



INDO AMERICAN JOURNAL OF PHARMACEUTICAL RESEARCH



DEVELOPMENT AND IMPLEMENTATION OF HOSPITAL FORMULARY FOR PROMOTING RATIONAL USE OF DRUGS IN TERTIARY CARE HOSPITAL IN URBAN AREA OF ANDHRA PRADESH

Lakshmi Prasanna. K¹, P. Bhavya¹, Dr. Balaiah Sandypakula², Dr. Charan Tej.K³, Dr. S.A. Rahaman⁴

¹Nirmala College of Pharmacy, Department of Pharmacy Practice Mangalagiri, Guntur, Andhra Pradesh., India.

²Department of Pharmacy Practice, Nirmala College of Pharmacy Mangalagiri, Guntur, Andhra Pradesh., India.

³Medical Superintendent, Manipal Hospitals, Vijayawada, Andhra Pradesh., India.

⁴Nirmala College of Pharmacy, Mangalagiri, Guntur, Andhra Pradesh., India.

ARTICLE INFO

Article history

Received 17/04/2017

Available online

30/04/2017

Keywords

Formulary,
Efficiency,
Monograph,
Patient Care.

ABSTRACT

The main aim and objectives of hospital formulary is to provide information about the use of medicines. Hence the central goals of the formulary are to help prescribers in the appropriate drug of choice to the suitable treatment and to make prescribers follow uniform choice of treatments. The prospective and developmental study was carried out in a tertiary care hospital, over a period of six months. The study was approved by PTC committee and also considers the healthcare professionals requirement and need of Hospital Formulary. All drugs present in the drug list were critically evaluated for its need, efficacy and safety. Monographs were prepared for all the selected 221 drugs in the hospital pharmacy with the prepared monograph content. Copies of the prepared hospital formulary were given to Medical superintendent, chief medical officer, and chief pharmacist and to Pharmacy and Therapeutic Committee. In our study, formulary was compiled in 221 drugs including FDCs. Monographs were prepared for all the selected drugs in the hospital pharmacy as per standard formularies. In conclusion, the development of the formulary will have major impact on prescribers and health care professionals' for clinical practice to endorse the quality of life in the patients, by promoting rational use of drugs towards patient care to getting better therapeutic outcomes.

Corresponding author

Dr. Balaiah Sandypakula

Assistant Professor,

Department of Pharmacy Practice

Nirmala College of Pharmacy, Mangalagiri, Guntur.

Andhra Pradesh., India

91- 7893482327

balu.slms@gmail.com

Please cite this article in press as **Lakshmi Prasanna. K et al.** Development and Implementation of Hospital Formulary for Promoting Rational Use of Drugs in Tertiary Care Hospital in Urban Area of Andhra Pradesh. *Indo American Journal of Pharmaceutical Research*.2017;7(04).

Copy right © 2017 This is an Open Access article distributed under the terms of the Indo American journal of Pharmaceutical Research, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

A vital step in maximizing the therapeutic outcome of public sector cost on drugs is rational selection of drug products. In the US, this process is termed "formulary development. Drugs are having a decisive role in the management and prevention and of diseases. World Health Organization (WHO) formularies are gives the complete information about the drugs. Defines as a formulary is a manual including clinically oriented summaries of complete monographs of selected medications, it is gives consideration to the current clinical decision of prescribers ^[1]. Hospital formularies originally started existence in hospitals as collection of commonly prescribed pharmaceutical medicaments and preparations, produced primarily for reference purposes ^[2]. The study was to prepare hospital drug formulary for the speciality departments in tertiary care hospital. Hence, developed formulary will be useful for reducing the brands available in the hospital which helps in rational drug use ^[1-2]. A number of other problems known to exist in most health care system are limited drug budgets, increasing number of drug alternatives, irrational pre-scribing and use of medications, incidence of unsafe and non-efficacious medications, be short of unbiased drug information, high costs of medications. ^[5]The rationale for formulary development is that prescribers become familiar with the pharmacological actions, indications for therapy, side-effects, interactions and contraindications for a defined range of drugs for common conditions. ^[9]

Formulary systems are used in many different settings and organizations with policy statements on the use of formularies and formulary systems in hospitals and health care systems ^[1]. A number of other problems known to exist in most pharmaceutical system are limited drug budgets, increasing number of therapeutic alternatives, improper prescribing and use of medications, presence of unsafe and non-efficacious drugs, lack of unbiased drug information, high costs of handling large number of drugs, drugs of questionable quality on the market. ^[2]

