

Assessment of Prescribing Pattern and Drug Use in Outpatient Department of Pulmonary Medicine at District General Hospital of Central India**Prabhakar Singh¹, Sanjay Tandon², Jitendra N. Chaturvedi³, Balvir Singh⁴, Raj Narayan Tiwari⁵, Shubhanshu Kashyap⁶, Anoop K. Patel⁷**¹Resident 3rd Year, Department of Pulmonary Medicine, PCMS & RC, Bhanpur, Bhopal, (MP)²Professor & HOD, Department of Pulmonary Medicine, PCMS & RC, Bhanpur, Bhopal, MP^{3,4}Associate Professor, Department of Pharmacology, GMC, Satna, (MP)⁵Assistant Professor, Department of Pharmacology, S.S. Medical College, Rewa, (MP)⁶Resident 2nd Year, Department of Pulmonary Medicine, PCMS & RC, Bhanpur, Bhopal, (MP)⁷Chief Consultant, Department of Pulmonary Medicine, District hospital, Rewa, (MP)

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Conflict of interest: Nil

Abstract:**Aims & Objectives:** To access the prescribing pattern and use of drugs by using WHO prescribing indicators among patients visiting to the Outpatient department of pulmonary medicine.**Material and Methods:** Study was conducted in the department of pulmonary medicine, PCMS & RC and District hospital, Rewa, MP between Oct-23 to Dec-23. The data were collected randomly, after taking the consent from patients who attending outpatient department. The collected data were coded and analyzed by using SPSS version 21.**Results:** Total 383 prescriptions were analyzed; most of the prescriptions were belongs to 31-40 yrs of age group. Most of (41.51%) patients were present with URI (viral infection) followed by allergic rhinitis. Among total (1846) prescribed drugs; maximum, 17.65% were antiulcer drugs followed by multivitamins (16.46%). The cefpodoxime-200mg was the most frequently (39.17%) prescribed antibiotic followed by azithromycin-500mg (25.80%). The average number of drug per prescription was 4.81 and 100% of drugs were prescribed from essential medicine list of India and WHO. Of total prescribed drugs 97.5% were prescribed by their generic name. "Dose and dosage forms" were not mentioned (one or more drugs of each prescription) in 76.38% and 27.95% and signature of that the prescribing pattern, use of drugs and the number of prescribed drug per encounter were considerable deviated from the standards recommended by the WHO. On the other hand, generic prescribing and prescribing from the essential drug list were fulfil WHO criteria; hence it is necessary to make time to time an educational programme for prescribing physicians.**Keyword:** Prescriptions; Pulmonary medicine; OPD; Bronchodilators.This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.**Introduction**

Medicines are an essential component of health care delivery. When used rationally, they produce the desired effect of improving patients' ailments. Their irrational use, on the other hand, leads to prolongation of the illness, development of adverse effects, and unnecessary expense [1]. Prescription of medicines is a crucial component of patient care. Rational use of drugs has become an important public health issue because of inappropriate drug prescribing. [2,3] Prescribing of drug is an important skill which needs to be continuously assessed and refined. It not only reflects physician's knowledge of pharmacology and pathophysiology but also his or her skills in diagnosis and attitude towards selecting the most appropriate cost effective treatment. [4]

Worldwide, >50% of all medicines are prescribed, dispensed, or sold improperly and 50% of patients fail to take them properly. Irrational prescribing is a global problem. The rationality of prescribing pattern is of utmost importance because bad prescribing habits including misuse, overuse and underuse of medicines can lead to unsafe treatment, exacerbation of the disease, health hazards, and economic burden on the patients and wastage of resources. Examples of irrational use of medicines include: poly-pharmacy, inadequate dosage, and use of antimicrobials even for non-bacterial infections, excessive use of injections when oral forms are available and inappropriate, self-medication and non-compliance to dosing regimes [6]. Ensuring rational use of drug requires, ongoing

evaluation of drug prescribing, dispensing, and use by patients. A number of tools have been developed, the globally accepted methods, particularly, the tools called “WHO drug use indicators”.

