A study on the pattern of drug prescription in the family physician centers of Mashhad University of Medical Sciences in 2017

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ABSTRACT

Introduction: The issue of managing and controlling pharmaceutical affairs is one of the most important affairs of the Ministry of Health and Medical Education. The aim of this study was to Survey the indexes of Principles of prescribing in Mashhad Medical Sciences Medical Centers and compare them with national indicators. It is hoped that by promoting the rational use of medicine, we will take a step towards a healthier and safe society.

Materials and Methods: The present study is a Sectional. 77,964 prescriptions were reviewed of People referring to the centers covered by the Rural Family Physician Program in 2017. Data were analyzed by SPSS software version 21 and analyzed by T-test, one-way ANOVA and Chi-square. The level of significance was considered to be less than 5%.

Results: The average of Medicines Per Prescription Was 2.51 ± 1.11. Antibiotics are among the most frequently prescribed medications by 44.9%, followed by NSAIDs with 20.77%. According to the results, 3.8% of prescriptions contained more than 4 drugs. The number of prescribed prescription drugs is higher for doctors with a higher employment status ($P<0.01$). Also, the number of drug items for older people is higher than for other age groups ($P<0.01$). The age of the patients is effective in the administration of antibiotics, in this study 69% of the children and adolescents who have received antibiotics are prescribed ($P<0.01$).

Conclusion: Precise policies on the rational use of drugs are essential to facilitate the use of electronic health records and the launch of electronic prescriptions. Based on the results, there are scientific and educational interventions to promote the principles of rational drug administration.

Introduction

The Management and supervision of drug affairs is one of important and critical issues of Ministry of Health and Medical Education. In this regard, the eighth part of first health care is the provision of basic medicine in health and care organization. Hence, people in different parts of the country have easy access to drugs (1). Drug as a strategic product is subsidized and is a basic need for the public. Considering the importance and sensitivity of drugs for the treatment of patients, sound management, production

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process supervision, provision, inventory, maintenance, distribution, and delivery are of utmost importance in the progress, development, and health of society. The reformation of drug policies in developing countries is one of chief reformatory procedures (2).

According to World Health Organization, rational usage of drugs means the patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community. Irrational prescription of drug could be using it unlike what was mentioned (3).

Negligence in rational usage of drugs could have unpleasant consequences like lengthening and worsening of disease, dangerous side-effects development and confinement in hospital, deterioration of the relationship between doctor and patient, and consequently treatment cost increase for individuals, organizations and more importantly the country (3,4). The experts of medicine in our country believe that the main cause of many drug instabilities is the culture of prescription and usage of them. WHO emphasized on the irrational drug usage in a report in 1998. This process leads to the inability of people to buy the drug and makes it out of reach (5).

Therefore, WHO, in order to highlight the importance of this issue in developing countries, held various conferences and made the countries to study drug prescription by establishing prescription and rational usage committees (6).

The function of doctors' drug prescription and their usage are studied based on WHO indices which include: 1. The number of drugs in each prescription 2. The percentage of prescription, including antibiotics 3. The percentage of prescription including injectable drugs (7). The prescription, though being simple, is a full reflection of medical education of country, cultural, social beliefs of society, drug status, and the quality of rules and regulations impact on medical society. Fortunately, in recent years, by creating prescription information bank in the country, systematic analyzing and monitoring the information related to prescription and drug usage, as well as, the

prescription patterns among physicians are possible. The rational prescription indices can be measured in all time. Considering the fact that physicians play a significant role in specifying prescription pattern and drug usage, rational prescription of drug by them can result to an increase in treatment quality. As it is known, General practitioners, as the most influential people in health organization of country, play a leading role in reformation of the present prescription process. It is due to the fact that the number of patients who refer to them are more than any other therapeutic groups. The aim of the present study is to investigate the prescription indices of health centers covered by Mashhad University of Medical Sciences in 2017. It is hoped that steps toward a healthier, more efficient and safer will be taken.

