Nonprescription Corticosteroid Use, Per Capita Consumption and Pattern of Distribution of Commonly Used Corticosteroids in Khuzestan Province Pharmacies Throughout 2016

Samira Dehghan[1], Leila Kouti[2*], Reza Zibandeh Gorji[1], Kaveh Eslami[2], Janet Soleymani[3], Hossein Barzegar Bafrooei[3], Farideh Younesi[3]

[1]Student Research Committee, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.
[2]Department of Clinical Pharmacy, School of Pharmacy, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.
[3]Food and Drug Deputy, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

A B S T R A C T

Background: Corticosteroids are widely used in many medical problems; therefore, they are easily available in all types of pharmacies. Because of their dramatic response and different available formulations, the non-prescription use of these drugs is high, even though there are many side effects related to their use. The present study evaluates and compares the data reported by FDA, main health insurance organizations and pharmaceutical companies that distribute the corticosteroids.

Methods: This descriptive correlational, cross-sectional study was designed to assess the prevalence, distribution pattern, per capita prescription and non-prescription consumption of 11 high-consumption corticosteroids in private and public pharmacies of Khuzestan province throughout 2016.

Results: The results indicated that the highest distribution of corticosteroids is related to private pharmacies. Among the cities of Khuzestan, the highest rate of non-prescription use of corticosteroids was in Haftkel city, and the lowest was in Andika city. Among the drugs, prednisolone 5 mg tablets and dexamethasone 5 mg tablets have the highest per capita prescription and non-prescription consumption in Khuzestan province, respectively.

Conclusion: According to the results of this study, the per capita consumption of corticosteroids is high, and the pharmacies seem to dispense these drugs widely. Therefore accurate recording of the distribution and dispense of corticosteroids by FDA on a monthly and annual basis is crucial. It is necessary to increase the supervision of drug companies that provide the supply of corticosteroids.

J Pharm Care 2020; 8(4): 159-163.

► Please cite this paper as:

Dehghan S, Kouti L, Zibandeh Gorji R, Eslami K, Soleymani J, Barzegar Bafrooei H, Younesi F. Nonprescription Corticosteroid Use, Per Capita Consumption and Pattern of Distribution of Commonly Used Corticosteroids in Khuzestan Province Pharmacies Throughout 2016. J Pharm Care 2020; 8(4): 159-163.

Introduction

Misuse of drugs is a global problem and self-medication is increasing all over the world (1). According to recent global statistics, the prevalence of self-medication is 2-3%, while in Iran, 10-15% of drugs are used without physician's order, and among them, painkillers, eye drops, antibiotics and corticosteroids are known as a most commonly used drug (2, 3) .

Some important risk factors for drug misuse which is identified in various studies include keeping medicine at home, ignorance of the dangers of self-medication, poor awareness towards side effects, symptomatic treatment of disease, pharmacies' malpractice, the inefficiency of health insurance in financing treatment and Low cost of drugs (3). Corticosteroids are commonly used in the treatment of various inflammatory disorders, autoimmune diseases, asthma, allergic reactions and some malignancies (4). But the adverse effects are relatively high, e.g. Cushing's syndrome (5), suppression of immune system (6), cataract (7), hyperglycemia (8), and ultimately increasing the cost of treatment in general. The poor awareness towards their chronic side effects along with their good availability in

Corresponding Author: Dr Leila Kouti
Address: Department of Clinical Pharmacy, School of Pharmacy, Ahvaz Jundishapur University of Medical Sciences, Golestan blvd., Ahvaz 61357-33184, Iran.
Tel: +986113738378, Fax: +986113738381.
Email: lkouti.pharmacotherapy@gmail.com

pharmacies and their prompt and dramatic response, are some reasons for the rather high misuse rate of these agents. It is necessary to plan to limit the excessive use of these drugs (9).

According to relevant statistics, the average drug prescription in Iran is twice the current international standard, and corticosteroid consumption increased from 13% to 23% between 2005 and 2010 (10).

There are various statistics on non-prescription sales of corticosteroids in local pharmacies in different countries. According to a survey in Sao Paulo, Brazil in 2010, over-the-counter (OTC) sales of corticosteroids in local pharmacies were 65% (11). However, in Iran, the exact amount of these statistics is not available.