These indicators are grouped into three categories, namely: prescribing indicators, patient care indicators, and facility indicators. Prescribing indicators include the average number of drugs per encounter, the percentage of encounters in which antibiotics are prescribed, the percentage of encounters in which an injection is prescribed, the percentage of drugs prescribed by generic name, and the percentage of drugs prescribed from an essential drug list or formulary. [7] Govt. of India formulating National List of Essential Medicines (NLEM) 2022, which contains 384 medicines as compared to 376 in NLEM 2015, the maximum (108) numbers of medicines are anti-infective agents.

National List of Essential Medicines (NLEM) is expected to result in better quality of medical care, better management of medicines and cost-effective use of health care resources. [8] Similar to NLEM MP State Govt. formulate SLEM 2021 which contains 295 drugs for District hospital, 270 for Civil hospital, 253 for CHC and 204 for PHC to established standard treatment guidelines for evidence-based practice and rational drug therapy and provide uninterrupted access to essential medicines free of cost for all public hospitals and health centers.

The aim of this study was to evaluate the medication prescribing pattern and their use by using WHO prescribing indicators among patients presenting to the Outpatient department of pulmonary medicine which will lead to developing a proper health care policy; improve the quality of the use of medicine and healthcare facilities.

Material & Methods

This is a cross-section, observational study “Assessment of Prescribing pattern and drug use in Outpatient Department of pulmonary medicine at District General Hospital of Central India.” was carried out in the Outpatient Department of Pulmonary medicine at District Hospital, Rewa (MP.) and PCMS & RC Bhopal, between Oct - Dec 2023. Data were collected by author (JR 2nd pulmonary medicine), of patients attending OPD pulmonary medicine department.

Data were collected in the structured format (structured prescription paper). The format was developed by directorate of health services of MP Govt. The format contains UHID No, socio-demographic variables, presenting complaint and signature. The collected data were reviewed, coded, and analyzed by using SPSS version 21.

Descriptive analyses such as percentage and frequency distributions were performed. WHO prescribing indicators were calculated, including the average number of drugs per encounter, percentage of drugs prescribed by international nonproprietary name, percentage of drugs prescribed from the essential drug list, and percentage of encounters at which antibiotics were prescribed. Finally, the result was interpreted and presented in tables and graphs.

Observations: Tables and Graphs are given at last page, at end of references.

Results

In present study total 383 prescriptions were analyzed; most of the prescriptions (35.77%) were belongs to 31-40 yrs of age group followed by 51-60 yrs (26.57%), 31-40 yrs (14.62%), >60 yrs (13.31%) and 21-30 yrs (9.92%). Of these 74.93% were males and 25.06% were females. Fig. No.1 Of these total (383) prescriptions, maximum (41.51%) patients were present with URI (viral infection) followed by allergic rhinitis (22.45%), asthma (17.23%), COPD (13.57%), pneumonia (4.43%) and ILD (0.78%). Fig. No.2 Total 1846 drugs were prescribed in 383 prescriptions; of these 1846 drugs, maximum 17.65% were antiulcer drugs followed by 16.46% multivitamins, 13.48% NSAIDs, 13.27% antihistamines, 11.97% bronchodilators, 11.75% antibiotics, 6.12% cough syrup, 3.73% steroids, 3.41% nasal drops and minimum 2.11% were mucolytic.