Materials and Methods

The present study is sectional-analytical which was carried out in 2017 on a population covered by Mashhad University of Medical Sciences. It was performed based on a research project approved by Research Assistant. The registered data in the system include the drug prescription of the people who referred to the family physician centers in villages.Overall 77964 prescriptions were studied, in this respect, some of the prescription indices based on World Health Center were used. They include: drug items mean, the percentage of prescriptions with more than four items, the percentage of the patients receiving injectable drugs, the percentage of the patients receiving antimicrobial drugs, the percentage of patients receiving corticosteroids drugs and the price of whole prescription were used. The mentioned prescriptions were studied for the identification of the patients (age, gender and address) and the physician (employment status, years of employment) by the link of prescription information to database document. The data codified were entered to SPSS (version: 21). In order to specify the study variants descriptive statistics was used. T-test, one-sided ANOVA test (considering the variants to be normal) and Chi- square were used. The significance level< 5% .

Results

The results of the present study showed that 37.9 percent of people who referred to hospitals were men and 60.1 percent of them were women. The age mean of men is 30/57±25/51 and women is 37/20±23/1. Of 92% of the people who referred to health centers and for whom prescription was written did not have diploma, 7 % of these people had diploma and 1% of them had the education higher than diploma. Out of the total of 19 people who were studied 19 % were employed and 81% were house-wives and jobless. Of 16 percent of the subjects lived in the city and 84 percent of them lived in the village. The physicians of the studied prescription had the mean of 4/23±4/75 years of service. Moreover, 17 percent of the prescriptions belonged to the physicians with official and treaty employment, 32 percent medical plan course, bill, and 51% were pertinent to family physicians.

In this study, 77964 prescriptions of the physicians who worked in the centers that are covered by rural family physician plan were studied. These prescriptions were registered in Sina Electronic File System. The drug item mean of all physicians' prescription was 2/51±1/11 in each prescription. According to Table 1, the mean of the items were more in urban regions in comparison with rural areas (P<0.05).

Table 1: Comparison of the drug items prescribed mean separated by patient and physician demographic variables

Drug items (mean, Standard deviation)	Group	Variant
2.56 ± 1.13	Lower than 10 years	
2.34 ± 0.95	10-20 years	Physician experience
2.75 ± 1.31	More than 20 years	
F=50.09 , P<0.001	Test Results	
2.38 ± 1.02	Official and treaty	Type of physician employment
2.55 ± 1.12	contractual	
T=16.09 , P<0.001	Test result	
2.51 ± 1.04	man	Patient gender
2.52 ± 1.14	woman	
T=0.185 , P=0.132	Test results	
2.67 ± 1.08	urban	Patient residence
2.49 ± 1.11	rural	
T=15.98 , P<0.001	Test results	
2.53 ± 1.16	Lower diploma	Patient education
2.39 ± 1.02	Diploma and higher	
T=7.49 , P<0.001	Test results	
2.52 ± 1.14	employed	Patient job
2.52 ± 1.15	Unemployed and housewife	
T=0.77 , P=0.28	Test results	
2.5 ± 1.09	Single	Patient marital status
2.77 ± 1.36	Married	
T=16.74 , P<0.001	Test results	
2.52 ± 0.93	Child (0-4)	
2.54 ± 0.92	Teenager (5-17)	
2.37 ± 1.03	Young (18-29)	Age
2.48 ± 1.14	Middle-aged (30-59)	
2.66 ± 1.34	Elderly (over 60)	
F =113.05 , P<0.001	Test results	

The test indicates that the mean of the prescribed items were different regarding the type of the physicians' employment. The mean of the prescribed items by official physicians were less than the plan employment and family physician contract (P<0.05).Regarding the results of the mean test, the prescribed items were different based on the background of the physicians (P<0.05).

