



Drug-drug interactions in prescriptions of Lorestan province, Western of Iran

Mohsen Asadbegi¹, Bahram Delfan², Ahmad Adineh^{2*}, Razieh Sohrabnejhad³, Reza Sepahvand³, Sehar Changizian³, Mahmoud Bahmani⁴ and Mahmoud Rafieian-Kopae⁵

¹Pharmacy and Manager of Drug Supervision, Lorestan University of Medical Sciences, Khorramabad, Iran

²Department of Pharmacology, Lorestan University of Medical Sciences, Khorramabad, Iran

³Food and Drug Administration of Lorestan University of Medical Science, Khorramabad, Iran

⁴Razi Herbal Medicines Research Center, Lorestan University of Medical Sciences, Khorramabad, Iran

⁵Medical Plants Research Center, Shahrekord University of Medical Sciences, Shahrekord, Iran

ABSTRACT

Rational prescribing means prescribing the more effective and healthiest drug for a disease according to patient's condition, the type of effective drugs, cost and etc. The non-normative and non-rational prescribing of medicine can cause side effects. Prescribing of effective and safe drugs can have an important role in treatment of patient and the lack of side effect, drug interactions and imposition of additional cost. The aim of this study was to evaluate drug interactions in prescriptions of Lorestan province, western of Iran. In this study, at first, the statistic of the insurance prescription of all provincial pharmacies were obtained, entered in the prescription review software of food and drug administration, processed in terms of drug interactions and data were statistically analyzed. This study shows that of the total 1443973 of the prescription numbers, 1112 numbers of that contain 1.25 mg of Digoxin tablets with 40 mg of Furosemide tablets that they have a severe interaction and can lead to arrhythmia in patients. Also 934 prescriptions contain Gemfibrozil and Lovastatin which can lead to myopathy and rhabdomyolysis in consumer patients. The survey revealed that 1.36, 3.76 and 0.56% of prescriptions have mild, moderate and severe interactions, respectively. Existence of severe and moderate drug interactions requires that further workshops be held for physicians on drug interactions.

Keywords: Drug interaction; prescribing; rational drug prescription; Lorestan.

INTRODUCTION

The specified responses of a drug, that is prescribed for a patient, can be changed by the other drug due to drug-drug interactions. Many of drug related problem (DRP) caused by drugs prescriptions and/or due to types of drug interactions [1, 2]. Drug interaction have not only limited to cases of concurrent use of two or more drugs and can be seen as a several forms such as drug-drug interaction, drug-food, drug-environmental factors, cigarette smoking and laboratory tests and drug- patients [3]. Every year, drug interaction causes several problems for peoples and physicians don't have enough time to monitor all patient for drug interactions harmful effects carefully. This phenomenon is more important in those patients who use multi-drugs regimen and especially about those group who are taken up drugs without prescription [4, 5]. Previous studies showed that drugs which have a low therapeutic index or their dose-response curves have a steeply slope, are more prone to the drug interaction. In these drugs, therapeutic dose is near to the toxic dose and a smallest change in the dose of drug causes changes in excretion, absorption and distribution of them and can leads to increase plasma concentration of drug. This causes toxic effects of the drug and

cardiovascular (CV) drugs with low therapeutic index are examples of these ^[6, 7]. Therefore, the important part of screening for drug interaction is separating of clinical significant reactions from clinically insignificant reactions.

In terms of the degree of severity, drug interaction can be divided into three categories include a) Severe interaction that clinically have great dangers for patient, such as sympathomimetic and inhibitors of monoamine oxidase inhibitor, b) Moderate interaction that have less clinical importance but there is still a risk for the patient such as Cimetidine and anticoagulant, and c) Mild interaction have a very little clinical importance and possible interactions can be eliminated by adjusting the time between drugs dose. Following factors may increase the interactions between drugs ^{[8][9]}:

- a- Various pharmacological effects of a drug.
- b- People referral to several doctors in a short
- c- The use of prescribed drugs by the doctors and the drugs that the patients themselves usually use them.
- d- Improper use of drugs by the patient due to insufficient training.
- e- Concurrent prescription of two or more drugs with strong potency.
- f- Interaction with illegal drugs such as alcohol, morphine and other narcotics

EXPERIMENTAL SECTION

In this survey, at first, the statistic of the insurance prescription of all provincial pharmacies were obtained, interred in the prescription review software of food and drug administration, processed in terms of drug interactions and data were statistically analyzed by the processor prescription software.

RESULTS

This study shows that of the total 1443973 of the prescription numbers, 1112 numbers of that contain 25.mg of Digoxin tablets with 40 mg of Furosemide tablets that they have a severe interaction and can lead to arrhythmia in patients. Also 934 prescriptions contain Gemfibrozil and Lovastatin which can lead to myopathy and rhabdomyolysis in consumer patients. Percentage of interactions according to their severity were presented in Table 1.