The formulary was development whereby the institution, working through the pharmacy and therapeutics committee members, assessment and evaluation of selected from among the numerous available drug entities and drug products those that are considered most useful in patient care. ^[2] The care of patients in hospitals and other health care facilities is often dependent upon the effective use of drugs. The multiplicity of drugs available makes it mandatory that a sound program of drug usage be developed within the institution to ensure that patient's receive the best possible care. This program is the basis of appropriate, economical drug therapy. ^[2-4]. The formulary concept is a method for providing such a program and has been utilized as such for many years. The formulary is a continually revised compilation of pharmaceuticals and important ancillary information that reflects the current clinical decision of the health care professional. ^[4]

A large number of medications and its variables and the multiplicity of drugs available for the treatment of diseases and making their utilization becomes difficulty. Lack of co-ordination and communication between health care providers contributes to more number of medication errors and adverse events. ^[1]

Significance of Hospital formulary:

The formulary system may be a mechanism by those health care professionals will solve these, and variety of alternative issues renowned to exist in most pharmaceutical systems: restricted drug expenditures.

Management and Economic Viability of Pharmacies

As a pharmaceutical sector is increasingly liberalized, basic business management skills can become more and more vital to managers in community pharmacies. Managers would like the talents to create management choices in such areas as management of operational prices, staffing levels, procural methods, product acquisition prices, and promoting methods. ^[8-9]

A formulary may be a most popular list of medicines that aims to accommodate treatment for the bulk (80-90 per cent) of patients presenting with common conditions that square measure possible to want treatment with a medication. ^[9]

A properly enforced formulary system has the subsequent positive results. Eliminating medicine that square measure unsafe and ineffective may result in diminished morbidity and Mortality. Reduction within the variety of medicine purchased leads to either lower overall expenditures, or victimisation constant level of funding to shop for bigger quantities of safe and effective medicine. There is also a diminished length of hospital stays through elimination of unsafe and ineffective medicine. Having a set list of medicine employed in the pharmacies its attention on the stipulation of drug data. ^[8-10]

The P and T committee is in charge of managing the formulary system. It's composed of physicians, prescribers, pharmacists, and nurses, management directors of the research in institute, quality improvement managers, and different health care professionals. ^[8] A system thus is needed to represent a PTC/DTC (Pharmacy / Drug Therapeutic committee) that perform with roles of informative and philosophy body and to develop a Hospital formulary (HF) for the rational-safe, low cost and effective use of medicine.

MATERIALS AND METHODS

It is a prospective and developmental study to design and develop hospital drug formulary for a tertiary care referral hospital. The study was conducted in a period of six months from September 2016 to February 2017, carried out in a tertiary care multispecialty hospital, Guntur, Andhra Pradesh.

Hospital details

Manipal is 300 bedded multispecialty tertiary care hospital situated in Guntur district. This includes more than 35 physicians from different departments, pharmacist and nurses. This hospital has not yet developed an effective hospital formulary system. As the beginning, our department started the drug data centre, ADR news and medicine error watching then worked on developing Hospital Formulary through PTC. By continuous amendment of the prepared formulary and conducting Drug Utilization analysis (DUE) programs, hospital formulary system may be created more practical.

Approval from P&T committee, Manipal hospital

The study was approved by the PTC; A meeting was conducted with PTC and other healthcare professionals to give the awareness about the need and importance of Hospital Formulary in the hospital, to consider the healthcare professionals requirements and suggestions in the hospital and to announce the starting of the study.

Study Procedure:

Different type of questionnaires were developed and designed by discussion with clinical pharmacist and paediatric doctors. It contained objective type of questions. These questionnaires were used to select the information like indications, precautions, dose, interactions, and adverse drug reactions to be included under each drug monograph.

