

Drug Prescribing and Economic Analysis for Skin Diseases in Dermatology OPD of an Indian Tertiary Care Teaching Hospital: A Periodic Audit

Bijoy KP¹, Vidyadhar RS², Palak P³, Chintan SP³, Atmaram PP^{*4}

¹ Assistant Professor, Department of Clinical Pharmacy, Bharati Vidyapeeth Deemed University, Poona College of Pharmacy, Pune, Maharashtra, India

² Professor and Head, Department of Skin and Venereal Diseases, Bharati Hospital and Research Centre, Pune, Maharashtra, India

³ Student, Pharm.D. (Post Baccalaureate), Bharati Vidyapeeth Deemed University, Poona College of Pharmacy, Pune, Maharashtra, India

⁴ Vice-Principal and Head, Pharm.D. Programme, Poona College of Pharmacy, Bharati Vidyapeeth Deemed University, Pune

ABSTRACT

Submitted: 10/2/2012

Accepted: 17/2/2012

Dermatological problem in India manifests as primary and secondary cutaneous complaints. Among them allergy and itches are widely observed in most of the patients. Periodic auditing of prescriptions is essential to increase the therapeutic efficacy, decrease adverse effects, provide feedback to prescribers and analyze the observance of standards of medical treatment. Study objectives were to assess drug prescribing pattern and cost analysis in dermatology out patient department (OPD) in a tertiary care teaching hospital. The prescriptions from dermatology OPD were collected randomly by twice weekly survey for the duration of 6 months which were analyzed in consultation with clinical collaborators and evaluated using WHO drug use indicators. A total of 260 prescriptions were analyzed from 226 patients. Average drugs prescribed were 2.39/ prescription. Topical drugs (62.7%) were most commonly prescribed than systemic drugs (37.3%). Topical drugs were mostly in combination (26.66%) followed by antifungals (20.51%) and steroids (17.44%) alone. Antihistaminics (33.62%) commonly prescribed systemically followed by antifungals (22.41%) and antibiotics (20.69%). In 43.47% instances high potency steroids were prescribed while mild potency (15.22%) were least prescribed. Frequency of administration was specified in majority of prescriptions (99%) for topical administered drugs but dose/strength was specified in 54 (13.85%) prescriptions only. Average cost of drugs per prescription was found to be 196.74 INR. A great majority of drugs were prescribed in brand names. Though, dose/strength for topical drugs was inadequately mentioned but chances of error were negligible as the brand had availability in single dose/strength in pharmacy. Clinical Pharmacist can conduct such periodic audit to rationalize the prescription, reduce errors and suggest a cost effective management of skin diseases.

Keywords: Dermatology, Prescribing pattern, Outpatient, WHO indicators.

INTRODUCTION

Dermatological problem in India manifests as primary and secondary cutaneous complaints. Among them, allergy and itches are widely observed in most of the patients. Yellowish coloration or dryness of skin in normal old age, pruritus, hypersensitivity reactions, eczemas, pellagra etc were the type of skin problems that are quite observed as well. Usually for peak level skin disorder, the therapy of skin problems is longer for complete removal of problems. Use of drug like benzoyl peroxides, proactive antibiotics, retin-A, oral retinoid, salicylic acid, anti-histaminics, vitamins and minerals, steroids and analgesics are of more interest for skin specialist for the treatment.^{1,2}

Principles of good prescribing are based on sound knowledge, understanding of the pathophysiology of disease to be treated and the knowledge of risks and benefits of the medicine.^{3,4} Appropriate drug use by patients and adherence to instructions given by the prescriber is an integral part of successful rational drug use programme. Patient's non-adherence to the prescribed treatment is a global problem. The reasons for poor compliance could be lack of instructions provided with the prescription, low literacy and poor dispensing practice. Rational prescribing can be achieved by practicing evidence-based medicine. Better interaction between pharmacists and the patient can lead to better patient knowledge about drug use and compliance to therapy as pharmacist is a vital link between prescribed medication and the patient.⁵

The pattern of drug use in a hospital setting need to be monitored intermittently in order to analyze their rationality.⁶ Periodic auditing of prescriptions is essential to increase the

Address for Correspondence:

Dr. Atmaram P. Pawar, Vice-Principal and Head, Pharm.D. Programme, Bharati Vidyapeeth Deemed University, Poona College of Pharmacy, Erandwane, Pune-411038, Maharashtra, India.