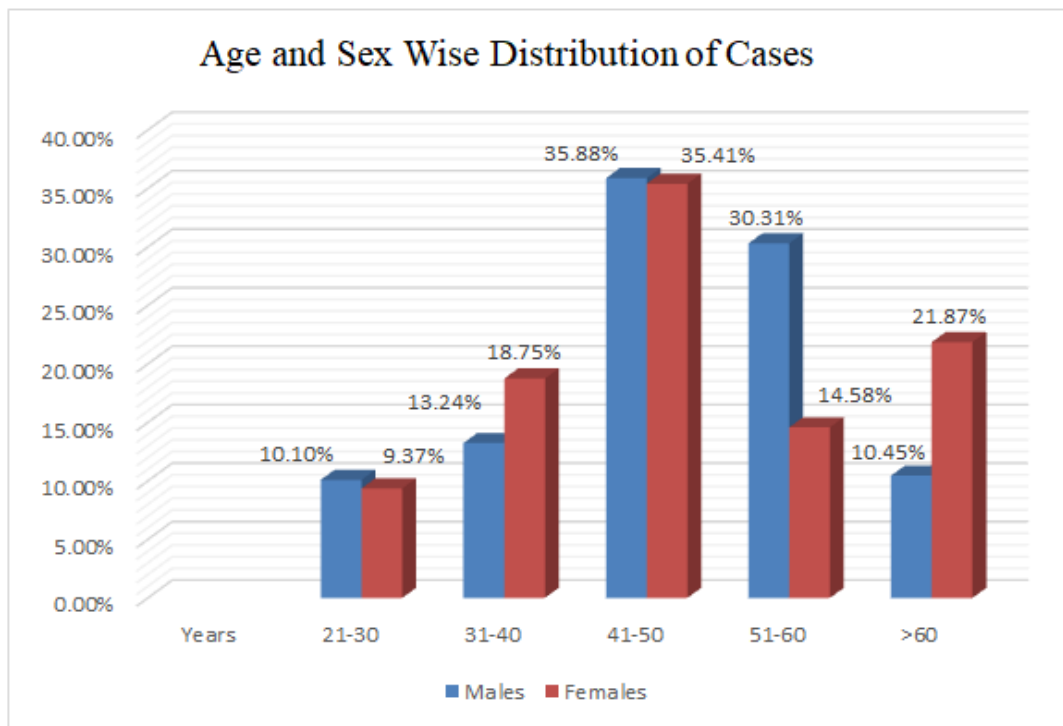
Table No.1 Amongst total prescription, 48.82% prescription had 5 drugs per encounter, 27.93% had 6 drugs, 12.53% had 4 drugs, 7.31% had 7 drugs and 3.39% had 3 drugs per encounter. Table No.2 Total 1846 drugs prescribed in 383 prescription, of these most of (80.33%) given in tablet form, followed by syrup (6.12%), DPIs (5.14%), capsules (3.73%), nasal drops (3.41%) and MDIs (1.24%). Fig. No.3 Amongst bronchodilators, etophylline was the most frequently (46.60%) prescribed followed by dry powder inhaler (42.98%) (Includes formoterol+budesonide-400 26.24%, formoterol+budesonide-200 10.40% and tiotropium bromide 6.33%) and metered dose inhaler 5.08% (includes formoterol+budesonide-200 2.26%, and salbutamol 8.14%).

Amongst antimicrobials, cefpodoxime-200mg were the most frequently (39.17%) prescribed followed by azithromycin-500mg (25.80%), amoxicillin-500mg (22.11%), clindamycin-600mg (9.67%) and levofloxacin-500mg (3.22%). Among antiulcer drugs; only two molecules were prescribed one was ranitidine-150mg (85.58%) and other omeprazole-20mg (14.41%).

