Study Of Rationality Of Prescriptions & Analysis Of Drugs Prescribed Among In-Patients Of Mcgann Teaching Hospital, S.I.M.S, Shimoga, Karnataka, India.

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Abstract:

Objective: *Irrational prescribing is a common problem in drug use. Rational prescribing can prevent & avoid this. The present study was undertaken to evaluate the rationality of prescriptions according to WHO core drug use indicators.*

Materials & Methods: *1070 prescriptions from in-patient departments were randomly analysed for rational prescribing retrospectively for 5 months (from July to November 2013) based on WHO drug use indicators .*

Results: *Prescribing of brand name (54.11%) was more common than generic name (45.89%). An average of 5.3 drugs were prescribed per person. 6.63% of prescriptions were partially legible or no treatment was recorded in treatment chart.90.18% of total drugs prescribed were from EDL & 7.85% of prescriptions had fixed dose combinations. Cephalosporins were the most commonly prescribed antibiotics. 3.36% of prescriptions have nil/incomplete diagnosis. Injectables were prescribed in 74.50% admissions.*

Conclusions: *Prescribing by generic name is to be promoted to avoid confusion in understanding prescriptions; this also adheres to WHO standards of rational prescribing. Also emphasis should be given to promote use of drugs from EDL & to avoid incomplete/illegible prescriptions & to properly diagnose all the cases treated at the hospital.*

Keywords: *Essential drug list (EDL), Fixed dose combinations (FDC), Irrational prescribing. WHO drug use indicator*

I. Introduction

Prescription is a written order of a registered physician to the pharmacist with proper directions for the dispensing of prescribed drugs & their use by the patient[1] . Drug prescribing is an integral part in treatment of patients. Various drugs are prescribed for numerous diseases afflicting mankind. However it is often observed that the prescribers do not adhere to the process of right prescribing i.e. prescribing the right drug , to the right patient, at the right time, at right dose through the right route . These have been described as the 5 R's of right prescribing or 5R's of medication safety. A 6th R called right documentation is sometimes added to this. When one of these norms are violated medication errors are likely to occur[2,3]. Also rational prescribing involves "SANE criteria" i.e. safety, affordability, need & efficacy of the drug[3].

Good prescribing involves instruction on appropriate dose, preparation & medication administration [4]. The prescribed medications should be periodically reviewed so that any errors in prescription are detected early & corrective measures be implemented to meet the standards [5]. Prescription based survey may be considered as one of the most cost effective methods to assess & evaluate the prescribing attitude of clinicians & dispensing practices of pharmacists[6]. Medication or drug use evaluation (DUE) study [7,8] is one of the commonly used methods to survey the prescriptions. Drug use evaluation (DUE) is of three types: prospective, concurrent & retrospective. Retrospective type of study is easy and accurate to perform as the information required is readily available. Therefore the pattern of drug use in hospital based setting needs to be monitored intermittently in order to analyze their rationality & provide inputs to promote rational drug use.

The rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time & at the lowest cost to them & their community [9] . According to National coordinating council for medication error reporting & prevention (NCC-MERP) medication error is " any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of health care professional , patient or consumer"[10].The rational use of drugs depends upon three perspectives namely patient, physician & healthcare provider perspective. The drug use indicators recommended by WHO cover all three perspectives [11]. These indicators may be used to study & analyse the pattern of drug use in any hospital based setting.

II.   Materials & Methods:

The study is retrospective, involving 1070 prescriptions among inpatients of Mc Gann teaching hospital Shimoga Institute of Medical sciences(S.I.M.S) during the periods of July to November 2013. The prescriptions were randomly chosen and analysed based on WHO drug use indicators [11] & other criteria for their:

1) Age & sex statistics.
2) Average number of drugs prescribed per person.
3) Duration of treatment & disease pattern like infectious, non-infectious, combined. System wise diagnosis & incomplete or without any diagnosis.
4) Prescriptions that were completely legible, partially legible or no treatment recorded.
5) Prescriptions with an antibiotic & type of antibiotic prescribed.
6) Drugs prescribed from EDL.
7) Prescriptions where drug was prescribed by brand name or generic name.
8) Number of fixed dose combinations prescribed.
9) % of Prescriptions with injections.
10) Prescriptions with vitamins & tonics.