E-mail: p_atmaram@rediffmail.com

therapeutic efficacy, decrease adverse effects and provide feedback to prescribers⁷ therefore used to oversee, monitor and analyze the observance of standards of medical treatment at all levels of the health care delivery system.⁸

Collection of data on the utilization of drugs at the hospital out-patient level has been shown to be an effective tool to constitute guidelines for improving drug utilization patterns. This has resulted in more effective and rational therapy as well as economic benefits in the use of drugs.⁹

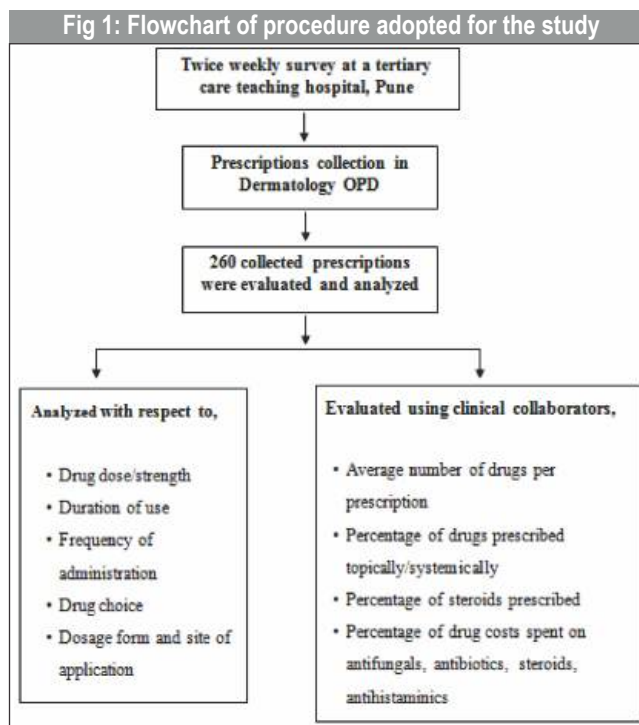
Considering the economic burden of the skin diseases cause owing to its high prevalence, it is of interest to study the drug prescribing patterns and cost effectiveness of skin diseases. Irrational prescription of drugs is a common occurrence in clinical practice.¹⁰ The cost of such irrational drug use is enormous in developing countries in terms of both scarce resources and the adverse clinical consequences of therapies that may have real risks but no objective benefits.¹¹ Therefore periodic auditing of prescriptions is essential to increase the therapeutic efficacy, decrease adverse effects and provide feedback to prescribers.¹²

As per our knowledge, very few systematically analyzed data are available on the drug use pattern in dermatology in India. Hence, the present study was undertaken in patients taking treatment under the dermatology outpatient department (OPD) of the teaching hospital to generate baseline data and analyze various aspects of drug prescribing practices. This can be also used as a tool to generate the rational prescribing pattern. The primary objective of this study was to perform a periodic audit of drug prescribing for patients attending dermatology OPD for rationalizing prescribing practices while secondary objectives were to analyze the disease pattern of patients attending dermatology OPD and drug cost spent on individual drug class. This study was first of its kind in this hospital.

MATERIALS AND METHODS

Prescriptions of patients attending dermatology OPD of a tertiary care teaching hospital, Pune were collected randomly by twice weekly survey for the duration of 6 months from January 2011 to June 2011. This collected prescriptions were analyzed under the sub-heads with respect to drug choice, drug dose/strength (in case of corticosteroids, potency), duration of use, frequency of administration, dosage form and site of application. Obtained information was compiled, scored and analyzed in consultation with clinical collaborators and were subjected to critical evaluation using WHO guidelines as described in accordance with "How to investigate drug use in health facilities?"^{13, 14} Disease pattern was analyzed for each patient attending dermatology OPD

and classified according to dermatologic condition.¹⁵ Average cost of drugs prescribed per prescription was calculated by analyzing unit cost of drugs prescribed to the patient. Flow of the procedure adopted for this study is shown in Fig I.