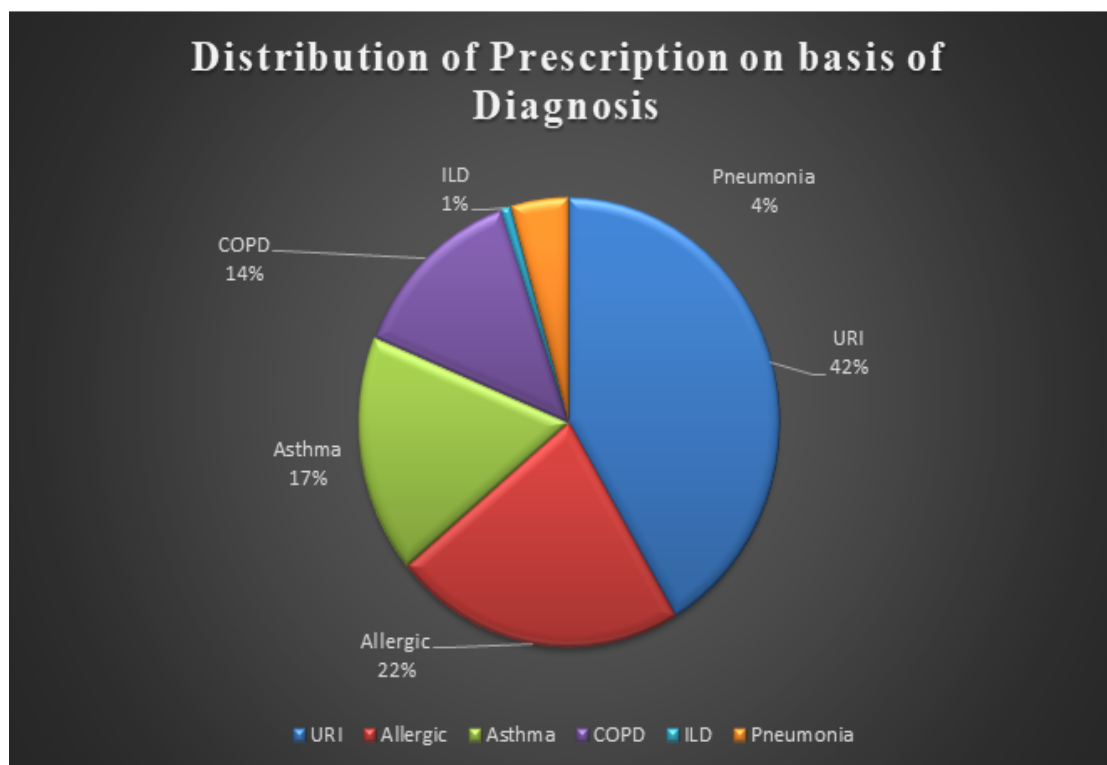
Amongst other drugs, methyl prednisolone was prescribed (100%) as steroids, cetirizine (100%) as

antihistamines, and oxymetazoline (100%) as nasal drops. Table No.3 the average number of drugs per prescriptions is 4.81 of these 100% of were prescribed from essential medicine list of WHO, India and MP State. 97.5% of these drugs were prescribed by generic and 2.5% by brand names. Total 12.51% drugs were prescribed in form of

FDC. The “dose and dosage forms” were not mentioned in 76.38% and 27.95 % one or more drugs in each prescriptions respectively, and duration of therapy was not mentioned in 71.07%, complete diagnosis was not written in 22.97% and signature of physicians were absent in 37.07% of prescriptions. Table No.4



Graph 1: Age and Sex wise distribution of patients attending / visiting Pulmonary OPD