III.   Results:
Table 1 : Age Statistics

Age (yrs)	No. of patients	Percentage(%)
0-10yrs	104	9.72
11-20yrs	169	14.95
21-30yrs	342	31.96
31-40yrs	150	14.50
41-50yrs	106	9.91
51-60yrs	99	9.25
>60yrs	106	9.91
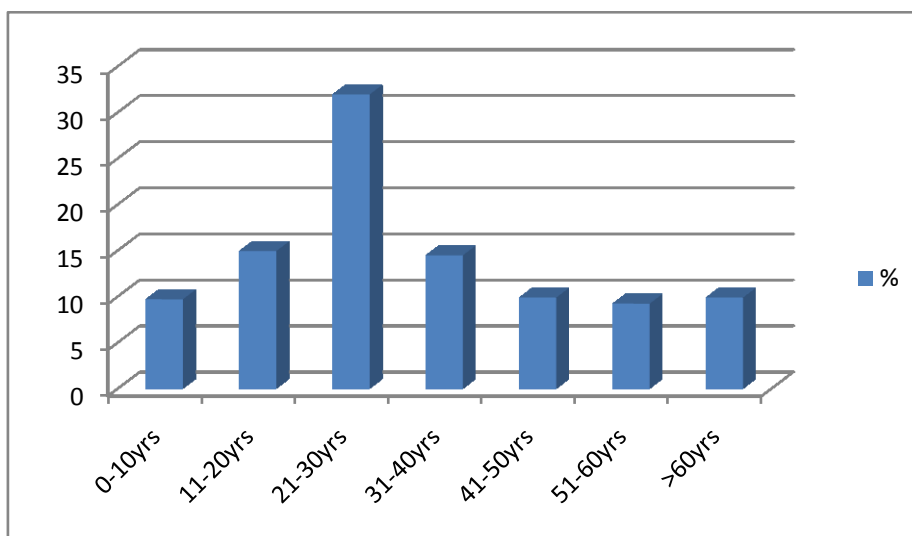
FIG 1: Age Distribution

Table 2:Duration Of Treatment Statistics:

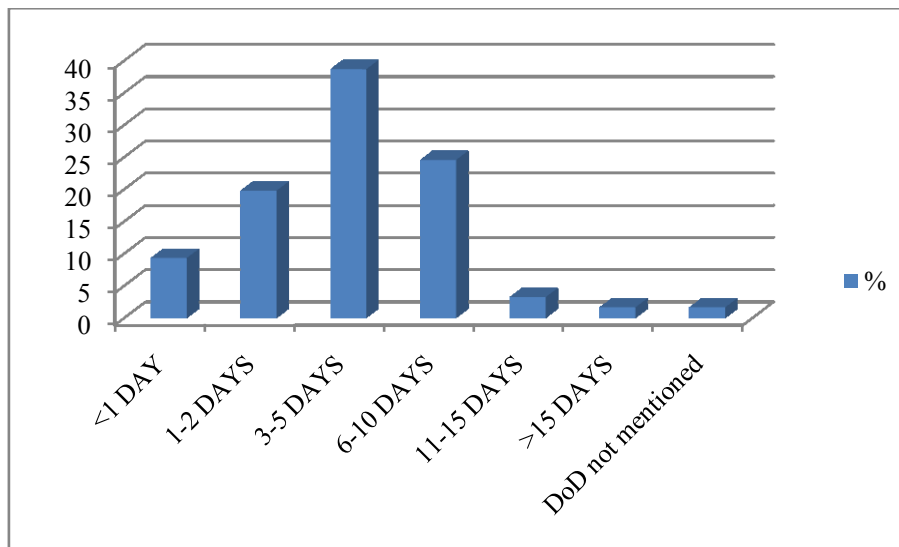| Duration of treatment (in days)	No of patients	Percentage(%)
< 1day	100	9.35
1-2 days	212	19.81
3-5 days	414	38.69
6-10 days	263	24.58
11-15days	035	03.27
>15days	018	01.68
Date of discharge not mentioned	018	01.68