RESULTS

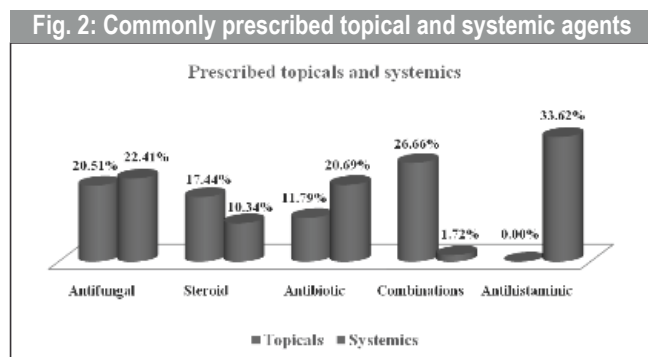
Overall 260 prescriptions were analyzed amongst 226 patients during the study period. Table I provide the age distribution of the patients. The number of males were 142 (62.83%) while number of females were 84 (37.17%) with male to female ratio of 1.69. The maximum number of patients were in the age group of adults (19 to 60 years) and minimum numbers of patients were in the age group of infants (1 month to 1 yr) that visited the OPD during the study period.

Table I: Age distribution of study population

	No. of Patients (n=226)	% of Patients
Infants (1 month - 1 yr)	2	0.88%
Children (1 yr - 11 yr)	16	7.08%
Adolescents (12 yr - 18 yr)	38	16.81%
Adults (19 yr - 60 yr)	156	69.03%
Geriatrics (> 60 yr)	14	6.19%

Average no. of drugs prescribed was 2.39/prescription which includes topical and systemic formulations. Maximum number of drugs prescribed were topicals (62.7%) compared to systemics (37.3%).

Antifungals (23.15%) were the most commonly prescribed class of drugs followed by steroids (19.61%) and antibiotics (16.72%). Commonly prescribed topical agents were combination preparations (26.66%) followed by antifungals and antibiotics alone (20.51% and 11.79% respectively) while the most commonly prescribed systemic agents were antihistaminics (33.62%) followed by antifungals (22.41%) and antibiotics (20.69%) alone as shown in Fig. 2.



Major combinations prescribed were steroids in combination with antibiotics, antifungals and keratolytics.

In about 43.47% instances high potency steroids were prescribed while steroids with mild potency were least prescribed (15.22%) (Table 2). Out of 92 steroids prescribed, 30 were in combination with antibiotics, antifungals and keratolytics

Table 2: Steroid classification on the basis of potency

	No. of Steroids Prescribed (n=92)	% of Steroids
Very potent	40	43.47%
Potent	20	21.74%
Moderately potent	18	19.57%
Mild	14	15.22%

Table 3 shows the disease pattern of patients attending dermatology OPD during the study period. The common skin conditions encountered were of fungal infections (25.26%) followed by 16.98% of sebaceous gland disorders and 13.84% cases of eczema and dermatitis.

Table 3: Disease pattern in dermatology OPD

	No. of Diagnosis (n=318)	% of Diagnosis
Fungal infection	80	25.26%
Viral infection	8	2.52%
Bacterial infection	20	6.29%
Parasitic infection	20	6.29%
Eczema and dermatitis	44	13.84%
Photosensitivity reactions	8	2.52%
Hypersensitivity reactions	20	6.29%
Papulosquamous disorders	26	8.18%
Sebaceous gland disorders	54	16.98%
Disorders of pigmentation of skin	8	2.52%
Disorders of hair	8	2.52%
Tumors of skin	6	1.88%
others	16	5.03%

Total cost of drugs prescribed was found to be 51152.4 INR. Average cost of drugs per prescription was found to be 196.74 INR. Maximum percentage drug cost spent was on antifungals (28.61%) followed by combination products (22.28%) and antibiotics (15.11%) (Table 4).

Table 4: Percentage cost incurred on drug classes

Class of Drugs	Total Cost incurred In INR (c=51152.4 INR)	% Drug Cost incurred
Antifungals	14635.22	28.61%
Antibiotics	7727.64	15.11%
Steroids	5485.52	10.72%
Antihistamines	1880.16	3.68%
Combination products	11394.52	22.28%

DISCUSSION

Average number of drugs prescribed was 2.39/prescription in our study which correlates with other two studies carried out by Sarkar C et al⁹ and Narwane SP et al¹⁶ showed average number of drugs prescribed was 2.42 and 2.7/prescription respectively. A great majority of drugs were prescribed in brand names in this study. Our study depicted slightly lower average number of drugs/ prescription compared to previous studies.