Based on the information from the questionnaire, a drug list was prepared for the Paediatric department. By using Master Drug List and some standard Drug Information resources, drug monographs were prepared. Each monograph provided the information of generic name, brand names, quantity, synonyms if any, indications, precautions, contraindications, paediatric dose, adverse drug reactions, interactions, practice points, administration and counselling points of drug. The drugs that were available in combinations were also mentioned separately at the end of the formulary along with their brand name, generic name, quantity and cost per unit. The resources used for collection of drug information from the different standard formularies. Monographs were prepared for all the selected drugs in the hospital pharmacy with the following contents: Synonyms, Therapeutic category, Indication, Pregnancy risk factor, Contraindications, Precautions/ Warnings, Adverse reactions, Dosage, Drug interactions, Patient information, Brands available/strength/ formulations^[12-16]

The developed drug monographs were given to the healthcare professionals for their opinion and suggestion towards the prepared drug monographs and modifications were made accordingly. General information which may be useful to the practicing prescribers was also included in the formulary.

RESULTS AND DISCUSSION

The monographs were prepared for all the selected drugs in Manipal formulary by referring some of standard formularies such as WHO Model formulary, WHO Essential Drug List, NFI and Standard Databases such as Micro Med-ex, Lexicomp. Table 1 shows the references of formularies and its contents.

I. References for preparation of monographs.

Table 1. References for preparation of monographs.

S No	References	Content of Each Monograph
1.	WHO Model Formulary	Use, Medical safety issues, Adverse Reactions, Contraindications, Warnings/Precautions
2	WHO List Of Essential Medicines	Pregnancy Implications, Breast Feeding Considerations
3	National Formulary of India	Storage, Pharmacological Category, Dosing-Adult, Pediatric, Geriatric, Dosage Forms
4	Micromedex Health Services	Metabolism/ Transport effects, Drug Interactions, Food Interactions, Dietary Considerations, Monitoring Parameters
5	Lexicomp drug information handbook	Alert, Brand Names, Dosing- Renal Impairment, Hepatic Impairment, Generic Equivalent available, Product Availability, Administration, Mechanism of Action, Pharmacodynamics/Kinetics

II. Monograph Content of Manipal Hospital Formulary.

The monographs of prepared hospital formulary were compared with the prepared Manipal hospital formulary. Information on Alert , Brand name , Pharmacological category, Dosing, Dosage forms , Generic Equivalent Availability, Product Availability, Administration , Use, Medical safety issues, ADR, Contraindications, Precautions, Metabolism , Food Interactions , Drug Interactions, Pregnancy ,Breast feeding considerations, Dietary considerations , Monitoring Parameters , Mechanism of action, storage , Pharmacokinetics/dynamics were present in prepared formulary .Table 2 shows content of MHF.

Table 2. Monograph Content of Manipal Hospital Formulary.

S No	Content of Hospital Formulary	WHO	NFI	Manipal Hospital Formulary
1	Alert	NO	NO	YES
2	Brand Names	NO	NO	YES
3	Pharmacological Category	YES	YES	YES
4	Dosing- Adult	YES	YES	YES
5	Dosage Forms	YES	YES	YES
6	Generic Equivalent available	NO	NO	YES
7	Product Availability	NO	NO	YES
8	Administration	NO	YES	YES
9	Use	YES	YES	YES
10	Medical safety issues	YES	YES	YES
11	Adverse Reactions	YES	YES	YES
12	Contraindications	YES	YES	YES
13	Warnings/Precautions	YES	YES	YES
14	Metabolism	NO	NO	YES
15	Drug Interactions	NO	NO	YES
16	Food Interactions	NO	NO	YES
17	Pregnancy Implications	YES	NO	YES
18	Breast Feeding Considerations	YES	NO	YES
19	Dietary Considerations	NO	NO	YES
20	Monitoring Parameters	NO	NO	YES
21	Pharmacodynamics/Kinetics	NO	NO	YES
22	Mechanism of action	NO	NO	YES
23	Storage	NO	YES	YES

Comparison between monograph content of Manipal hospital formulary and who model list of essential drugs 2015

Information on Alert , Brand name, Generic Equivalent Availability, Product Availability, Administration, , Food Interactions , Drug Interactions, Metabolism, Dietary considerations, Monitoring Parameters, Mechanism of action, storage , Pharmacokinetics/dynamics was not present in WHO Model Formulary 2015

Comparison between monograph content of Manipal hospital formulary and NFI 2016

Information on Alert, Brand name, Generic Equivalent Availability, Product Availability, Metabolism, Dietary considerations, Monitoring Parameters, Mechanism of action, storage, Pharmacokinetics/dynamics was not present in national formulary of india 2016.

