



Comparing the Drug Prescription before and after the Implementation of Health System Reform Plan in Southeastern Community Pharmacies of Iran

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ABSTRACT

Background: In Iran, the health system reform plan (HSRP) has been implemented since 2014. We aimed to evaluate the prescriptions in Zabol city before and after the implementation of this national plan.

Methods: 2000 prescriptions received to six pharmacies in Zabol city were evaluated. 1000 prescriptions were randomly selected in April 2014 and the pharmacy code, distance from clinic, type of insurance, number of drugs prescribed, total price of drugs, price of the drugs under insurance coverage and not under insurance coverage, and most prescribed drugs were compared with 1000 prescriptions randomly selected from the same pharmacies in April 2015.

Results: Of 68822 prescriptions before HSRP, 71.8% and after HSRP, of 56536 prescriptions, 66.5% were related to pharmacies close to clinic. The mean number of the prescriptions reduced from 260.4 ± 132.2 to 242.9 ± 102.3 and that of prescribed drugs in each prescription reduced from 3.42 ± 1.6 to 3.1 ± 1.4 (both $P < 0.001$), while the price of the drugs did not change ($P > 0.05$).

Conclusion: HSRP reduced the number of the drugs prescribed, but not the price, although the type of drugs most commonly prescribed varied between the two study phases. HSRP was successful in Zabol city regarding reducing the total number of drugs prescribed.

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Introduction

According to the main objective of a health system, consisting of all the organizations, institutions, and resources, is achieving the highest attainable level of health equitably for the whole population (1). Due to the continuous changes in the epidemics of diseases and

development of new and expensive health technologies, the growing cost of health systems around the world has become one of the main concerns of managers and decision makers of health systems, which necessitate dynamic changes in the health system plan (2).

The health system of Iran, like other health systems, faces the socioeconomic challenges and the changing burden of diseases and thus requires changes (3, 4). The increasing health costs, non-coverage of considerable numbers of eligible patients by insurance, especially in urban areas, lack of referral system and policy making

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fragmentation are some important challenges of the health system in Iran (5). The main source of financing health costs is out-of-pocket (OOP) payment and health insurance companies and government cover less than 40% of the overall health costs (6, 7). Therefore, the Ministry of Health and Medical Education (MOHME) has designed and implemented the health system reform plan (HSRP) as a step toward the great health vision in 2025 to attain developed health standards (8). The main goal of HSRP, based on the fifth 5-year health development national strategies (2011-2016), is to increase the population covered by primary health insurance, increase quality of care, reduce OOP inpatient payments, and update tariffs to more realistic values that have resulted in favorable social reaction and general public satisfaction; nevertheless, there are some concerns for sustainability of the programs and equity of financing (9).

As HSRP is a newly-launched evolving plan and the conditions of its implementation are different in each region of the country, research on the outcome of its implementation can help improve the management and implement correct strategies in the present and future health system plan(s) (10). One of the main determinants of health costs is the types and total number of drugs prescribed (11) and studying the types, costs, and total number of drugs can be a guide towards total drug expenditure (12). As the effect of HSRP on the prescribed drugs has not been studied in Zabol city, this study aimed to evaluate the number and price of the drugs prescribed in outpatient prescriptions in Zabol city before and after the implementation of this national plan in order to evaluate the quality of implementation of HSRP regarding outpatient prescriptions.

Methods

The present descriptive cross-sectional observational study investigated the prescriptions available in the archives of the Food and Drug Administration of Zabol, related to six selected pharmacies and the data were collected in two phases: once in April 2014 and once in April 2015. The protocol of the study was approved by the Ethics Committee of Zabol University of Medical Sciences.

Zabol city, the center of Sistan and Balouchestan, is placed in Eastern Iran with an area of about 334 m² and two cities (13). Among 20 pharmacies, 6 were selected from two main treatment areas of the city, three close to Imam Khomeini Hospital clinics (the main public health center in the city) and three far from the clinic (Besat Avenue, the main place of private clinics).