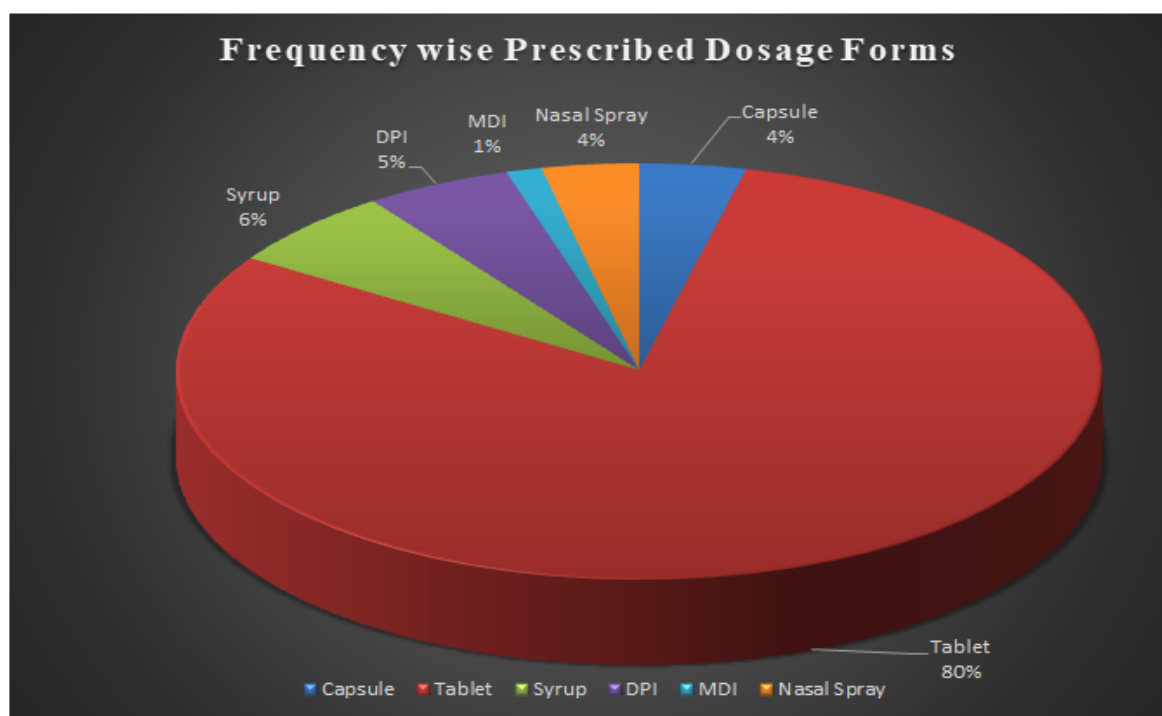
Graph 2: Distribution of cases on the basis of Diagnosis of patients attending / visit Pulmonary OPD

Table 1: Patterns of prescribed drug groups in patients attending / visiting Pulmonary OPD

S.N.	Drugs groups	Number and percentage of Prescribed drugs	
1.	Bronchodilator	221	11.97%
2.	Antibiotic	217	11.75%
3.	Steroid	69	3.73%
4.	Antihistaminic	245	13.27%
5.	Mucolytics	39	2.11%
6.	LT. Antagonist	NA	00%
7.	Cough Syrup	113	6.12%
8.	NSAIDS	249	13.48%
9.	B Complex	304	16.46%
10.	PPI	326	17.65%
11.	Nasal Spray	63	3.41%
Total		1846	100%

Table 2: Distribution of Prescriptions on the basis of Number of drugs/Prescription of patients attending / visiting Pulmonary OPD

S.N.	Number of drugs/encounter	Number and percentage of Prescription	
1.	3	13	3.39%
2.	4	48	12.53%
3.	5	187	48.82%
4.	6	107	27.93%
5.	7	28	7.31%
Total		383	100 %



Graph 3: Frequency of prescribed dosages form in patients attending / visiting Pulmonary OPD

Table 3: Frequency of prescribed drugs of various group/ class for patients attending / visiting Pulmonary OPD

SN.	Group of Drugs	Dosage forms	Prescribed Drugs	Number and percentage	
1.	Bronchodilator (n=221)	DPIs	Formoterol + Budesonide - 400	58	26.24%
			Formoterol + Budesonide - 200	23	10.40%
			Tiotropium bromide 18mcg	14	6.33%
		MDIs	Formoterol + Budesonide - 200	05	2.26%
			Salbutamol 100mcg/dose	18	8.14%

		Tab	Etophylline 231mg	103	46.60%
2.	Antibiotics (n=217)	Tab	Cepodoxime-200mg	85	39.17%
			Azithromycin 500mg	56	25.80%
			Levofloxacin 500mg	07	3.22%
		Caps	Amoxycillin 500mg	48	22.11%
			Clindamycin 600mg	21	9.67%
3.	Systemic Corticosteroids (n=69)	Tabs	Prednisolone	Nil	00%
			Methyle prednisolone	69	100%
			Dexamethasone/ Betamethasone	Nil	00%
4.	Anti-histaminic / LT receptor antagonists (n=245)	Tabs	Ceterizine	245	100%
			Levoceterizine	Nil	00%
			Levoceterizine + Montelukast	Nil	00%
5.	Nasal (drops/ spray) Decongestant (n=63)	Drops	Oxymetazoline 0.05%	63	100%
		Spray	Fluticone furoate + Oxymetazoline	Nil	00%
6.	PPIs (n=326)	Tabs	Ranitidine 150mg	279	85.58%
			Omeprazole 20mg	47	14.41%