III. Total No of Drugs in Different Type Formula

Figure 1 shows ,the total no of drugs present in Manipal hospital formulary, National Formulary India, WHO – Essential Drug List are 221, 377, 452 drugs respectively.

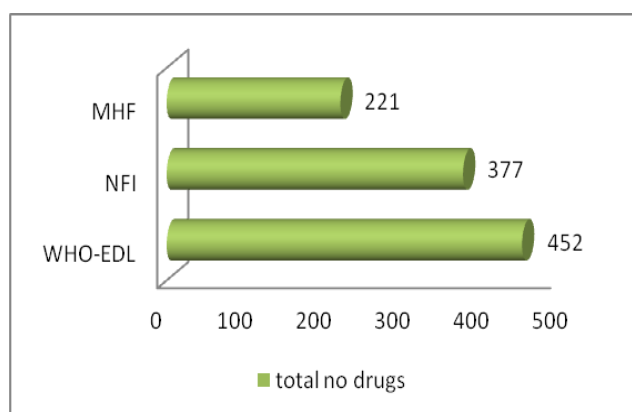


Figure 1: Total no of drugs in different types of formularies.

IV. Percentages of Drugs in Different Types of Formularies

Who Model List of Essential Medicines

In WHO Essential Medicines List out of 452 drugs, Anti Microbial, Anti Fungal, Anti Viral, Anti Malarials, Analgesics, Dermatology , Gynaecology, Gastro , Hormones, Neurology, Nephrology, Nutrition, Oncology, Respiratory, Vaccines consists of 65 (14.3%), 7(1.53%), 29(6.41%), 15(3.31%), 3(0.66%), 16(3.53%), 18(3.98%), 9(1.99%), 13(2.87%), 21(4.64%), 5(1.10%), 12(2.65%), 40(8.81%), 4(0.88%), 24(5.30%) drugs respectively. The Anti Diabetic and Blood products comprised of same no of drugs 6(1.32%), Cardiology and Fixed Dose Combinations comprises of 23(5.08%), Ortho and Urology comprises of 1(0.22%) drugs respectively.

National Formulary of India 2016

In NFI List out of 377 drugs Antimicrobial, Anti Malarials , Analgesics, Anti diabetic, Blood products, Cardiology , Dermatology, Neurology, Oncology, Respiratory, Urology , Fixed dose combinations had 35 (9.0%), 7 (1.85%), 9 (2.3%), 10 (2.65%) , 6 (1.59%), 42 (11.14%), 17 (4.5%), 50 (13.2%) , 28 (7.42) , 25 (6.6%) , 3 (0.79%) respectively . The antifungal and Nutrition comprised of same no of drugs 8 (2.1%), Anti virals and Gynaecology consists of 15 (3.9%), Gastro, Hormones and Nephrology consists of 23 (6.1%), Ortho and Vaccines consists of 14 (3.71%) drugs respectively.

Table 3. Percentages of Drugs in different types of Formularies.

S no	Name of the drug category	WHO(452)	NFI(377)	MPH (221)
01	Antimicrobial	65 (14.3%)	35 (9.0%)	26 (11.76%)
02	Anti Fungal	7 (1.53%)	8 (2.1%)	6 (2.71%)
03	Anti Viral	29 (6.41%)	15 (3.9%)	2 (0.90%)
04	Anti Malarial	15 (3.31%)	7 (1.85%)	2 (0.90%)
05	Analgesics	3 (0.66%)	9 (2.3%)	12 (5.42%)
06	Anti Diabetic	6 (1.32%)	10 (2.65%)	5 (2.26%)
07	Blood products	6 (1.32%)	6 (1.59%)	5 (2.26%)
08	Cardiology	23 (5.08%)	42 (11.14%)	38 (17.19%)
09	Dermatology	16 (3.53%)	17 (4.50%)	1 (0.45%)
10	Gynecology	18 (3.98%)	15 (3.97%)	8 (3.61%)
11	Gastro	9 (1.99%)	23 (6.1%)	25 (11.31%)
12	Hormones	13 (2.87%)	23 (6.1%)	6 (2.71%)
13	Neurology	21 (4.64%)	50 (13.2%)	16 (7.23%)
14	Nephrology	5 (1.10%)	23 (6.1%)	6 (2.71%)
15	Nutrition	12 (2.65%)	8 (2.1%)	11 (4.97%)
16	Oncology	40 (8.84%)	28 (7.42%)	27 (12.21%)
17	Ortho	1 (0.22%)	14 (3.71%)	3 (1.35%)
18	Respiratory	4 (0.88%)	25 (6.6%)	12 (5.42%)
19	Urology	1 (0.22%)	3 (0.79%)	4 (1.80%)
20	Vaccines	24 (5.30%)	14 (3.71%)	1 (0.45%)
21	Fixed Dose Combinations	23 (5.08%)	22 (5.83%)	108 (43%)

