E, Ansari-Moghadam A, Setoodehzadeh F, Zanganeh Baygi M, Peyvand M, et al. The households health spending and impoverishment: a study after Iran's health transformation plan. Health Scope. 2018;7(S):e62316. https://doi.org/10.5812/jhealthscope.62316.
- 51. Moradi T, Naghdi S, Brown H, Ghiasvand H, Mobiniza-

deh M. Decomposing inequality in financial protection situation in Iran after implementing the health reform plan: what does the evidence show based on national survey of households' budget? Int J Health Plann Manage. 2018 Mar;2018(3):1–10.

- 52. Nouraei Motlagh S, Darvishi B, Haghighatfard P, Imani-Nasab MH. Fairness of health financing before and after introduction of Iranian health sector evolution plan: a case study. J Clin Diagn Res. 2018;12(6):IC10–5.
- 53. Shojaei S, Yousefi M, Ebrahimipou H, Valinejadi A, Tabesh H, Fazaeli S, et al. Catastrophic health expenditures and impoverishment in the households receiving expensive interventions before and after health sector evolution plan in Iran: evidence from a big hospital. Koomesh. 2018;20(2):283–90.
- 54. Goudarzi R, Tasavon Gholamhoseini M, Noori Hekmat S, YousefZadeh S, Amini S. The effect of Iran's health transformation plan on hospital performance: kerman province. PLoS One. 2021 Feb;16(2):e0247155.
- 55. Baird KE. The financial burden of out-of-pocket expenses in the United States and Canada: how different is the United States? SAGE Open Med. 2016 Jan;4:2050312115623792.
- Erus B, Aktakke N. Impact of healthcare reforms on out-of-pocket health expenditures in Turkey for public insurees. Eur J Health Econ. 2012 Jun;13(3):337–46.
- Wu D, Yu F, Nie W. Improvement of the reduction in catastrophic health expenditure in China's public health insurance. PLoS One. 2018 Apr;13(4):e0194915.
- 58. Tangcharoensathien V, Limwattananon S, Patcharanarumol W, Thammatacharee J, Jongudomsuk P, Sirilak S. Achieving universal health coverage goals in Thailand: the vital role of strategic purchasing. Health Policy Plan. 2015 Nov;30(9):1152–61.
- 59. Behzadifar M, Beyranvand T, Jafari M, Behzadifar M, Taheri Mirghaed M, Martini M, et al. A Description of the Temporal Pattern of Out-of-Pocket Expenditure Related to Iranian Healthcare Services during 1995-2014. Iran J Public Health. 2018 Oct;47(10):1552–7.
- 60. Whitehead BR, Bergeman CS. The effect of the financial crisis on physical health: perceived impact matters. J Health Psychol. 2017 Jun;22(7):864–73.
- Maynou L, Saez M. Economic crisis and health inequalities: evidence from the European Union. Int J Equity Health. 2016 Sep;15(1):135.
- Kheirandish M, Rashidian A, Bigdeli M. A news media analysis of economic sanction effects on access to medicine in Iran. J Res Pharm Pract. 2015 Oct-Dec;4(4):199–205.
- Mahdavi M, Parsaeian M, Jaafaripooyan E, Ghaffari S. Recent Iranian health system reform: an operational perspective to improve health services quality. Int J Health Policy Manag. 2018 Jan;7(1):70–4.
- 64. Letafat M, Beyranvand T, Aryankhesal A, Behzadifar M, Behzadifar M. Universal Health Coverage (UHC) in Iran. Iran J Public Health. 2018 Jul;47(7):1061–2.
- 65. Behzadifar M, Behzadifar M, Bakhtiari A, Azari S, Saki M, Golbabayi F, et al. The effect of the health transformation plan on cesarean section in Iran: a systematic review of the literature. BMC Res Notes. 2019 Jan;12(1):37.
- 66. Rashidian A, Moradi G, Takian A, Sakha MA, Salavati S,

Faraji O, et al. Effects of the Health Transformation Plan on caesarean section rate in the Islamic Republic of Iran: an interrupted time series. East Mediterr Health J. 2019 Jun;25(4):254–61.

67. Abouie A, Majdzadeh R, Khabiri R, Hamedi-Shahraki S, Emami Razavi SH, Yekaninejad MS. Socioeconomic inequities in health services' utilization following the Health Transformation Plan initiative in Iran. Health Policy Plan. 2018 Dec;33(10):1065–72.