In this study, per capita consumption, pattern of distribution and dispense of 11 commonly used corticosteroids in pharmacies supervised by Food Drug Administration of Ahvaz Jundishapur University of Medical Sciences through the year of 2016. The present study evaluates and compares the data reported by FDA, main health insurance organizations and pharmaceutical companies that distribute the corticosteroids.

To the best of our knowledge, this present is the first study to examine the data of sales from drug distributors and insurance organizations to estimate the non-prescription sales of corticosteroids in Iran.

Methods

An open, cross-sectional drug use evaluation study, evaluates and compares the distribution, dispense and consumption pattern of 11 corticosteroids in private, governmental pharmacies and health centers in 17 cities under the supervision of Ahvaz Jundishapur University of Medical Sciences FDA in one year (2016).

This study was approved by the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences (code IR.AJUMS.REC.1396.937).

The most widely used corticosteroids in 2016 were selected based on Iran pharmaceutical statistics (2016) reported by Iran Food and Drug Administration (Betamethasone 0/5 mg Tab, Betamethasone 4 mg/ml Amp, Betamethasone LA Amp, Clobetasol propionate Ointment, Clobetasol Propionate Cream, Dexamethasone 8 mg/2 ml Amp, Dexamethasone 0/5 mg Tab, Prednisolone 5 mg Tab, Prednisolone 50 mg Tab, Triamcinolone Acetonide 40 mg/ml Amp, Methylprednisolone 40 mg/ml Amp).

The cities were Mahshahr, Izeh, Andimeshk, Ramhormoz, Masjed Soleyman, Dasht-e Azadegan, Karun, Bagh-e Malek, Bavi, Omidiyeh, Ramshir, Andika, Hendijan, Hoveyzeh, Lali, and Haftkel. The population each was obtained from the Statistical Center of Iran. The number of physicians in each city was obtained from the Medical Council of Iran and the number of governmental and private pharmacies in each city was obtained from the Food and Drug Deputy of Ahvaz

Jundishapur University of Medical Sciences.

22 out of 45 pharmaceutical companies provided the supply of these pharmacies in terms of the eleven selected corticosteroids. The amount of sale, most distributed and bestselling corticosteroids were obtained and compared.

The data of prescribed corticosteroids by physicians in each city were obtained from the major insurance organizations (Tamin and Salamat).

The gathered data was sorted and analyzed to provide the following outcomes:

• The per capita prescriptions of each corticosteroid in different cities of Khuzestan Province, calculated by dividing the number of corticosteroids prescribed by the healthcare professionals in each city by the population of each city

• The distribution pattern of corticosteroids from drug companies to pharmacies

• The per capita sale amount of each corticosteroid

• The estimated amount of non-prescription sale rates of each corticosteroid in all cities by subtracting the number of drugs prescribed by physicians from the whole corticosteroids bought by a pharmacy from drug distributing companies.

Data underwent descriptive statistical analysis. All collected data were analyzed using SPSS 21.

Results

According to Table 1, Triamcinolone Acetonide 40 mg/ml Amp, among private pharmacies and dexamethasone 0.5 mg among governmental pharmacies had the highest rate of corticosteroid distribution pattern.

Table 1. Distribution pattern of corticosteroids based on the population of cities in the governmental and private pharmacies of Khuzestan Province (%).

Drug name	%	
	Distribution pattern in Governmental Pharmacies	Distribution pattern in Private Pharmacies
Triamcinolone Acetonide 40 mg/ml Amp	3.58	96.42
Dexamethasone 8mg/2 ml Amp	3.87	96.13
Prednisolone 5 mg Tab	4.88	95.22
Methylprednisolone 40 mg/ml Amp	5.99	94.01
Prednisolone 50 mg Tab	6.04	93.96
Clobetasol propionate Oint	6.93	93.07
Betamethasone 4mg/ ml Amp	8.46	91.54
Betamethasone LA Amp	11.54	88.46
Clobetasol Propionate Cream	11.99	88.01
Betamethasone 0.5 mg Tab	20.83	79.17
Dexamethasone 0.5 mg Tab	32.22	67.78

Tab; Tablet, Amp; Ampoule, Oint; Ointment.

Table 2 describes the per capita distribution of drugs based on population of Khuzestan province and the number of pharmacies in each city.

