Economic burden of irrational use of injectable form of Dexamethasone: a warning to health system

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ABSTRACT
Background: Irrational prescribing of injections is common in Iran. According to the statistics of the National Committee of Rational Use of Drugs (NCRUD), more than 40% of prescriptions have at least one injectable form, while injectable dosage form of dexamethasone is on the top of the list. Considering the side effects of corticosteroids, the objective of this study was to investigate the prescribing pattern of dexamethasone in all physicians’ prescriptions from 2007 to 2011 in Iran. Method: A cross-sectional study was carried out on a collection of prescriptions collected from health insurance companies from 2007 to 2011. The inspection was for prescriptions including injectable form of dexamethasone using special software called Rx Analyst and cost analysis was conducted using NCRUD. Results: Almost 365 million prescriptions were reviewed. Those prescriptions including at least one injectable form were identified. Among prescriptions including injectable form of medicines, more than 21% had at least one injectable dosage form of dexamethasone making it the first prescribed medicine by general practitioners. An overall increasing tendency in prescribing pattern and the cost of injectable dosage form of dexamethasone were evident over the observation period. Prescribing the injectable form of dexamethasone was 12.28% in 2007, 13.11% in 2010 and 12.10% in 2011 by all physicians. All related costs were calculated using governmental prices and finally total costs were adjusted to 2011 fees in USD. Conclusion: Irrational pattern of prescribing injectable form of dexamethasone was extracted from the results of this study. It seems that general practitioners are trying to substitute pain relievers’ drugs by injectable dosage form of dexamethasone. Irrational prescriptions of injectable dexamethasone cause not only further costs but also adverse reactions associated with steroid injections. A robust strategy to promote rational use of medicine is strongly needed to correct the pattern of dexamethasone prescription in Iran.

Keywords: Dexamethasone, Drug use pattern, Irrational use of drugs, Cost

1. Introduction
Injection is one of the most common methods of treatment. Every year we have about 16 billion injections all over the world [1]. In some countries, the injectable medicine is prevalent and usually does not comply with therapeutic guidelines. In some developed countries, 50% of patients that refer to medical centers get-at least one injection [2]. Previous studies have also shown that more than 70% of these injections are unnecessary and irrational [2]. Rational use of drugs means that patients receive medicines to their clinical needs appropriately, in doses that meet their individual requirements for an adequate period of time, and at the lowest cost [2]. Irrational drug prescription has been previously discussed in Iran. Several studies have shown the irrational pattern of drug use in Iran. Due to high prescription and use of parenteral diclofenac, the Ministry of Health decided to recall the product from the market. During the following years in pursuit of replacement therapy, doctors and patients focused on other injectable drugs such as tramadol and corticosteroids [3]. Injectable form of dexamethasone in Iran is dexamethasone phosphate disodium 8mg/2ml, administrated for adrenal insufficiency, inflammation and allergic disorders, suppressing the immune system, adrenal congenital hyperplasia, brain edema, shock, inflammatory rheumatoid diseases and for recognition of Cushing syndrome and endogenous depression [4]. Dexamethasone has been reported to have different side effects; long term therapy with dexamethasone makes patient susceptible to infectious diseases and also masks infection symptoms. Dexamethasone, in high quantity, may intensify psychotic disorders, cataracts, decreased or blurred vision, frequent urination, gastric ulcer, Cushing-like symptoms, acne, diabetes, scatic pain and high blood pressure [4]. The disadvantages of injection include: 1. higher expenses compared to other dosage forms, 2. The need for personnel training, 3. Difficulty of drug elimination in case of toxicity or increased side effects, 4. Double injection chance and contamination with micro-organisms and toxins, 5. The increased possibility of drug overdose because of shooting to blood, 6. Reactions and texture complications [5]. Some evidence show that injectable forms of nonsteroidal anti-inflammatory drugs (NSAIDs) are replaced with dexamethasone. According to the present claims, the objective of this study was to evaluate the cost and prescription pattern of dexamethasone injections using prescriptions collected from health insurance companies from 2007 to 2011 in Iran.