A total of 1000 prescriptions were selected by simple randomization method from six selected pharmacies. The number of prescriptions reviewed was determined based on the closeness to the health center, minimum, and the total number of prescriptions in the selected pharmacies.

The information collected included date of the prescriptions, the pharmacy code, distance from clinic, type of insurance, number of drugs prescribed, total price of drugs prescribed, price of the drugs under insurance coverage and not under insurance coverage, and the most prescribed drugs. Then, the collected data at each study phase were compared with each other to see the trend.

Statistical analysis

The collected data of the two phases were recorded in specific checklists and entered into computer after the data collection was completed. The results were reported by descriptive analysis, presented as mean \pm standard deviation (SD) for quantitative variables and frequency (percentage) for categorical variables. Then, for inferential analysis, first, Kolmogorov-Smirnov test was used to assess the normal distribution of data. Continuous variables were compared using T test or Mann-Whitney U test, whenever the data did not appear to have normal distribution or when the assumption of equal variances was violated across the study groups. Categorical variables were, on the other hand, compared using chi-square test. For the statistical analysis, the statistical software IBM SPSS Statistics for Windows version 21.0 (IBM Corp. 2012. Armonk, NY: IBM Corp.) was used. P values of 0.05 or less were considered statistically significant.

Results

The total number of prescriptions before and after the HSRP in the six pharmacies was 68822 that reduced to 56536 after the HSRP. As shown in table 1, the highest number of prescriptions both before and after the HSRP was related to pharmacy No.3 (N=27352; 39.7% and N=18892; 33.4%) and the lowest number of prescriptions before and after the HSRP was related to pharmacy No.2 (N=3755; 5.45% and N=2883, 5.09%). (Figure 1)

Comparing the distribution of prescriptions according to distance from clinic before and after HSRP showed that of 68822 prescriptions before HSRP, a total of 49478 of prescriptions (71.8%) were close to clinic and 19344 far from clinic; and reduced to 56536 prescriptions after HSRP: 37614 (66.5%) close to clinic and 18922 (33.5%) far from clinic. Of all prescriptions, 87092 were related to the three pharmacies close to clinic and 38266 related to the three pharmacies far from clinic. Of the total prescriptions, 1000 prescriptions before and 1000 prescriptions after HSRP were randomly selected to evaluate the price and type of drugs. As shown in Table 2, before HSRP, the pharmacy No.3 had the largest number of prescriptions (39.7%) and the pharmacy No.2 the least (5.4%). After HSRP, the pharmacy No.3 had again the largest number of prescriptions (33.4%) and the pharmacy No.2 the least (5%).

The mean and SD of number of the prescriptions

Table 1. Distribution of prescriptions before and after health system reform plan at the selected pharmacies.

	Before the health system reform plan		After the health system reform plan		Total
	Number	Percent	Number	Percent	Number
Pharmacy No. 1	18371	26.69	15840	28.02	34211
Pharmacy No. 2	3755	5.46	2882	5.10	6637
Pharmacy No. 3	27352	39.74	18892	33.42	46244
Pharmacy No. 4	8346	12.13	7434	13.15	15780
Pharmacy No. 5	6596	9.58	6264	11.07	12860
Pharmacy No. 6	4402	6.40	5224	9.24	9626
Total	68822	100	56536	100	125358

studied at the six selected pharmacies was 260.4 ± 132.2 before HSRP that reduced to 242.9 ± 102.3 after HSRP and comparison by T-test showed statistically significant difference ($P < 0.001$). The mean number of prescribed drugs in each prescription was 3.4 ± 1.6 (range: 1-10) before HSRP that reduced to 3.1 ± 1.4 (range: 1-10) after HSRP and comparison by T-test showed statistically significant difference ($P < 0.001$).

The total price of the drugs were evaluated in IRR and assessed in the selected prescriptions before and after HSRP and the results showed that the mean and SD of the drugs' price did not significantly change ($P = 0.061$), nor did the price of the drugs under insurance coverage or those not under insurance coverage ($P = 0.998$ and 0.741 , respectively), as the results of T-test indicated (Table 3).