Per capita distribution shows that the highest per capita distribution was for dexamethasone 0.5 mg tablet and the lowest that was for Clobetasol propionate cream. While, the highest and lowest per capita distributions based on population of Khuzestan province was for Triamcinolone Acetonide 40 mg/ml Amp and Clobetasol propionate cream, respectively.

Table 2. Distribution pattern of corticosteroids based on the population of cities in the governmental and private pharmacies of Khuzestan Province (%).

Drug name	Per capita distribution		Per capita of prescription	Per capita of Non- prescription	Per capita of prescribed drug
	population	pharmacies	population		Number of physicians
Betamethasone 0.5 mg Tab	0.24	1191.53	0.0777	0.0973	190.9671
Betamethasone 4mg/ ml Amp	0.21	1215.37	0.1483	0.0301	364.5873
Betamethasone LA Amp	0.24	1827.97	0.1537	0.1111	386.7541
Clobetasol propionate Oint	0.0185	127.76	0.0150	0.0036	37.0790
Clobetasol Propionate Cream	0.0082	62.21	0.0078	0.0025	19.2545
Dexamethasone 8mg/2 ml Amp	0.3140	2056.7072	0.2633	0.0388	647.0736
Dexamethasone 0.5 mg Tab	2.3292	7106.9740	0.718	0.9722	176.5262
Prednisolone 5 mg Tab	0.2545	1067.6291	1.4770	0.2147	3631.7008
Prednisolone 50 mg Tab	0.0124	160	0.1379	0.0188	339.1166
Triamcinolone Acetonide 40 mg/ml Amp	2.8320	11521.965	0.0387	0.0048	95.1597
Methylprednisolone 40 mg/ml Amp	0.6859	2489.4317	0.3277	0.0379	805.4455

The highest per capita consumption of prescribed and non-prescribed drugs was prednisolone 5 mg and dexamethasone 0.5 mg, respectively. Clobetasol propionate cream had the lowest per capita consumption.

Table 3 shows the cities with the highest and lowest per capita distributions of prescribed and non-prescribed drugs based on the population of cities and per capita number of drugs prescribed by each physician based on the number of physicians. According to this table, the highest and lowest per capita distribution of non-prescribed corticosteroids was for Haftkel and Andika, respectively.

Table 3. Cities with the highest and lowest number of corticosteroids distribution among different cities of Khuzestan Province.

Drug name	Per capita of prescribed drugs based on cities population		Per capita of non-prescribed drugs based on cities population		Per capita of prescribed drug based on Number of physicians	
	Highest	Lowest	Highest	Lowest	Highest	Lowest
Betamethasone 0/5 mg Tab	Haftkel(0.3496)	Andika(0.0016)	Haftkel(0.0927)	Andika(0.0008)	Dasht-e Azadegan	Lali
Betamethasone 4mg/ ml Amp	Karun(0.2550)	Andika(0.0126)	Hendijan(0.0516)	Hoveyzeh(0.0071)	bavi	Hoveyzeh
Betamethasone LA Amp	Karun(0.2550)	Andika(0.0103)	Izeh(1.4183)	Ramhormoz (-0.1654)	Dasht-e Azadegan	Hoveyzeh
Clobetasol propionate Oint	Masjed Soleyman(0.0333)	Hoveyzeh(0.0030)	Haftkel(0.0138)	Hoveyzeh(0.0008)	bavi	Hoveyzeh
Clobetasol Propionate Cream	Masjed Soleyman(0.0209)	Hoveyzeh(0.0013)	Haftkel(0.0128)	Mahshahr(0.0010)	bavi	Hoveyzeh
Dexamethasone 8mg/2 ml Amp	Dasht-e Azadegan(0.5121)	Andika(0.0184)	Ramhormoz(0.0946)	Andika(0.0030)	Dasht-e Azadegan	Andika
Dexamethasone 0.5 mg Tab	Haftkel(0.5040)	Andika(0.0012)	Ahvaz(2.2582)	Ramshir(-0.0315)	Izeh	Hoveyzeh
Prednisolone 5 mg Tab	Ahvaz(2.5000)	Andika(0.0209)	Ahvaz(5.4208)	Bagh-e Malek(0.0207)	omidiyeh	Andika
Prednisolone 50 mg Tab	Ahvaz(0.2312)	Andika(0.0006)	Ahvaz(0.4875)	Andika(0.0021)	bavi	Andika
Triamcinolone Acetonide 40 mg/ml Amp	Hoveyzeh(0.0850)	Andika(0.0026)	Haftkel(0.0138)	Mahshahr(0.009)	bavi	Hendijan
Methylprednisolone 40 mg/ml Amp	Ahvaz(0.6640)	Andika(0.0028)	Omidiyeh(0.3992)	Hendigan(0.0010)	ahvaz	Andika

