

A Study to Assess the Prescription Pattern to Promote Rational Use of Drugs: Cross-Sectional Descriptive StudyKanchan Kumari¹, Asha Kumari², Naveen Kumar³¹Tutor, Department of Pharmacology, DMCH, Laheriasarai, Darbhanga, Bihar, India²Assistant Professor and HOD, Department of Pharmacology, DMCH, Laheriasarai, Darbhanga, Bihar, India³Tutor, Department of Pharmacology, DMCH, Laheriasarai, Darbhanga, Bihar, India

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Conflict of interest: Nil

Abstract**Aim:** The aim of the present study was to assess the prescription pattern to promote rational use of drugs.**Methods:** A cross-sectional descriptive study was done for one year in DMCH in Darbhanga. Prescriptions from Out-patient departments especially Medicine and Pediatrics were collected and analyzed. The prescribed fixed dose combination drugs and other drugs were categorized according to Anatomical Therapeutic Chemical classification (ATC classification).**Results:** Most common FDCs in elderly age group belonged to Gastrointestinal system and in Pediatric population mainly respiratory system. The highest percentage of FDCs were seen in alimentary tract, followed by anti-infective, respiratory system. The maximum number of FDCs was of antacid combination followed by combination of proton-pump inhibitors and prokinetic drugs in the alimentary tract. In case of respiratory drugs maximum number was of antihistaminics, anticholinergics followed by anti asthamatics. In nervous system combination of paracetamol, tramadol followed by paracetamol, codeine and caffeine. In anti-infective group mostly amoxiclav, norfloxacin-tinidazole, ofloxacin-ornidazole.**Conclusion:** A significant number of drugs are being prescribed as FDCs which also includes various irrational combinations. A multipronged corrective approach involving regulator, academia, industry, physicians, and public is needed to correct the dismal FDC scenario.**Keywords:** Fixed dose combination, prescribing pattern, irrational, ATC classificationThis 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**

A 'Fixed Dose Combination (FDC)' is a combination of two or more active ingredients in a fixed ratio of doses. This term is used generically to mean a particular combination of active ingredients irrespective of the formulation or brand. It may be administered as a single entity product given concurrently or as a finished pharmaceutical product. [1] Use of FDCs is associated with many advantages like synergistic action and increased efficacy (e.g. cotrimoxazole), reduced adverse effects (e.g. levodopa with carbidopa, thiazides with potassium sparing diuretics), reduced pill burden and cost of therapy and hence better patient compliance (e.g. anti-tubercular drug combinations).

However, certain disadvantages like incompatible pharmacokinetics, inflexible dose ratio, increased toxicity and cost, contraindication of one component of the FDC decreased their utility. Adverse effect of any one component also limits their use. FDCs are

used worldwide. Ten percent of new products in Japan are FDCs, about 56% of all drugs prescribed in European countries like Spain are FDCs, showing the higher trend of prescribing these formulations. [2] In India, there are more than 80,000 commercial formulations are available either as single drug formulations or FDCs.

The goal of drug therapy is to achieve the desired therapeutic response without producing toxicity, i.e., maximizing efficacy with minimal untoward effects. Low adherence to the prescribed medications for chronic conditions is well documented in literature, the impact of which is more in developing countries considering the dearth of health resources and inequalities in access to health care. [3-5] Concomitant use of two or more drugs (polypharmacy) adds to the complexity of individualization of drug therapy. To obviate these problems, two or more drugs in a fixed-dose combination were formulated with the objectives of

providing benefits in terms of better therapeutic efficacy, improvement in pharmacokinetic profile, lowering the frequency of adverse effects, reduction in the pill burden, and attenuation in development of resistance, each reason being adequately supported by sound scientific evidence. [6-8]

The aim of the present study was to assess the prescription pattern helps in developing national database which can be used to promote rational use of drugs.

Materials and Methods

A cross-sectional descriptive study was done for one year in DMCH in Darbhanga. Prescriptions from Out-patient departments especially Medicine and

Pediatrics were collected and analyzed. The prescribed fixed dose combination drugs and other drugs were categorized according to Anatomical Therapeutic Chemical classification (ATC classification). The list of Fixed drug combinations that are currently banned were also identified. Over 500 prescriptions were collected and analysed. Out of these 500 prescriptions about 1400 drugs were prescribed. Among these drugs, about 475 were FDCs, and rest 925 were others. The data was entered, stored and evaluated using Microsoft excel 2016. Data was calculated according to the percentages.