2. Methods
In this retrospective, cross sectional study, all data on insured prescriptions including physician identification, dosage forms, strength, and quantity of dexamethasone prescribed from 2007 to 2011 in the database of NCRUD were analyzed. The number of prescriptions for the mentioned period was more than 365 million. Data processing and analyses were carried out by especial software developed for NCRUD. Some restrictions of this study were inaccessibility to patients’ age and also diseases diagnosis.

Prescriptions were collected from different level of health care professionals; general practitioners and specialists such as internists, pediatricians, cardiologists, gynecologists, ophthalmologists, orthopedists, otolaryngologists, general surgeons, neurologists, psychiatrists, infectious diseases specialists, pediatric urologists and dentists. Data related to dispensing of dexamethasone injection was obtained from the official data bank of national regulatory authority. Prescription pattern of dexamethasone injection was described as follows: the percentage of prescriptions including injectable forms of dexamethasone, the average number of dexamethasone injections prescribed per 100 prescriptions in each year, percentage of injectable...
forms of prescribed corticosteroid, and the cost of dexamethasone prescribed by all physicians from 2007 to 2011.

Total number and cost of injectable form of dexamethasone dispensed from wholesalers to retail pharmacies were considered. Costs from the health society perspective were converted from Iranian rial (IRR) into United States dollar (USD) at an official exchange rate of 12,260 IRR/USD in 2011 in order to facilitate comparisons with previous years’ costs [6].

Three percent discount rate and 21.9% annual inflation rate of health care expenditure were applied to the study period was 120, 576, 186 USD from national sales data.

4. Discussion

There is a misbelief that injections are the strongest and the most rapid way to gain recovery. Interestingly, many physicians have the same belief. In fact, physicians prescribe injectable drugs more because they believe that patients are more satisfied with injectable forms of drugs [2]. Injections may be the fastest way to deliver drugs to reach maximum therapeutic effects; however, it may have more side effects and risks versus other forms of drug [7]. In Iran, more than 50% of adverse drug reactions registered by the office of adverse drug reaction center (ADR) are from injectable drugs [8]. The data for injectable drugs in Iran is similar to other developed countries (36-48%) and shows improper prescription patterns and irrational drug use [9]. In a study in Iran it was found a high tendency toward prescribing corticosteroids as well as injectable forms among general practitioner [10]. ADR had received more than 343 cases of dexamethasone side effect in form of injection till 2010, while many of these cases were used irrationally [8]. Among top ten prescribed drugs administered by all physicians’ and general practitioners, dexamethasone has the first rank from 2007 to 2010 [11, 12]. During these five years, for prescriptions having only one injectable form of drugs, almost 50% had corticosteroids and 30% had dexamethasone ampoule.

During our study period, 12% of patients from all physicians’ prescriptions and 17% of patients from general practitioners received dexamethasone. According to the international guidelines and also indications of dexamethasone, it seems we have a huge irrational use of dexamethasone in Iran. This irregular prescription coincides with the claim that there is no proper injectable analgesic drug in Iran. According to the national sales data, total number of dexamethasone ampoules is more than the number of these drugs in prescriptions. This gap depicts irrational use of such medications. The consequence of irrational use is more than the number of these drugs in prescriptions. This gap depicts irrational use of such medications. The consequence of irrational use is irrational use of such medications. The consequence of irrational use is a major concern [13].

Irrational prescriptions and use of injectable dexamethasone not only cause further costs but also adverse reactions associated with steroid injections. However, development of evidence-based clinical guidelines, establishment and support of drugs and therapeutics committees, continuing education, unbiased drug information, consumer education, financial incentives, regulatory and managerial strategies are the main issues which should be noted to promote proper prescription pattern and rational drug use in Iran.
References

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