Manipal Hospital Formulary

In Manipal hospital formulary List out of 251 drugs Anti microbials, Cardiology, Gynaecology , gastro , Neurology , Nutrition , Oncology , Ortho, Urology , Fixed Dose Combinations had 26 (11.76%), 38 (17.19%), 8 (3.61%), 25 (11.31%), 16 (7.23%), 11 (4.7%), 27(12.21%), 3 (1.35%), 4 (1.80%) , 108 (43%) respectively . The Anti fungals, Hormones, Nephrology comprised of same no of drugs 6 (2.71%), Anti viral and Anti Malarial comprises of 2 (0.9%), Respiratory and Analgesics comprises of 12 (5.42%), Anti Diabetic and Blood products comprises of 5 (2.26%), Vaccines and Dermatology comprises of 1 (0.45%) drugs respectively.

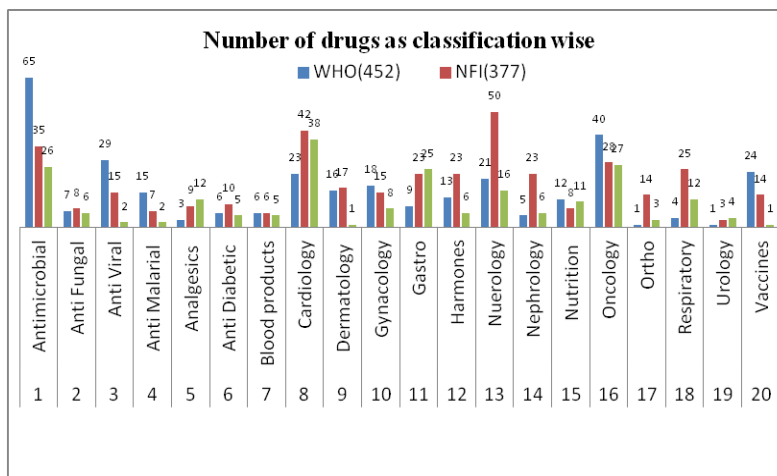


Figure 2: Number of drugs as classification wise.

V. Occupancy of Manipal Hospital Formulary (MHF) in WHO & NFI

In WHO& NFI the Fixed Dose Combinations(FDC) of Manipal hospital formulary occupies the highest percentage, next cardiology drugs occupies the second highest , on other hand Dermatological drugs and vaccines occupies the lowest

Table 4. Occupancy of Manipal Hospital Formulary (MHF) in WHO & NFI.

S no	Category	MHF	WHO (%)	NFI (%)
01	Antimicrobial	26	5.75	6.89
02	Anti Fungal	6	1.32	1.59
03	Anti Viral	2	0.44	0.53
04	Anti Malarial	2	0.44	0.53
05	Analgesics	12	2.65	3.18
06	Anti Diabetic	5	1.1	1.32
07	Blood products	5	1.1	1.32
08	Cardiology	38	8.40	10.07
09	Dermatology	1	0.22	0.26
10	Gynecology	8	1.76	2.12
11	Gastro	25	5.53	6.63
12	Hormones	6	1.32	1.59
13	Neurology	16	3.53	4.24
14	Nephrology	6	1.32	1.59
15	Nutrition	11	2.43	2.91
16	Oncology	27	5.97	7.16
17	Ortho	3	0.66	0.79
18	Respiratory	12	2.65	3.18
19	Urology	4	0.88	1.06
20	Vaccines	1	0.22	0.26
21	Fixed Dose Combinations	108	43	43

VI. Pregnancy category table

In the prepared Manipal hospital formulary (221) the percentage of drugs present in Pregnancy Category X, A, B, C, D, are 5.88%, 2.71%, 39.81%, 35.29%, 14.02% respectively.