Our study finding showed antifungal as the most commonly prescribed drug class followed by steroids and antibiotics which differ from the study carried out by Narwane SP et al showing antiallergics as the most commonly prescribed drug

followed by antifungal and antibiotic.¹⁶ Moreover, our study showed there was a correlation between classes of drug prescribed with the disease encountered. Antifungals and steroids were commonly prescribed as majority of the patients had fungal infections and inflammatory skin condition as a common disorder. In the context of antifungal agents, fluconazole was the drug most commonly prescribed systemic antifungal rather than terbinafine in this study. A study by Lesher JL showed effectiveness of oral antifungals in fungal infections and found that tinea corporis and tinea cruris were effectively treated by 150 mg once weekly for 2 to 3 weeks and 250 mg terbinafine daily for 1 to 2 weeks while tinea pedis has been effectively treated with pulse doses of 150 mg fluconazole once weekly and with 250 mg terbinafine daily for 2 weeks.¹⁷ However, prescribing practice of fluconazole once weekly was found to be more cost effective with lesser side effect profile than terbinafine prescribed daily.¹⁸ We also found that antibiotics were another class of drugs commonly prescribed for the treatment of acne. Among the antibiotics clindamycin, azithromycin and minocycline were commonly prescribed, as these are the first line therapy and found to be effective for the treatment of acne.

Topicals were commonly prescribed compared to the systemic agents. Use of topicals were usually preferred for treating skin diseases as they have site specific action, less systemic absorption resulting in less side effects and convenient for patient use. Majority of topicals (27%) were prescribed in combinations. This finding was comparable with studies by Khan NA et al⁵ and Sarkar C et al⁹ that showed steroid and its combinations were most commonly prescribed topically. The most commonly prescribed systemic agents were antihistaminics (33.62%) in this study which correlates with the findings of above two studies.^{5,9} Analysis of data showed that all the antihistaminic agents were prescribed systemically in dermatology because of disease prevalence with related symptoms of itching (associated with fungal infection, scabies, eczema and dermatitis).

Corticosteroids were among the most widely used drugs in dermatology and one has to view their usage in the light of their limitations and adverse effects.¹⁹ Our study findings showed maximum number of steroids prescribed were of high potency (43.47%) while mild potency were least prescribed (15.22%). Findings of a study in Tamilnadu by Ashok kumar M et al showed 27.7% steroids prescribed were of very potent class while 22.3% were of potent class.²⁰ Major steroids were prescribed in combination containing antibiotics, antifungals and keratolytics which is comparable with the Sweileh WM study² on prescribing of corticosteroids showing the same combination of steroids with the antimicrobials and other

agents. As a general rule, physicians should use the weakest possible corticosteroid that will treat the dermatological condition. Topical corticosteroids are mainly used for non-infective dermatologic disorders associated with inflammation such as psoriasis, atopic dermatitis, contact dermatitis, otitis externa etc.²¹⁻²⁶ Potent topical steroids used on areas like face and flexures or when used under occlusion may lead to cutaneous side-effects like striae, atrophy, steroid acne and hypertrichosis.²⁷ So, careful consideration of patient's age, potency of steroid prescribed, site of application and efficacy of prescribed corticosteroid need to be taken into consideration. However, in this study adequate prescribing information, other advices and cautions regarding corticosteroid use was maintained in majority of the prescriptions.

Vitamin A may be helpful in acne, psoriasis and ichthyosis. Synthetic retinoids (isotretinoin, acitretin) are commonly used in treatment of acne and psoriasis respectively, but is a potent teratogen thus limiting its use in women with child-bearing potential.²⁸ The commonly prescribed retinoids found in our study were adapalene and tretinoin either alone or in combination with clindamycin as an antibiotic.