Table 4: Analysis of Prescription on basis of WHO prescribing indicators

S. N.	Prescribing parameters	Number and percentage of Prescribed dosage forms	
1.	Total number of prescriptions assessed	383	NA
2.	Total number of drugs prescribed	1846	NA
3.	Average number of drugs per prescription	4.81 / prescription	
4.	Average number of AMAs per prescription	0.56 / prescription	
5.	Drugs prescribed form * EML of India (n=3047)	1846	100%
6.	Drugs prescribed form EML of WHO (n=3047)	1846	100%
7.	Total number of prescribed antimicrobials (n=217)	217	11.75%
8.	No. of drugs prescribed by generic name (n=1846)	1798	97.39%
9.	“Dose and dosage forms” not mentioned in (n=1846)	1410 and 516	76.38% and 27.95 %
10.	“Duration of therapy” not have mentioned in (n=1846)	1312	71.07%,
11.	Total number of FDC was prescribed in (n=1846)	231	12.51%
12.	Complete diagnosis was not written in (n=383)	88	22.97%
13.	Signature of doctor was absent in (n=383)	142	37.07%

Discussion

Time to time prescriptions audit plays very important role, as incorrect prescription can lead to ineffective and unsafe treatment, which can cause exacerbation of the disease conditions or harm the patients, additionally increases extra economic burden to the patients. Study of prescribing patterns also seeks to monitor, evaluate and suggest modifications in practitioners' prescribing habits to make rational and cost effective medical care. In developing countries the cost of health care is a matter of major concern [9].

In this study, most (43.57%) of prescriptions were belonged to 31-40 yrs of age group patients that visiting the OPD as compared to study conducted in Pokhara Valley [10] of Western Nepal where maximum (54%) patients were aged 20 to 39 years. In these study younger and middle age groups constituted the highest number of OPD visitors, this might be due to greater health awareness among this age group, as well as they represent higher proportion of the earning population. In this study males were predominant (74.93%) compare to females, these higher numbers of male visitors

were residing in rural areas. The less number of female visitors reflects the possibilities that they were probably less aware and less educated about their health and hygiene. In our study most of the prescription had diagnosis of URI (viral infection) (41.51%) followed by allergic rhinitis. Antiulcer drugs were most commonly (17.65%) prescribed followed by multivitamins and NSAIDs. Among antiulcer drugs, ranitidine-150mg was most frequently prescribed followed by omeprazole-20mg. Among bronchodilators, tab etophylline was the most frequently (46.60%) prescribed compare to dry powder inhaler or metered dose inhaler. Among antimicrobials, cefpodoxime-200mg were the most frequently (39.17%) prescribed followed by azithromycin-500mg and amoxicillin-500mg in our study, this differs from the study conducted by the Agency for Health care Research and Quality [11] and MacDougall et al study [12] in which fluoroquinolones was the most frequently prescribed antibiotics for acute respiratory illness, that are usually caused by viral infections. In our study maximum no of prescriptions had five to six drug per encounter, which showed polypharmacy (≥ 2 drug per encounter). The major drawback of

polypharmacy is high risk of drug-drug interactions, reduced patients compliance and high incidence of drug toxicities. In this study average number of drugs per prescription was 4.81, this was dissimilar to the study conducted in democratic Yemen [13], Pakistan [14], India [15] and Nigeria [16] in which the average number of drug per prescription was 3, 3.1, 3.7 and 3.8 respectively, while other Indian studies conducted in Puna [17] and Bangalore [18] were reported 2.8 and 2.71 drugs per prescription respectively. However the average number of drug per prescription should be 2.0 as per WHO recommendation. [19] In our study the most of drugs (97.5%) were prescribed by generic name which is similar to the study conducted in Cambodia [20] and in the Republic of Iran in which 99.80% and 98% of drugs were prescribed by generic name [21]. Several other studies conducted in India (73.4%), [22] Brazil (30.6%) [23] and Nepal (63.5%) [24] In which very less number of drugs were prescribed by generic names compare to our study.