Discussion

The purpose of this study was to estimate the amount of non-prescription corticosteroid sales from pharmacies in Khuzestan province by collecting the data regarding the amount of corticosteroids bought from drug distributors and number of corticosteroids prescribed by physicians. The results can help authorities to have more clear targets and strategies in terms of supervision, surveillance and public awareness towards corticosteroid use.

Although many great studies have discussed the prescription patterns of corticosteroids or reasons for irrational prescribing of these drugs in Iran, a thorough search of the relevant literature yielded no related article for systemic steroids. In terms of topical steroids, since some of them are on OTC drug lists, the comparison did not provide useful interpretations (12).

Controlling the non-prescribed use of corticosteroids is a major concern of authorities and health care providers in Iran. But with specific data from the centers providing these drugs (mainly pharmacies), the committees that supervise the rational use of drugs can have a better understanding. Studies such as the present study can help identify the targets for education and awareness, in addition to more focused surveillance, stewardship and monitoring (9).

This study showed that drug distributers' largest wholesale customers, in terms of corticosteroids, are private pharmacies, with pharmacies of Haftkel city being on top of the list. Haftkel and Ahvaz also had the highest non-prescribed corticosteroid use. Therefore, these two cities may need more monitoring and stewardship tactics.

The non-prescribed corticosteroid consumption was low in Lali, Andika, Ramshir and Bagh Malek. The authors believe that this is due to the higher number of family physicians per capita in these cities, compared to the other cities of Khuzestan.

Comparisons of drugs in different cities showed that Haftkel had the highest sales of over-the-counter corticosteroids in its pharmacies compared to other cities such as Lali, Hoveyzeh, Hendijan and Andika, which are all close in terms of population.

Some previous great studies showed that the rational use of drugs can be improved by educating and increasing patients' knowledge by pharmacists (13, 14).

In Khuzestan, many educational sessions are held by university of medical sciences, focusing on promoting the rational use of drugs, for physicians. Meanwhile, surveillance approaches by insurance companies and FDA monitoring for physicians are performed to ensure appropriate treatment of patients. But it seems that this strategy alone cannot control the use of corticosteroids, since the non-prescription use of these drugs is a major concern (15).

According to the results of the study, the highest per capita consumption of prescribed corticosteroids was for prednisolone 5 mg tablet. Dexamethasone 0.5 mg tablet had the highest per capita non-prescribed consumption. The authors believe that educational sessions on dexamethasone, for public, can be a good target.

In some other studies, it has been observed that the restriction of public access to drugs (especially drugs with dangerous side effects), public education in the rational use of drugs, limitation of the number and type of the drugs stored in homes, improving the quality of health services, increasing public access to the service provider systems has been very useful in reducing the rate of self-medication (16).

Chalker and colleagues' study in 2005, compared the impact of restrictive policies on non-prescription corticosteroids in community pharmacies of Vietnam and Thailand. In Vietnam, the increasing trend of corticosteroid use decreased from 62% to 29% after the implementation of policies. In Thailand, following the implementation of these policies, the downward trend in non-prescription corticosteroid use intensified, from 44% to 25% (17). Given the statistics of this downward trend in non-prescription corticosteroid use in these two countries, it can be implied that, by considering an approach of restricting non-prescription corticosteroid drugs, the rate of unnecessary use of these drugs would decrease.

Limitations of this study

- The data on prescribed corticosteroids were collected by the records of two main insurance organizations (Tamin and Salamat). Prescriptions covered by other insurance companies were not included in this study, due to the lack of compliance and response from their organizations. However, this issue did not have a major influence on the results since in 2016, due to national public health insurance, all Khuzestan residents were insured by either Tamin or Salamat insurance.

- It is known that some pharmacies depot the drugs they buy from drug distributors; hence this supply can be a bias in the results. This concept is weighty when drug prices change frequently. In 2016, the price of drugs sold by drug distributors did not alter significantly, therefore the authors believe the results can be considered reliable.