We found 21 prescriptions where multiple prescribing of antifungals was given i.e. 2 topicals, topical along with systemic and 2 systemics. In a case of polymorphous light eruption (back) + Intertrigo (right inflammatory area) fluconazole tablet given in combination with miconazole, clotrimazole topical and betamethasone as steroid. Similarly in 6 cases more than one steroid was prescribed. However, polypharmacy (2 topical + 1 systemic antifungal or 1 topical + 1 systemic antifungal/steroid together) should better be avoided.²⁷

Our study findings showed most of the dermatological conditions in the OPD were of fungal infections (25.26%) followed by sebaceous gland disorders (16.98%). The common fungal infection found includes tinea cruris, tinea corporis and candidiasis and among the sebaceous gland disorder maximum number of patient was of acne (grade I, II and III) with or without Post Inflammatory Hyperpigmentation (PIH). The reason responsible for the above finding can be humid environmental condition and poor hygiene. This data differs from the study carried out in Nepal showing the cutaneous infections (40%) as the most common dermatologic condition followed by eczema (31%).⁹

Considering the economic burden and high prevalence of the skin diseases, this topic is of interest to study the drug prescribing patterns and cost effectiveness of skin diseases. In developing country like India, patient compliance is primarily

dependant on the cost of treatment.⁸ Our study findings showed the average cost of 196.74 INR (\$ 4.37) per prescription which was quite higher than Narwane SP et al study which reported the average cost of 135.60 INR.¹⁶ Unit cost of drugs prescribed per patient was calculated. However actual direct costs and indirect costs were not taken into consideration for cost analysis.

Frequency and duration of administration was specified in majority of prescriptions (99%) for topical administered drugs which shows quite rational prescribing but dose/strength was specified in 54 (13.85%) prescriptions only which shows that the prescribing pattern should be improved to avoid imprecise prescription leading to the prescription errors while dispensing the medication by a pharmacist and there is a need to emphasize on rational and appropriate prescribing pattern to be followed in the OPD for better patient care. Although dose/strength for topical drugs was inadequately mentioned but chances of error were negligible as the brand had availability in single dose/strength in pharmacy.

CONCLUSION

A great majority of drugs were prescribed in brand names. Though, dose/strength for topical drugs was inadequately mentioned but chances of error were negligible as the brand had availability in single dose/strength in pharmacy. The prescription audit can be an eye opener for the prescribers. Clinical pharmacist can conduct such periodic audit to rationalize the prescription, reduce errors and suggest a cost effective management of skin diseases. The hospital administration can look into the issues in the hospital by implementing a formulary into the system so that physicians restrict their prescribing in generic names and provide a cost effective therapy to the patients as essential drugs will be incorporated in hospital pharmacy.

ACKNOWLEDGEMENTS

We thank Department of Dermatology, Bharati Hospital and Research Centre, Pune for their kind cooperation and support in conduct of the study. We would also like to extend our thanks to the postgraduate students for their support.

REFERENCES

- Patel NG, Patel NJ. Epidemiological study of skin (dermatological) diseases and its treatment in North Gujarat. *Asian J Pharm Clin Res* 2010; 3(4):40-42
- Sweileh WM. Audit of prescribing practices of topical corticosteroids in outpatient dermatology clinics in north Palestine. *East Mediterr. Health J* 2006; 12(1):161-169
- Grahame-Smith DG, Aronson JK. Principles of prescribing and how to write prescriptions. In: Grahame-Smith DG, Aronson JK, editors. *Oxford textbook of clinical pharmacology and drug therapy*. 3rd ed. New York: Oxford University Press; 2002. p173-188
- Reid JL, Rubin PC, Whiting B. Drug prescription: Legal and practical aspects. In: Reid JL, Rubin PC, Whiting B, editors. *Lecture notes on clinical pharmacology*. 5th ed. London: Blackwell Science Ltd; 1998. p383-389
- Khan NA, Abid M, Maheshwari KK, Kaviarasan PK, Mohanta GP. Antibiotic prescribing pattern in department of dermatology of a teaching hospital in Tamilnadu. *Indian J Pharm Pract* 2010; 3(3):18-21
- Lunde PKM, Baksaas I, Halse M, Halvorsen IK, Stromnes B, Oydvin K. The Methodology of Drug Utilization Studies. In: Bergman U, Grimson A, Westerholm B, editors. *Studies in Drug Utilization*. WHO Regional Publications, European Series 1979 Copenhagen: No. 8,17-28
- Krishnaswamy K, Dinesh Kumar B, Radhaiah G. A drug use survey- precepts and practice. *Eur J Clin Pharmacol* 1985; 29:363-370
- Gupta N, Sharma D, Garg SK, Bhargava VK. Auditing of prescriptions to study antimicrobials in a tertiary hospital, *Indian J Pharmacol* 1997; 29(6):411-415
- Sarkar C, Das B, Sripathi H. Drug prescribing pattern in dermatology in a teaching hospital in western Nepal. *J Nepal Med Assoc* 2001; 41:241-246
- Soumerai SB. Factors influencing prescribing. *Aust J Hosp Pharm* 1988; 18(3):9-16
- Lamichhane DC, Giri BR, Pathak OK, Panta OB, Shankar PR. Morbidity profile and prescribing patterns among outpatients in a teaching hospital in Western Nepal. *Mcjill J Med* 2006; 9(2):126-133
- Krishnaswamy K, Dinesh Kumar B, Radhaiah G. A drug use survey- precepts and practice. *Eur. J. Clin. Pharmacol.* 1985; 29(3):363-370
- WHO. How to investigate drug use in health facilities: Selective drug use indicators. Geneva, World Health Organization; 1993. p1-87
- Thomas M. Rational drug use and the essential drug concept. In: Parthasarathi G, Nyfort-Hansen K, Nahata MC, editors. *A Textbook of Clinical Pharmacy Essential Concepts and Skills*. Chennai: Orients Longman Pvt Ltd; 2004. p72-83
- Section XXI: Dermatology In: Sainani SG, editor. *API Textbook*