The other studies conducted in Allahabad and Meerut was showed only 2% [25] and 3.79% [26] of drugs were prescribed by generic names. The factor that may contributed to low proportion of generic drug prescription is the poor promotion, and a belief among prescribers that generic drugs were manufactured from raw materials and had low efficacy and potency. Use of drugs by generic names was recommended by WHO and regarded as an important factor for promoting RUD, this high percentage of prescribing generic drugs in our study was due to the dream project of MP Govt. ‘Sardar Vallabh Bhai Patel Muft Dawa Yojana’ and providing most of essential drugs given in EDL and order for prescribers to prescribe only those drugs whose provided by hospital pharmacy, listed in the state/national EDL and prescribe only by their generic names. The use of generic drugs contributes to cost reduction and provides more alternatives for drug purchases. [27]

In our study, most of drugs were prescribed in form of tablet (80.33%) and injectable form was not used, however 6.19% of drugs were used in injectable form in study conducted at Meerut, UP [26] but this was slightly higher than study conducted in the Sri Lanka, where only 1% of the drugs were prescribed in injectable forms. [28] 12.51% fixed dose combinations were prescribed in our study. It may warrant inappropriate use of unwanted drugs which can lead to adverse effects and drug interactions. Use of fixed dose combinations should be discouraged unless strictly necessary. However there were several Indian studies which reported 75%, 60%, 28.85% and 40.92% usage of FDCs respectively. [29,30,31,26] In present study the “dose and dosage forms” and duration of therapy were not mentioned in 76.38%

and 27.95 % and 71.07% of prescriptions respectively. This was dissimilar to study conducted in teaching hospital of Nepal [32] (in which dose, dosage form and duration of therapy were not mentioned in 18.9%, 12.1% and 59.9% respectively) and governmental hospital of Ethiopia [33] (in which dose and dosage form were not prescribed 72.6 and 67.3% respectively). In our study complete diagnosis was not written in 22.97% of prescriptions, this was less than study conducted in Pakistan and more than study of Saudi Arabia 15.1%. [34,35] The determination of diagnosis is a part of rational prescribing. The diagnoses in prescription will help to dispense accurate drugs by the pharmacist during interpretation of prescription even if the handwriting of medicine mentioned is not clear. [36] if the diagnosis were not correct, the treatment would not be achieved.

The wrong diagnosis results in economic wastage and patient health hazards. The signature of physicians were absent in 37.07% of prescriptions in our study, this was dissimilar to several studies conducted at the tertiary care hospital of India, Nepal and Saudi Arabia that showed prescriber’s signature were missed in 12%, 15.7%, and 18.1% respectively [31,35,37]. The prescriber details were absent comparatively higher in our study than above mentioned studies. The pharmacist or the dispenser is unable to confirm whether the prescriber and prescription are genuine or not if the prescriber details are not written in a clear, legible way. The absences of prescriber details make it difficult to communicate by pharmacists in confusion on medicine writing and by patients in further follow up on their medical conditions. The prescriber details are crucial in cases of narcotics, hormonal and antibiotic can only be dispensed on the prescription of registered medical doctors. Therefore, the prescriber’s details must be required. [38]

Conclusion

Prescription assessment give a clear picture of the prescribing pattern in our hospital setting. Present study reveals that despite of all the efforts taken by the government and the WHO, the pattern of prescription in terms of completeness and rationality remains poor. There is a need for improvement to standardize the prescription pattern in all aspects, in terms of polypharmacy, missed diagnosis, relative absence of the directions about the use of drugs and excessive use of nutritional supplements.

To improve the quality of care, it is necessary to change the present prescribing pattern as set by Govt. standard treatment guidelines. This study recommends the physicians to attend regular continuing medical education, short-term training

sessions, including a briefing on proper prescription writing, so as to update their knowledge specially about mention the proper diagnosis his/her signature in prescriptions.

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