Table 1. Percentage of interactions in Lorestan province doctors' prescription in 2013

Type of interactions	Frequency
Mild	1.36
Moderate	3.76
Severe	0.56

DISCUSSION

In the late 19th century, the first observations of drug interactions practically examined. One of the first reports is related to tubular excretion and increasing the plasma concentration of salicylates by Paraaminobenzoic acid (PABA). After that, many reports from desirable and undesirable results of use of drugs that were taking simultaneously, published in scientific journals Similar studies in Iran have been done in line with rational drug prescribing consuming and preventing drug interactions Rahidi and Senobar Tahaee conducted the study of the amount of drug interaction observed in the doctors insurance prescriptions in Kurdistan in 2000. Thier study demonstrated that of the total drug interactions observed, the rate of severe, intermediate and slight interactions were 15.6%, 42.6% and 41.8% respectively^[10]. Also, evaluation of CV drugs interactions in insured prescriptions in Sari during the years 2000–2001 showed that 40.2% of prescriptions contained CV drugs were prescribed by cardiology specialists, 18.4% were prescribed by other fields specialists and 41.4% were prescribed by general practitioners. Among the above prescription, 50% of them had drug interaction that among the highest percentage of interactions observed in the prescriptions of other field specialist^[11]. In another similar study, the frequency distribution of drug interactions in the doctors insurance prescriptions of Gorgan city was examined. Of the total of 5300 prescription of 53 doctors of Gorgan city in 1380, in 4367 cases (82%), drug interaction were observed that 38 cases (72.8%) were severe interactions, 302 cases (26.69%) were moderate interaction and the rest were mild interaction and percent of drug interaction in general practitioner was greater than specialist^[12]. In conducted studies by Nabavizadeh and Khoshnevisan in the general practitioners' prescription of Yasuj city in 2003, among the 1100 drug prescription of

57 general practitioner, 169 cases of drug interactions reported that among them, 55.3% have severe interactions, 55.54% have moderate interaction and 42% have mild interaction^[13]. In addition, in a systematically review of the literature on the incidence and pattern of DDIs in Iran, it had been demonstrated that The most involved drug classes in DDIs were beta blockers, angiotensin-converting-enzyme inhibitors (ACEIs), diuretic agents, and non-steroidal anti-inflammatory drugs (NSAIDs)^[14].

Despite of Iran, relatively few studies which were performed in the general population in developed countries also showed a wide variability of estimates on incidence of drug-drug interaction (i.e. 9.8% in Finland^[15], 18.5% in Greece^[16]). According to the above mentioned reports from Iran and other countries, there is wide range of difference between reported values for drug-drug interaction. Different study methods, various drug interaction databases, diverse study populations, different sample sizes, and some other factors have caused this considerable variability; therefore, direct comparison between the studies is impossible.

In conclusion, the present study in Lorestan shows that drug interactions are somewhat inevitable and like other provinces, there is drug interaction in the doctors' prescriptions. Existence of severe and moderate drug interactions requires that further workshops be held for physicians on drug interactions. Also, it is essential to revise the education system in the period of doctors' education and continuous retraining with respect to the causes of the drug interactions should be done and practical training should be dealt with more importance and seriously.

REFERENCES

- [1] Harkness R. Drug interaction guide book. 1st ed. FASCP. New gerscy: Prentice Halt publishing; **1991**: 5-9.
- [2] Ritter JM, Lewis DL, Mant TGK. A text book of clinical pharmacology. 4th ed. New York: Arnold publishing; **1999**: 261-262.
- [3] Hardman JG, Limbird LE, Gilman AG. Goodman and Gilman's: The pharmacological basis of the therapeutics. 10th ed. New York: McGraw-Hill; **2006**: 1225-1233.
- [4] Sutter C, Hoffman W. Integrated pharmacology update. 2nd ed. New York: Elsevier mosby; **2005**: 303-550.
- [5] Rang HP, Dale MM, Ritter JM. Pharmacology. 5th ed. Edinburg Churchill Livingstone Publishing; **2003**: 718-719.
- [6] Stockly IH. Drug interaction. 2nd ed. Oxford: Black Well Scientific Publication, **1991**: 1-3.
- [7] Tamblyn R. *Therapie*. **1996**, 51(3): 269-282.
- [8] Marginal A. Drug interaction facts. St, Louis MO: JB Lippincott Co; **1987**: 627-651.
- [9] Dorland W, Newman A. Dorland's illustrated medical dictionary. Philadelphia: W. B. Spunders Co; **1998**: 141: 1257-1275.
- [10] Rashidi K, SenobarTahaee SN. *SJKU*. **2005**; 10 (3) :78-84.
- [11] Morteza-Semnani K, Saeedi M, Gharipour O. *J Mazandaran Univ Med Sci*. **2001**; 11 (32) :37-45.
- [12] Roshandel G. Evaluation of drug interactions in physicians' prescriptions in Gorgan. Golestan Faculty of Medicine; **2002**.
- [13] Nabavizadeh SH, Khoshnevisan F. *Armaghan Danesh*, **2003**, 7(28): 53-59.
- [14] Nabovati E, Vakili-Arki H, Taherzadeh Z, Hasibian MR, Abu-Hanna A, Eslami S. *DARU Journal of Pharmaceutical Sciences* **2014**, 22:52
- [15] Heikkila T, Lekander T, Raunio H: *Eur J Clin Pharmacol* **2006**, 62:661-665.
- [16] Chatsisvili A, Sapounidis I, Pavlidou G, Zoumpouridou E, Karakousis VA, Spanakis M, Teperikidis L, Niopas I: *Pharm World Sci* **2010**, 32:187-193.