According to the results of this study, the per capita consumption of corticosteroids is high, and the pharmacies seem to dispense these drugs widely. Therefor accurate recording of the distribution and dispense of corticosteroids by FDA on a monthly and annual basis is crucial.

It is necessary to increase the supervision of drug companies that provide the supply of corticosteroids. The authors believe that, by subtracting the number of drugs prescribed by physicians from the whole corticosteroids bought by a pharmacy from a drug distributing company, the amount of

non-prescribed dispensing of the pharmacy can be roughly estimated.

Acknowledgements

References

1.   Jalilian F, Hazavehei SMM, Vahidinia AA, Moghimbeigi A, Zinat Motlagh F, Mirzaei Alavijeh M. Study of causes of self-medication among Hamadan Province Pharmacies Visitors. Avicenna Journal of Clinical Medicine 2013;20(2):160-166.

2.   Chuc NT, Tomson G. "Doi moi" and private pharmacies: a case study on dispensing and financial issues in Hanoi, Vietnam. Eur J Clin Pharmacol 1999;55(4):325-32.

3.   Ershadpour R, Zare Marzouni H, Kalani N. Review survey of the reasons of the prevalence of self-medication among the people of Iran. Navid 2015;18(60):16-23.

4.   Nieman LK. Pharmacologic use of glucocorticoids. In: :André Lacroix Kathryn A Martin, editors. UpTo-Date. [Internet]. Waltham (MA): UpToDate Inc; 2020. [updated 2019 Mar 02; cited 2020 may 14]. Available from: https://www.uptodate.com/contents/pharmacologic-use-of-glucocorticoids

5.   Hasselgren PO, Alamdari N, Aversa Z, Gonnella P, Smith IJ, Tizio S. Corticosteroids and muscle wasting: role of transcription factors, nuclear cofactors, and hyperacetylation. Curr Opin Clin Nutr Metab Care 2010;13(4):423-8.

6.   Carpenter WT Jr, Gruen PH. Cortisol's effects on human mental functioning. J Clin Psychopharmacol 1982;2(2):91-101.

7.   oogood JH, Markov AE, Baskerville J, Dyson C. Association of ocular cataracts with inhaled and oral steroid therapy during long-term treatment of asthma. J Allergy Clin Immunol 1993;91(2):571-9.

8.   Donihi AC, Raval D, Saul M, Korytkowski MT, DeVita MA. Prevalence and predictors of corticosteroid-related hyperglycemia in hospitalized patients. Endocr Pract 2006;12(4):358-62.

9.   R. Zareshahi, A.a. Haghdoost, A. Asadipour, B. Sadeghirad. Rational usage of drug indices in the prescriptions of kerman medical practitioners in 2008. Journal of Rafsanjan University of Medical Sciences 2012;11(6):523-536.

10. Teymourzadeh E, Babashahy S, Hoseini Shokouhi SM, et al. Hakim Research Journal 2013;16(2):169-170.

11. Ferraz MB, Pereira RB, Paiva JG, Atra E, Dos Santos JQ. Availability of over-the-counter drugs for arthritis in Sao Paulo, Brazil. Soc Sci Med 1996;42(8):1129-31.

12. Rogers J, Wood SM, Garrette EL, et al. Use of nonprescription topical steroids: patients' experiences. Br J Dermatol 2005;152(6):1193-8.

13. Toklu HZ, Akici A, Oktay Ş, Cali S, Sezen SF, Keyer-Uysal M. The pharmacy practice of community pharmacists in Turkey. Marmara Pharmaceutical Journal 2010;14(1):53-60.

14. Laing R, Hogerzeil H, Ross-Degnan D. Ten recommendations to improve use of medicines in developing countries. Health Policy Plan 2001;16(1):13-20.

15. Sinha A, Kar S, Yadav N, Madke B. Prevalence of Topical Steroid Misuse Among Rural Masses. Indian J Dermatol 2016;61(1):119.

16. Moayeri A, Moayeri A. Assessing related factors on the illicit use of medications in Abbas Abad City (Mazandaran): A cross sectional study. Journal of Ilam University of Medical Sciences 2014;22(5):11-19.

17. Chalker J, Ratanawijitrasin S, Chuc NT, Petzold M, Tomson G. Effectiveness of a multi-component intervention on dispensing practices at private pharmacies in Vietnam and Thailand- A randomized controlled trial. Soc Sci Med 2005;60(1):131-41.