Fig 2: Duration Of Treatment

Regarding age group of patients admitted**(table 1, fig 1**) 0-10yrs (9.72%), 11-20yrs(14.95%),21-30yrs(31.96%),31-40yrs(14.50%),41-50yrs (9.91%) 51-60yrs(9.25%) & >60yrs(9.91%). Regarding sex of patients admitted males were 42.72% & females were 57.28% respectively. A total of 5675 number of drugs were prescribed for 1070 prescriptions at 5.3 drugs per patient. 9.35% of patients were admitted for <1 day, 19.81% for 1-2 days, 38.69% for 3-5 days, 24.58% for 6-10 days, 3.27% for 11-15 days,1.68% for >15 days (**table 2, fig 2**) & date of discharge was not mentioned in 1.68% of patients. Communicable diseases constituted 26.45% of cases while non-communicable diseases constituted 69.91% of cases, while 1.5% of cases were of both types. 6.63% of prescriptions were either illegible or partially legible or no treatment mentioned at all.

Table 3 : Percentage Of Antibiotics Prescribed Statistics:

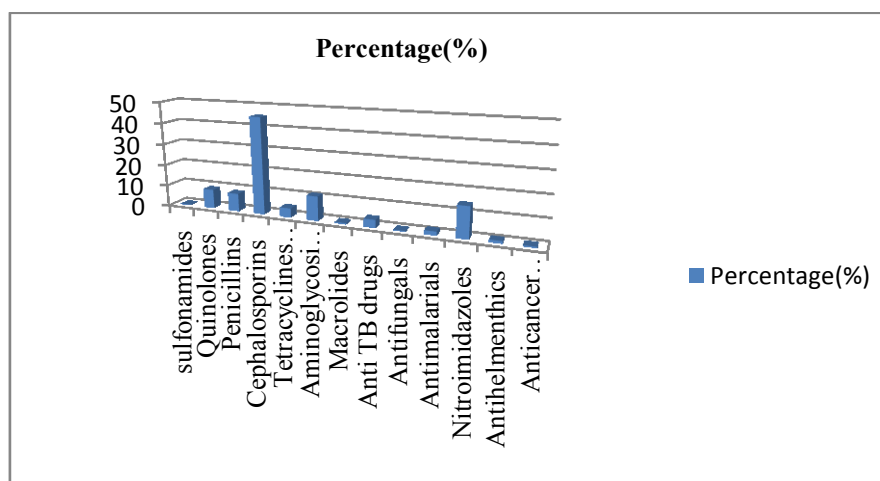| Antibiotics prescribed	Number(out of 1470)	Percentage(%)
sulfonamides	3	0.20
Quinolones	131	8.91
Penicillins	122	8.30
Cephalosporins	664	45.17
Tetracyclines & chloramphenicol	62	4.22
Aminoglycosides	166	11.29
Macrolides	7	0.48
Anti TB drugs	53	3.61
Antifungals	4	0.27
Antimalarials	25	1.70
Nitroimidazoles	210	14.29
Antihelmenthics	16	1.09
Anticancer drugs	7	0.48

Fig 3: % of Group of Antibiotic Prescribed

Table 4: Antibiotic Prescription Pattern According To Age Group:

Drug group	Age of patient(in years)			Total
	0-18yrs	**19-60yrs**	**>60yrs**	
Sulphonamides	02	01	00	03
Quinolones	21	93	17	131
Penicillins	17	82	23	122
Cephalosporins	147	470	47	664
Broad spectrum drugs	11	49	02	62
Aminoglycosides	95	67	04	166
Macrolides	02	05	00	07
Anti TB drugs	16	29	08	53
Antimalarials	05	19	01	25
Nitroimidazoles	21	178	11	210
Antihelmenthics	02	14	00	16
Antifungal drugs	00	04	00	04
Anticancer drugs	00	03	04	07
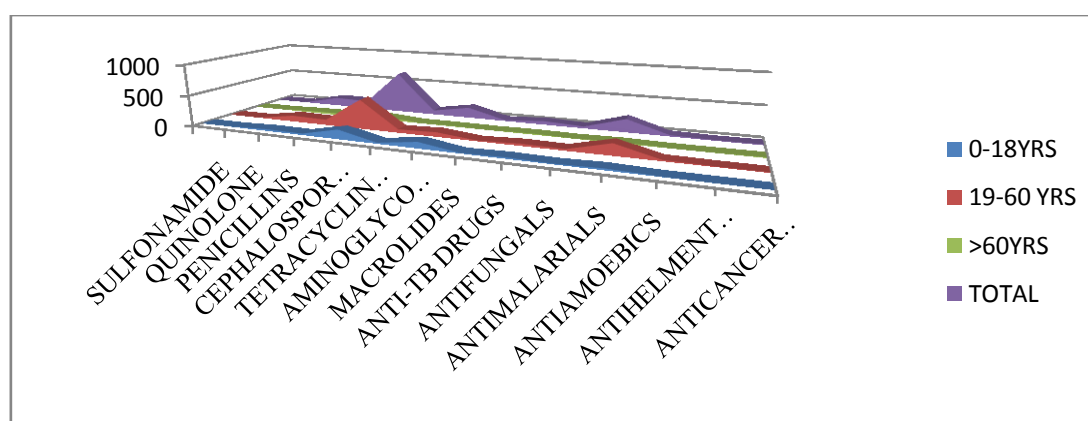
Fig 4: Age Wise Representation Of Number Of Antibiotics Prescribed

25.92% of admissions an antibiotic was prescribed (**table 3, fig 3**) of which sulphonamides constituted 0.20%, quinolones 8.91%, penicillins 8.30%, cephalosporins 45.17%, tetracyclines & chloramphenicol 4.22%, aminoglycosides 11.29%, macrolides 0.48%, anti-tubercular drugs 3.61%, antifungals 0.27%, antimalarials 1.70%, nitroimidazoles 14.29%, antihelmenthics 1.09% & anticancer drugs 0.48% of total antibiotics prescribed. Cephalosporins were most common antibiotics prescribed in all age groups(**table 4, fig 4**) while in 0-18yr age group 2nd common were aminoglycosides & in 19-60yr age group nitroimidazoles & in >60yr age group penicillins were 2nd commonly prescribed drugs.

Table 5: Diagnosis Pattern Statistics:

| Disease diagnosis	Number of cases	Percentage(%)
R.S & E.N.T	86	8.04
G.I.T & appendages	151	14.11
OBG including neonatal diseases	317	29.63
Musculoskeletal system	59	5.51
CNS	53	4.95
CVS	23	2.15
Endocrines	8	0.75
Dermatology	26	2.43
Renals including prostrate	30	2.80
Eye	15	1.40
Blood & lymphatics	39	3.64
Cancer related	07	0.65
Multiple diagnosis	102	9.53
Miscellaneous(including viral fever)	118	11.05
No/Incomplete diagnosis	36	3.36
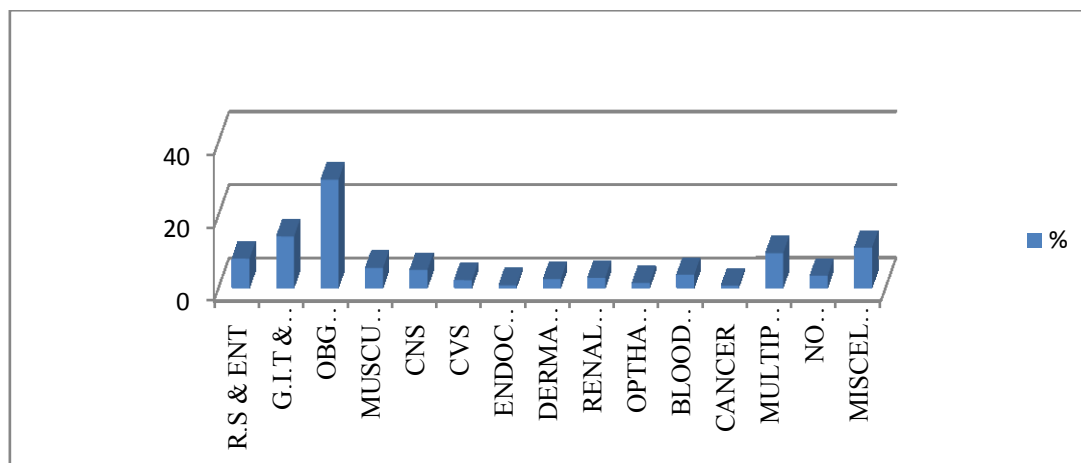
FIG 5: SYSTEM WISE DIAGNOSIS OF CASES IN %

90.18% of prescriptions contained drugs from EDL. In 54.11% of prescriptions brand name was used while 45.89% prescriptions contained generic name. Fixed dose combinations 9.85% of which cephalosporin plus sulbactam as injection was most common followed by anti-tubercular drug regimens. Injectables were prescribed in 74.50% of prescriptions. Vitamins & tonics constituted 12.99% of drugs prescribed. Regarding diagnosis of cases (**table 5, fig 5**) respiratory 8.04% , GIT & its appendages 14.11%, OBG including neonatal cases 29.63%, musculoskeletal system cases 5.51%, CNS diagnosis 4.95%, CVS diagnosis 2.15%, endocrines 0.75%, dermatology 2.43%, renal including prostate 2.80%, eye 1.40%, blood & lymphatics 3.64%, cancer related 0.65%,multiple diagnosis (2,3 & 4)9.53%, incomplete/ nil diagnosis 3.36%, miscellaneous (including viral fevers etc) 11.05%.

IV.   Discussion:

Analysis of prescriptions based on above criteria reveals that age group of 21-30yrs (31.96 %)(**table 1 & fig 1**) was maximum among patients admitted followed by 11-20 years (14.95%) , 31-40 years (14.50%) & 41-50years , >60years(9.91 % each). This shows that 11-40 years age group accounted for 62% of patients admitted in the hospital. It was found that females & males constituted nearly 57.28% & 42.72% respectively. A total of 5675 number of drugs were prescribed for 1700 prescriptions. An average of 5.3 drugs was prescribed per patient. This was much more than the reported statistics of 2-3 or 3-4 drugs prescribed per person [12,13].However the difference noted in our study was because it was carried out among in- patients . Injectables were prescribed in 74.50% of admissions, even this can be explained based on the in-patient nature of our study. Regarding total duration of treatment   3-5 days treatment was noted to be the highest (38.69%) followed by 6-10 days treatment(24.58%), 1-2 days treatment was found to be (19.81%) and < 1 day (9.35%) (**Table 2 & fig 2).**

25.92% of drugs prescribed had an antibiotic in them, out of which cephalosporins (45.17%) accounted for majority followed by nitroimidazoles (14.29%) aminoglycosides (11.29%) & quinolones (8.91%)(**table 3 & fig 3**). While cephalosporins accounted for maximum number of antibiotics prescribed among all the age groups the next most common antibiotic differed among various age groups (**table 4,fig 4**). Aminoglycosides in 0-18 yr age group & nitroimidazoles in the 19-60 year age group while in >60 year age group penicillins were 2nd most common prescribed antibiotics in our study.