Tukey post hoc test results showed that the most difference between the experiences was 10-20 years with the experience of more than 20 years. The mean of drug items was different in age groups (P<0.05) and Tukey test results presented that the most

difference was between the aged and young people. Additionally, in the study carried out, 3/8 percent of the studied prescriptions had more than 4 drug items. The mean price of each prescription was 94286±107156. Based on the results obtained, the most prescribed drug type was 44/9 antibiotics and non-steroidal, anti-inflammatory NASAID was 20/77, respectively. In the next step, hypertension drug was 11/37, 9/8 corticosteroids, injectable drugs 5/79, and the dugs related to patients with diabetes was 4/63. For 12/7 percent of patients who referred to physicians injectable drugs was prescribed. Injectable corticosteroid was prescribed in the top of injectable drugs. The drug was more prescribed for women rather than men (P<0.05). The drug was more prescribed for the elderly, children and teenagers (P<0.05).

According to the results of Table 2, there was a relationship between antibiotic prescription and physicians' experience. On the report of the percentage of antibiotic prescribed, it can be said that it is less in the physicians with more than 20 years of experience (P<0/05). The physicians with official employment prescribe more antibiotics in comparison with others (P<0/05).

Table 2: Study of the Relationship between prescribed drug with patient and physician demographic variables

NSAID		Injectable drugs		Corticosteroids		Antibiotic		Category	Variable
yes	no	yes	no	yes	no	yes	no		
11,858,(20)	47,131(80)	3,661(6)	55,328(94)	6,326(11)	52,663(89)	26,894	32,095(54)	Lower than 10 years	Physician experience
2701(21)	10206(79)	796(6)	12111(94)	1,278(10)	11,629(90)	6,817(53)	6,090(47)	10-20 years	
126(27)	335(73)	18(4)	443(96)	34(7)	427(93)	138(30)	323(70)	More than 20 years	
χ2=18.65 , P< 0.001		χ2=4.18 ,=P= 0.123		χ2=12.55 , P =0.002		χ2=274.9 , P<0.001		Test results	
2119(15)	12134(85)	996(7)	13257(93)	1449(10)	12804(90)	7310(51)	6943(49)	Official and treaty	Type of physician employment
3675(21)	50003(79)	3927(6)	59751(94)	587(10)	57091(90)	29085(46)	34593(54)	Contractual	
χ2=314.7 , P<0.001		χ2=13.26 , P<0.001		χ2= 0.39 , P=0.528		χ2=147.3 , P<0.001		Test results	
5505(19)	24046(81)	1846(6)	27705(94)	3332(11)	26219(89)	15522(52)	14029(48)	Man	Patient gender
10294(21)	38119(79)	3077(6)	45336(94)	4706(10)	43707(90)	20888(43)	27525(57)	Woman	
χ2=78.7 , P<0.001		χ2=0.27 , P=0.36		χ2=47.97 , P<0.001		χ2=648.74 , P<0.001		Test results	
2129(17)	10006(83)	1066(9)	11069(91)	1754(14)	10381(86)	6985(58)	5150(42)	Urban	Patient residence
13670(21)	52159(79)	3857(6)	61972(94)	6284(9)	59545(91)	29425(45)	36404(55)	Rural	
χ2=65.81 , P<0.001		χ2=148.2 , P<0.001		χ2=266.9 , P<0.001		χ2=680.94 , P<0.001		Test result	
11828(21)	44081(79)	4064(7)	51845(93)	6320(11)	49589(89)	21664(39)	34245(61)	Lower diploma	Patient education
833(18)	3896(82)	433(9)	4296(91)	620(13)	4109(87)	2636(56)	2093(44)	Diploma and higherDiploma and higher	
χ2=33.1 , P<0.001		χ2=22.6 , P<0.001		χ2=14.04 , P<0.001		χ2=524.2 , P<0.001		Test result	
2136(21)	8142(79)	879(9)	9399(91)	1357(13)	8921(87)	3885(38)	6393(62)	Employed	Patient job
9708(21)	36054(79)	3081(6)	42681(94)	4683(10)	41079(90)	19451(42)	26311(58)	Unemployed and housewife	
χ2=0.936 , P=0.17		χ2=42.3 , P<0.001		χ2=76.96 , P<0.001		χ2=76.47 , P<0.001		Test result	
13741(20)	54181(80)	4444(6)	63478(94)	7162(10)	60760(90)	32170(47)	35725(53)	Single	Patient marital status
1278(25)	3822(75)	372(7)	4728(93)	587(12)	45132(88)	958(19)	4142(81)	Married	
χ2=67.69 , P<0.001		χ2=4.34 , P=0.037		χ2=4.6 , P=0.031		χ2=1563.2 , P<0.001		Test result	
1871(16)	9875(84)	203(2)	11543(98)	690(6)	11056(94)	8139(69)	3607(31)	Child (0-4)	Age
2438(18)	11201(82)	672(5)	12967(95)	1129(8)	12510(92)	9466(69)	4173(31)	Teenager (5-17)	
1582(19)	6863(81)	766(9)	7679(91)	1046(12)	7399(88)	4720(56)	3725(44)	Young (18-29)	
6394(22)	22624(78)	2227(8)	26791(92)	3515(12)	25503(88)	11347(39)	17671(61)	Middle-aged (30-59)	
3514(23)	11602(77)	1055(7)	18061(93)	1658(11)	13458(89)	2738(18)	12378(82)	Elderly(over60)	
χ2=336.6 , P<0.001		χ2=672.4 , P<0.001		χ2=459.3 , P<0.001		χ2=1115.1 , P<0.001		Test result	