Table 5. Pregnancy category table.

S no	Pregnancy Category	Total No of Drugs	% Of Drugs in MHF (221)
1	Category X	13	5.88
2	Category A	6	2.71
3	Category B	88	39.81
4	Category C	78	35.29
5	Category D	31	14.02

CONCLUSION

In conclusion, the developed formulary will have major impact on clinical practice for prescribers and health care professionals to endorse the quality of life in the patients, by promoting rational use of drugs towards patient care for getting better therapeutic outcomes.

ACKNOWLEDGMENT

The authors sincerely thank Dr. Charan Tej. K, Medical Superintendent, Manipal Hospitals Vijayawada, and members of PTC, Chief Pharmacist of Manipal hospital, for their valuable guidance, constant support and inspiration throughout the preparation of this work.

CONFLICTS OF INTEREST

The authors don't any conflicts of interest to declare

ABBREVIATIONS

WHO	:	World health organization
HF	:	Hospital formulary
NFI	:	National formulary of India
MHF	:	Manipal hospital formulary
DUA	:	Drug Utilization analysis
P&TC	:	Pharmacy and therapeutic committee
DTC	:	Drug therapeutic committee
ADR	:	Adverse drug reactions
FDC	:	Fixed Dose Combinations

REFERENCES

1. Divya Raj et al. /Journal of Pharmacy Research 2011,4(8),2537-2540
2. Fatima, et al.: Hospital Formulary and Rational Drug Use, Indian Journal of Pharmacy Practice, Vol 8, Issue 1, Jan-Mar, 2015.
3. D'Almeida,et al: Development of a hospital formulary for tertiary care teaching hospital in south India, Indian journal of pharmaceutical sciences, volume 69,issue 6,nov-Dec 2007,p:773-779.www.ijpsonline.com
4. Mahindra Kumar BJ - Evaluation of Development and Implementation of Hospital Formulary for Paediatric Department in a Rural Tertiary Care Teaching Hospital of South India, Indian Journal of Pharmacy Practice Volume 6 Issue 3 Jul - Sep, 2013.
5. Mr.Sushilkumar P L et al. Development and Implementation of a Drug Formulary for the Medicine Department of Teaching Hospital. Indo American Journal of Pharm Research.2015:5(07).
6. *shashikalacw* - development and implementation of hospital formulary, indian journal of pharmacy practice volume 6 issue 3 jul - sep, 2013
7. roshniet al. development and implementation of pediatric formulary & drug therapy guide in a tertiary care hospital in india *int j pharm pharmsci, vol 6, issue 6,450-451*
8. American Society of Hospital Pharmacists. ASHP Statement on the Pharmacy and Therapeutics Committee. Am J Hosp Pharm.1992;49:2008-9.
9. rosalind grant, joint drug formularies: are they worth developing? prescriber 5 september 2006. www.escriber.com
10. Principles of a sound drug formulary system. In: Hawkins B, ed. Best practices for hospital and health system pharmacy: positions and guidance documents of ASHP. Bethesda, MD: American Society of Health-System Pharmacists; 2006:110-3.
11. Hardman JG, Limberd LE. Goodman & Gillman's The Pharmacological Basis of Therapeutics, 10th edition, McGraw-Hill, USA, 2001.
12. Australian Pharmaceutical Formulary And Handbook, 18th edition, The Pharmaceutical Society of Australia, 2002.
13. Shargel L, Souney PK, Mutnick AH, Swanson LN. Comprehensive Pharmacy Review, 8 th edition, Wolters Kluwer Private Limited, New Delhi, 2010.
14. Kelly WJ. AHFS Drug Handbook, 2nd edition, Lippincott Williams & Wilkins, Newyork, 2003.
15. Tripathi KD. Essentials of Medical Pharmacology, 6th edition, Jaypee Brothers Medical Publishers Private Limited, New Delhi, 2008.
16. CIMS India [Online], Available from <http://www.mims.com/india>.



54878478451170435



Submit your next manuscript to **IAJPR** and take advantage of:

Convenient online manuscript submission

Access Online first

Double blind peer review policy

International recognition

No space constraints or color figure charges

Immediate publication on acceptance

Inclusion in **ScopeMed** and other full-text repositories

Redistributing your research freely

Submit your manuscript at: editorinchief@iajpr.com