54.11% of drugs were prescribed by their brand name & 45.89% of drugs were prescribed by generic name. This can be avoided by educating the prescribers about the importance of prescribing drugs by generic name. Example in a tertiary care hospital it is easier to procure , distribute & administer drugs when they are mentioned by their generic name except for drugs with narrow therapeutic index like lithium, phenytoin where prescribing by brand name is beneficial as it ensures proper bioavailability of drugs. 84 fixed dose combinations were prescribed in our study which accounted for 9.85% of drugs prescribed, majority of which were of cephalosporin plus sulbactam inj combination followed by anti-tubercular regimen combinations while ORS & asthalin plus budecort combinations were third most commonly prescribed . 90.18% of drugs that were prescribed are from EDL which is in accordance with WHO principles of good prescribing practices. Still there is some scope (more number of drugs could be prescribed from EDL) for improvements in prescribing practices based on WHO essential drugs list. 12.99% of prescriptions had vitamins & tonics, although in some cases it may be necessary to prescribe vitamins & tonics like chronic intestinal diseases & dietary deficiencies routine prescribing of vitamins & tonics should be discouraged.

6.63% of prescriptions were found to be completely or partially legible along with no treatment recorded for some patients ,this could be because of the heavy patient load at the teaching hospital. However it should not be an excuse for not mentioning medications that are already administered to the patient.Regarding diagnosis 26.45% of diagnosis were of communicable diseases & 69.91% were non-communicable diseases & 1.5% was of both types. Multiple diagnoses (2, 3 & 4) accounted for 9.53% of cases. Nil/incomplete diagnosis accounted for 3.36% of cases; therefore efforts should be made to diagnose all the cases as far as possible. When this is not possible at least a provisional diagnosis should be made & entered in the appropriate column of in-patients admission chart. Regarding diagnosis pattern**(table 5, fig 5**), OBG   cases   including   neonatal diagnosis were most common (29.63%) followed by diseases of the GIT including its appendages (14.11%) while miscellaneous diagnosis(viral fever etc) accounted for 11.05% of cases.

A 2002 WHO publication proposed 12 core policies to promote rational use of medicines [14]. These are:
1) Mandated multi-disciplinary body to coordinate medicine use policies.
2) Evidence based clinical guidelines.
3) Essential medicines list based on treatments of choice.
4) Drugs & therapeutics committees in districts & hospitals.
5) Problem based learning in pharmacotherapy in undergraduate curricula.
6) Continuing in-service medical education as a licensure requirement.
7) Supervision of health care workers, audit of prescriptions & providing feedback to prescribers.
8) Provision of drug bulletin on medicines.
9) Public education about medicines.
10) Avoidance of perverse financial incentives.
11) Appropriate & enforced regulations.
12) Sufficient government expenditure to ensure availability of medicines & staff.

Implementation of these policies will help prevent to a great extent irrational prescribing & promote rational drug therapy.

V.   Conclusion:

Most of drugs prescribed were from EDL(90.18%), brand name   prescribing is considerably more(54.11%), nil/ incomplete diagnosis(3.36%) & no treatment mentioned in treatment chart (6.63%) should be as minimal as possible. 25.92% of drugs prescribed were antibiotics of which cephalosporins were most commonly prescribed.5.3 number of drugs were prescribed per person.7.85% of prescriptions had Fixed dose combinations of which cephalosporin plus sulbactam injection   was most commonly prescribed. Therefore   it is mandatory to educate about rational prescribing from early days of medical education & provide updates & scrutiny needed for clinicians. This will minimise & prevent irrational prescriptions in the benefit of the patient & society at large.

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