Antibiotic prescription for men was more in men rather than women (P<0.05). Moreover, in urban regions, antibiotics was prescribed more than rural areas (P<0.05). There was a relationship between antibiotic and the age of the patients receiving the drug. Regarding the percentage of the prescription, it can be said that the most prescription belonged to children and teenagers (P<0.05).

There was a relationship between drug prescription and physicians' experience. Based on the prescription percentage it can be said that anti-inflammatory, non-steroidal NSAID drug prescription was more in experienced physicians (P<0.05). Physicians with plan employment type, bill and family physician contract prescribed this drug more than other physicians (P<0.05). This drug was prescribed more for female patients rather than males (P<0.05). Anti-inflammatory, non-steroidal NSAID were prescribed more in villages rather than cities (P<0.05). It is prescribed more in people with lower education (P<0.05). This drug is prescribed more for the married rather than single people (P<0.05).

There was a relationship between the drug usage and the age of the patients who receive drug. According to the percentage of the prescribed drug, it can be said that anti-inflammatory, non-steroidal NSAID was prescribed more for the middle-aged and the elderly rather than other age groups (P<0.05). Corticosteroids was prescribed less by physicians who were more experienced (P<0.05). Furthermore, corticosteroids was prescribed more in urban regions (P<0.05). Additionally, this drug was prescribed more for young and middle-aged people (P<0.05).Injectable drug prescription was more in urban regions in comparison with rural areas, and The most injectable drugs were prescribed more for the young age group (P<0.05).

Discussion

In the present study, the mean of drug items in physicians' prescription of Mashhad University of Medical Sciences, Mashhad, Iran was 2.51. Nevertheless, the mean of drug prescription which was recommended by World Health Organization is 1.5 in each prescription (9). The mean of the country drug items was 2.96 (10).

The results of the studies in prescription and drug usage in Tehran revealed that the number of prescribed items in each prescription was more in comparison with many countries (8).

In this study, the mean of the items in urban regions was more than rural areas (P<0.05). The number of drug items in contract physicians was more than official ones. In addition, the number of drug items related to urban regions was more than rural areas.