- of Medicine. 6th edition. Mumbai: Association of Physicians of India; 1999
16. Narwane SP, Patel TC, Shetty YC, Chikhalkar SB. Drug Utilization and Cost Analysis for Common Skin Diseases in Dermatology OPD of an Indian Tertiary Care Hospital-A Prescription Survey. *British Journal of Pharmaceutical Research* 2011; 1(1):9-18
 17. Leshner JL Jr. Oral therapy of common superficial fungal infections of the skin. *J Am Acad Dermatol* 1999; 40(6 pt 2):S31-34
 18. Suchil P, Montero Gei F, Robles M, Perera-Ramirez A, Welsh O, Male O. Once-weekly oral doses of fluconazole 150 mg in the treatment of tinea corporis/ cruris and cutaneous candidiasis. *Clin Exp Dermatol* 1992; 17(6):397-401
 19. The hazardous jungle of topical steroids (Editorial). *Lancet* 1977; 2: 487-488
 20. Ashok Kumar M, Noushad PP, Shailaja K, Jayasutha J, Ramasamy C. A study on drug prescribing pattern and use of corticosteroids in dermatological conditions at a tertiary care teaching hospital. *International Journal of Pharmaceutical Sciences Review and Research* 2011; 9(2):132-135
 21. Zachariae H, Zachariae R, Blomqvist K et al. Treatment of psoriasis in the Nordic countries: a questionnaire survey from 5739 members of the psoriasis associations data from the Nordic Quality of Life Study. *Acta Derm Venereol* 2001; 81(2):116-21
 22. Lebwohl MG, Tan HM, Meador SL, Singer G. Limited application of fluticasone propionate ointment 0.005% in patients with psoriasis of the face and intertriginous areas. *J Am Acad Dermatol* 2001; 44(1):77-82
 23. Ellis CN, Drake LA, Prendergast MM et al. Cost of atopic dermatitis and eczema in the United States. *J Am Acad Dermatol* 2002; 46(3):361-370
 24. Lebwohl M. Efficacy and safety of fluticasone propionate ointment, 0.005%, in the treatment of eczema. *Cutis* 1996; 57(2 suppl.):62-68
 25. Thomas KS, Armstrong S, Avery A et al. Randomised controlled trial of short bursts of a potent topical corticosteroid versus prolonged use of a mild preparation for children with mild or moderate atopic eczema. *Br Med J* 2002; 324(7340):768
 26. Ramsing DW, Agner T. Efficacy of topical corticosteroids on irritant skin reactions. *Contact Dermatitis* 1995; 32(5):293-297
 27. Pierard GE, Pierard Franchimont C, Ben Mosbah T, Arrese Estrada J. Adverse effects of topical corticosteroids. *Acta Derm Venereol Suppl (Stockh)* 1989; 151:26-30; discussion 47-52
 28. Buxton ILO. Principles of prescription order writing and patient compliance. In: Brunton LL, Lazo JS, Parker KL, editors. *Goodman and Gilman's The Pharmacological Basis of Therapeutics*, 11th edition. McGraw-Hill: Medical Publishing Division, USA; 2006. p1777-1786.