Results

Table 1: The group wise distribution of drugs, according to ATC classification and FDCs in that category

ATC classification	No. of FDCs	Percentage
Alimentary tract	170	35.78
Blood and blood forming organs	9	1.89
CVS	3	0.63
Dermatology	1	0.21
Genitourinary	47	9.89
Systemic hormones	3	0.63
Anti infective	95	20
Musculoskeletal	44	9.26
Nervous	42	8.84
Anti parasitic	8	1.68
Respiratory system	52	10.94
Others	1	0.21

Most common FDCs in elderly age group belonged to Gastrointestinal system and in Pediatric population mainly respiratory system. The highest percentage of FDCs were seen in alimentary tract, followed by anti infective, respiratory system.

Table 2: The ATC classification and various FDCs

ATC classification	Name of drugs	No. of prescriptions
Alimentary tract	Simethicone Alum.hydroxide Mag .hydroxide	60
	Pantoprazole Domperidone	45
Anti infective	Amoxiclav	40
	Norfloxacin Tinidazole	35
Respiratory	Pseudoephedrine Guaifensin	35
	Dextromethorphan Phenylephrine chlorphenarimine	35
	Paracetamol Tramadol	25
Nervous system	Paracetamol Codeine Caffeine	35
	Mefenamicacid, paracetamol	55
Musculoskeletal	Mefenamic acid, dicycloverine	50

The maximum number of FDCs was of antacid combination followed by combination of proton-pump inhibitors and prokinetic drugs in the alimentary tract. In case of respiratory drugs maximum number was of antihistaminics,

anticholinergics followed by antiasthmatics. In nervous system combination of paracetamol, tramadol followed by paracetamol, codeine and caffeine. In anti-infective group mostly amoxiclav, norfloxacin-tinidazole, ofloxacin-ornidazole.

Discussion

World Health Organization (WHO) defines Fixed Dose Combinations (FDCs) as combination of two or more active ingredients in a fixed ratio of doses. [9] It can be given as a sole agent given together or as a combined pharmaceutical product. Drug utilisation studies are powerful tools to ascertain the role of drugs in medical practice. [10] The ultimate goal of drug utilisation research is to assess whether drug therapy is rational or not. Various advantages associated with FDCs are synergistic action, improved efficacy, minimal adverse effects and good patient compliance. Disadvantages like cost, contra indication to one of the component, dose ratio. The FDC may not contain the specified amount of each individual medicine and the combination may not be synergistic. FDCs may expose patients to unnecessary risk of adverse drug reactions. [11] Most drugs should ideally be prescribed as single compounds, but doctors prescribe a lot of FDCs forwarding the argument of better patient compliance. [12]

Most common FDCs in elderly age group belonged to Gastrointestinal system and in Pediatric population mainly respiratory system. The highest percentage of FDCs were seen in alimentary tract, followed by anti infective, respiratory system. The maximum number of FDCs was of antacid combination followed by combination of proton-pump inhibitors and prokinetic drugs in the alimentary tract. In case of respiratory drugs maximum number was of antihistaminics, anticholinergics followed by antiasthmatics. In nervous system combination of paracetamol, tramadol followed by paracetamol, codeine and caffeine. In anti-infective group mostly amoxiclav, norfloxacin-tinidazole, ofloxacin-ornidazole. Poly-pharmacy is common and there is an increasing inclination to combine drugs, more often than not without a sound rational basis for doing so. [13] Our study found that a total of 33.9% drugs were FDCs. A study conducted by Biswadeep das MD et al [14], had 64.8% as FDCs which is high compared to our study. Highest number of FDCs belonged to alimentary system followed by drugs belonging to anti-infective. In a study done in various clinical departments by Deepak et al., percentage of FDCs prescribed were 64.29% and most of them belonged to antimicrobial class. [15] Wide scale studies on FDC usage in various clinical departments to help build national database may go long way in promoting rational drug use. Some of these drugs were recently banned combinations because of their irrationality. [16]

The prescribing doctors, therefore, need to be well trained in rational prescribing so that they are able to make an accurate and sound decisions while selecting and prescribing FDCs based on the pharmacokinetic and pharmacodynamic concepts

thereby increasing the efficacy and improving the health outcome. The pharmacological basis of combining each ingredient in the FDC formulations should be taught to undergraduate as well as postgraduate students during their training in medical colleges. [17] Selection of personal drugs, rational drug use, use of rational drug combinations, and ethical laboratory practices should be included in the student's curriculum during their training period. This will not only help in developing the practice of critically analyzing the drug combinations and selecting a rational drug for treating the patients but also inculcate in them the habit of evidence based rational prescribing.

Conclusion

A significant number of drugs are being prescribed as FDCs which also includes various irrational combinations. A multipronged corrective approach involving regulator, academia, industry, physicians, and public is needed to correct the dismal FDC scenario.

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