Additionally, the results of this study exhibited that after the elderly, most of drug items were prescribed for children and teenagers. Regarding the antibiotic side-effects, Managers' education and planning are required. The percentage of the prescriptions with more than four drug items was 3.8 percent, while the other study results showed 12 percent for the prescriptions more than four drugs (11). Paying attention to this fact is vitally important. Hence, not only inappropriate and unnecessary prescription leads to side-effects, but also it increases the treatment cost and medication. In addition, it increases heightens the danger of drug interference (11). Irrational prescription of drug is a common issue in medication which is not limited to a specific country. It can expose the patient to physical and mental injuries, as well as, imposing extra costs to the patient and country economics.

Based on the study results, the mean of a prescription price was 94286±107156 Rials, while it was 30108±17206 according to a study by Zare Shahi in Kerman, Iran in 2008. Regarding the instability of prices during these years a comparison cannot be made.

According to the results obtained, the most of prescribed drug was related to antibiotics 44.9 %. At least one antibiotic was prescribed in each prescription which is much higher than developing countries. It can propose inappropriate usage of antibiotics at this university. The amount of this index in other developing countries like Brazil in 2004 was 21% and in Lebanon was 17% in 2001 (13). World Health Organization believes that not more than 20% of outpatient patients should receive antibiotics (14).

This study presented that the physicians with more experience prescribe antibiotics

less than other physicians and female physicians prescribe less than male physicians. The most of antibiotic prescribed was for children and teenagers which requires strict planning. According to the results obtained, after antibiotics the second prescribed drug was related to the anti-inflammatory and non-steroidal NSAID with 20.77 %. At least one anti-inflammatory and non-steroidal NSAID was prescribed in each prescription which is even more than developing countries like Saudi Arabia and Nigeria (16,15).

Based on the studies by Hadian et al. (17) the mean of prescriptions including (NSAID) was 27.49% out of total studied prescription. According to a study by Sepehri et al. (18) anti-inflammatory and non-steroidal (NSAID) were the second drug type which was inappropriately and irrationally prescribed which is more than the results of the present study.   Practitioners in the present study, the physicians with more experience, inflammatory and non-steroidal (NSAID) were prescribed more and female physicians prescribed this drug more than male physicians. In rural areas inflammatory and non-steroidal (NSAID) were prescribed more than cities. Inflammatory and non-steroidal (NSAID) was prescribed more for the middle-aged and the elderly in comparison with other age groups. According to the results of the study, corticosteroids drugs with the percentage of 9.8 is at least one corticosteroids drug in each prescription, which is 7.7% in the whole prescription. Inappropriate prescription of corticosteroids drugs in other studies is reported (20,15). The physicians with less experience prescribed corticosteroid drugs and in urban regions this drug is prescribed more. Corticosteroids was prescribed more for the young and the middle-aged. Based on the study results, after corticosteroids drugs, injectable drugs were prescribed more than other drugs. Inappropriate and extra excessive usage of injectable productions can lead to various problems, including: transmission of infectious diseases, neuron injury in injection place, higher treatment cost in health system of society. Therefore, it is suggested that injectable productions should be limited to serious and life-threatening illnesses, swallow inability, severe vomit, ineffectiveness of edible products and absorption disorders.

Consequently, the physicians should maintain a parallel between the real need of the patient and the danger of side-effect outbreak, as well as the costs. Based on these factors, he/she should decide the way to inject drug. Without a doubt, upgrading the public knowledge and holding technical retraining for physicians could be an effective measure in order to the prescription and consumption of rational drug usage. The injectable drugs by physicians with more experience were prescribed less. Physicians in urban regions prescribed more injectable drugs than rural areas. In various age groups, injectable drug prescription was the most for the young age group.

Conclusion

Careful policies in rational prescription is necessary, which can be facilitated by using electronic documents and establishing electronic prescriptions. It is needless to say that codification and implementation of standard therapeutic protocols in disease treatments is a vital approach in correct prescription. The necessity of the subject has been noticed, however, rational prescription principles should be institutionalized carefully. It requires scientific and educational interferences to upgrade rational principles of prescription.

Acknowledgements

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