The most commonly prescribed before HSRP in the total prescriptions studied included dexamethasone, cefexime, metronidazole, and expectorants/azithromycin/theophylline/SA, while after HSRP, the most commonly prescribed included dexamethasone, acetaminophen,

dextrose, and pyroxicam/sodium chloride/expectorants.

Discussion

In the present study, we selected six pharmacies and studied the prescriptions in these pharmacies, once in April 2014 and once again in April 2015 to compare the prescriptions before and after implementation of HSRP and the results showed that the total number of prescriptions reduced from 68822 before HSRP to 56536 after the HSRP. In the next step, for an accurate assessment of the costs and types of drugs prescribed, we randomly selected 1000 prescriptions from these pharmacies at each phase of the study and the results indicated reduction in the mean amount of prescriptions at the pharmacies and the number of drugs prescribed in each prescription; these results indicates the efficacy of HSRP in reducing the total number of prescriptions that can imply reducing the unnecessary prescription of medications and more appropriate management. As an extensive national program, HSRP covers a wide range

Table 2. Distribution of prescriptions evaluated at the selected pharmacies.

The selected pharmacies	Number	Percent	The cumulative percentage	Number	Percent	The cumulative percentage
Pharmacy No. 1	266	26.6	26.6	280	28	28
Pharmacy No. 2	54	5.4	32	50	5	33
Pharmacy No. 3	397	39.7	71.7	334	33.4	66.4
Pharmacy No. 4	122	12.2	83.9	132	13.2	79.6
Pharmacy No. 5	96	9.6	93.5	111	11.1	90.7
Pharmacy No. 6	65	6.5	100	93	9.3	100
Total	1000	100		1000	100	

Table 3. Comparison of the price of the drugs before and after health system reform plan in the total prescriptions studied.

		Minimum	Maximum	Mean	Standard deviation	P-value
Total	Before health system reform plan	10500	959000	80488.37	74884.48	0.06
	After health system reform plan	2700	2315000	88555.76	114154.96	
Under insurance coverage	Before health system reform plan	6790	783000	60566.29	68311.50	0.9
	After health system reform plan	1890	1026900	60559.26	66118.28	
Not under insurance coverage	Before health system reform plan	2910	566700	26248.1	30736.96	0.7
	After health system reform plan	810	904800	26794.97	41947.55	

of changes aimed to decrease the OOP of patients and improve the quality and equity of access to inpatient and outpatient health services (14). Although the reports from different cities report that HSRP is associated with increased satisfaction of patients and nurses (15-17), most studies have focused on inpatients and assessed the trend of changes in hospitals (18-21) and none has evaluated the prescriptions of pharmacies to assess the effect of HSRP on the amount, type, and price of the drugs prescribed in outpatient service, as far as the authors are concerned. As the results of the present study indicated after a one-year interval, there was a significant reduction in the amount of the prescriptions and drugs prescribed in the outpatient service in Zabol city. This reduction is

associated with a lower risk of prescribing unnecessary or mistaken drugs (22, 23). This reduction in the amount of total prescriptions and number of drugs per prescription in this study was not associated with reduced costs, either total costs or the costs of drugs under insurance coverage, or not under coverage, which was contrary to the initial hypothesis of the study. According to the present study, there was a slight increase in total costs of the drugs, but the change was not statistically significant. The previous studies on the effect of HSRP on the costs of admitted patients showed that the total costs of patients has increased after HSRP (24), although the insurance coverage has fortunately increased (25). These results are in line with the present study, although it focused on

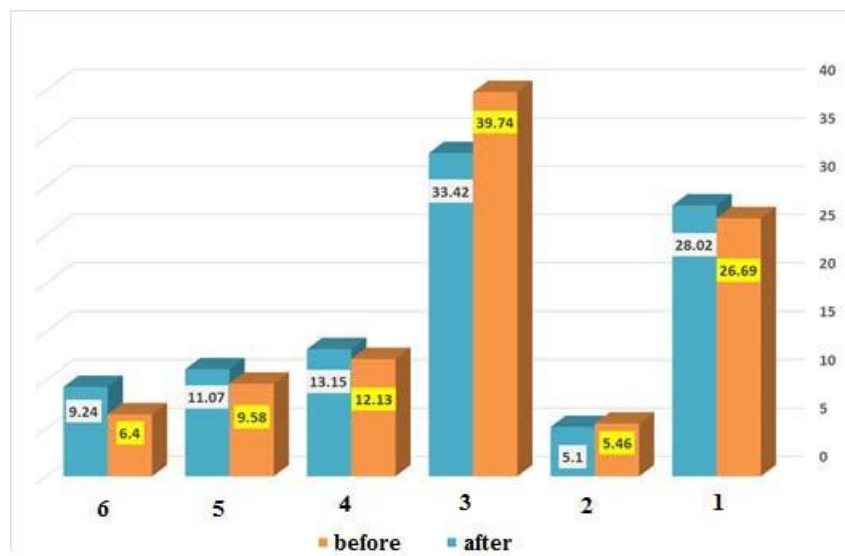


Figure 1. Comparison of the percent of prescriptions before and after health system reform plan at the selected pharmacies.

inpatient costs. The non-significant change in the total costs of drugs in this study could be due to the fact that we compared the results after one year that could have been shorter than the time required to show a significant difference. In addition, the total costs of the drugs are affected by the increased inflation rate and income, which could mask the significant change in the results in terms of costs of drugs or reflect the catastrophic health expenditure in Iran (26).

For assessment of the association of the prescriptions with closeness to clinic, we selected half of the pharmacies from those close to clinic and half from those far from clinic and the results indicated that most prescriptions were related to pharmacies close to clinics both before and after HSRP (71.8% and 66.5%, respectively). These results indicate that HSRP was not effective in increasing the patients' visits to governmental clinics and the frequency of prescriptions received from private clinics had a slight increase. As the main focus of attention of HSRP is to increase the efficiency of health provision in the governmental and public health centers and has less access to private clinics, this study showed that in this city this vision was not fully accomplished.

Furthermore, we evaluated the type of drugs prescribed and reported the most commonly prescribed drug and the results indicated that dexamethasone was the top most commonly prescribed both before and after HSRP. Dexamethasone should be only prescribed for treatment of inflammatory disorders, such as severe allergies, arthritis, ulcerative colitis, etc., while it may be prescribed mistakenly (27). As a significant methods of studying the drug use pattern in a community is studying the prescriptions of physicians, Iranian studies have focused on the prescriptions to study the mistakes, errors and interference of drugs, which have showed that the status of prescriptions in Iran is not satisfactory (28), which is consistent with the results of the present study, although none has compared them before and after HSRP.

One of the strengths of the present study was assessment of the prescription and drug patterns before and after HSRP to see the effect of this national plan on outpatient prescriptions in Zabol city, which as far as the authors are concerned, has not been evaluated previously. Nevertheless, the present study could have some limitations, such as short follow-up, which was due to the fact that HSRP is a newly-launched plan and the longest time possible was selected in this study. In addition, we collected our data from the prescriptions archived in the Food and Drug Administration of Zabol and any prescription that has not been recorded in this archive was missed from being assessed in this study, although this archive is the official archive of prescriptions and pharmacies should give all their prescription only to this center in this city. Also, this study was conducted only in one city and its generalizability to other cities of the

country is not possible.

This study showed that HSRP could significantly reduce the number and amount of drugs prescribed, but not the costs and most commonly prescribe drug. The findings of this study can provide useful information for managers and policymakers and healthcare providers towards more accurate and clearer planning considering the outpatient drug prescriptions, and providing an appropriate framework for monitoring and evaluating health promotion plans and providing appropriate solutions for policymakers and planners in the various stages of HSRP. As HSRP is newly launched, it requires research to indicate the trend of changes after this plan, and assessing the pattern and costs of outpatient drugs is an important indicator of efficacy of this plan, although as far as we are concerned no studies has addressed this issue in Iran. Therefore, it is recommended to conduct similar studies in other cities in different intervals to see how HSRP has affected the pattern and costs of outpatient drugs in Iran.

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