Research Article

Pharmaco-Surveillance at Retail Outlets In Southern India

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ABSTRACT

Introduction: Pharmaco-surveillance is one of the important tools to monitor the post marketing trends of modern medicament. The current study is an attempt to survey and document the drug use profile in an urban and a rural area of southern India.

Methodology: The study sites were selected based on socioeconomic status from a metro city and a rural area (180 kms away) using cluster sampling method. The data has been collected, compiled and analyzed from 50% of pharmacy outlets in rural area and 10% of outlets in the selected urban areas.

Results:A total of 1023 pretested schedules (Urban- 717, rural- 306) were recorded. The self-medication rate in urban area (25%) was more compared to rural area (8%). Analgesics (22-23%), antibiotics (20-22%), nutritional supplements (10-16%) and antacids (11-14%) were the main category of medicines purchased. The prescriptions for metabolic disorders were more in urban area (8%). The antibiotics like Cephalosporins were preferred in urban area to synthetic penicillins in rural area. The irrational use of antibiotics was observed in around 30-40% of prescriptions. The fixed dose combinations (FDC) constitute 35% of total drugs. The mean prescription cost in urban area and rural area was INR 111.4 ± 120.67 and INR 77.7 ± 59.13 respectively.

Conclusion: Irrational use of antibiotics remains the major concern due to prevalence of resistance. High use of FDCs warrant their requirement and suggest monitoring through regular pharmacosurveillance studies. This study also emphasizes the need of strict regulatory practices to implement rational use of drugs.

Keywords: Antibiotic; Nutritional supplement; Fixed dose combinations; NSAIDS

INTRODUCTION

Modern medicaments have become the inevitable tools for the therapeutic benefit of today's world. Although their use is obligatory, rational use should be prerequisite. In contrary, WHO estimates that more than half of all medicines are being used inappropriately [1]. Irrational use of medicines is evident in several reports all over the world. Liu et al. from USA reported that 40% of patients are using at least one inappropriately prescribed drug [2]. A survey from Pakistan and China reveal that around 25-60% prescriptions did not follow the WHO recommended standards [3-4]. Syed et al. survey in Bangladesh reveals that Poly pharmacy, high rate of irrational antibiotic usage and unscientific prescription by doctors remain the main problems of drug use which is in agreement with studies in Greece and Ethiopia [5-7].

In India, a survey from Pune by Kshirsagar et al., reported that more than 30% of prescriptions were irrational which is relatively similar to West Bengal (36%) [8-9]. Patel et al. study in Goa highlights the inadequacy in quality of prescriptions revealing that more than one third of the prescriptions were incomplete [10]. Previous studies conducted by Indian Council of Medical Research-National Institute of Nutrition, Hyderabad reported that irrational antimicrobials are prescribed for 69.4 % of common acute infections and highlighted the gaps between percepts and practice among prescribers and patients [11-12].

The evolving regulatory procedures emphasized the need to document the post marketing data related to safety and therapeutic efficacy. Regular monitoring of drug consumption profile has to be undertaken as a part of pharmacovigilance studies and irrational use of medicines should be avoided. In view of this, the current study is aimed to document dispensing and prescription pattern at retail outlets in both rural and urban areas.

METHODS AND MATERIALS

The information on drug consumption profile has been collected in a pretested schedule. The urban area selected was Hyderabad and the nearby rural areas (180 km away) were selected based on the presence of different socio-economic groups and availability of referral and community hospitals [13]. The Cluster sampling method was followed during collection of data in three socio economic areas i.e., Low income, Middle income and High-income areas (Census 2011, Hyderabad Urban Development Authority (HUDA) Plan, 2011) [13].

10% of total retail drug stores in the selected urban areas and 50% in selected rural area are considered for the survey. Approximately 30% of total dispenses during active hours in a complete day at each drug outlet is selected as sample size. The data has been collected from September 2012-December 2012 by a trained pharmacist. The compiled data was classified into categories of drugs purchased, prescribed and self-administered. The collected data was collated and analyzed using statistical software, Microsoft Excel 2010 and SPSS Version 21.0.

RESULTS

A total of 1023 dispenses were monitored in urban and rural areas. Among them 65-70% dispenses are through doctor prescription and 20-25% are self-administered and10-11% are dispensed on advice of pharmacist in urban and rural area respectively. Mean number of drugs prescribed were around ≤ 3 in both urban and rural area. Among self-prescriptions, schedule H drugs (prescription drugs) were 65% and majority of them include antibiotics (26%), analgesics (27%) and antihistamines (25%) Figure 1.

Cost distribution

Mean cost per prescription is marginally high in urban area (INR 111.4 ± 120.67) compared to rural area (77.7 ± 59.13). Of the total mean cost 60-70% includes cost of antibiotics Table 1.

*Range in urban area varies from 6-1400 INRand in rural area 6-492 INR

Category of drugs prescribed

Analgesics/Antipyretics/Anti-inflammatory drugs (23-24%) and antibiotics (22-20%) were the most preferred category of drugs in both urban and rural area. The nutrition supplements were prescribed more in rural area (16%) than urban area (10%). Drugs prescribed for lifestyle and chronic disorders like hypertension, diabetes, arthritis etc. were significantly high in urban area (8.2%) compared to rural area (2-3%) Figure 2.

Analgesics/Antipyretics/Antiinflammatory drugs

The NSAID (Non-steroidalAnti-inflammatory drugs) and its combinations were the most preferred category of analgesics in both urban (90%) and rural area (80%). Corticosteroids and
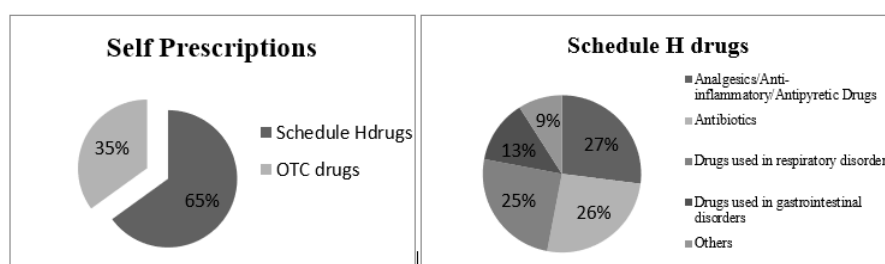

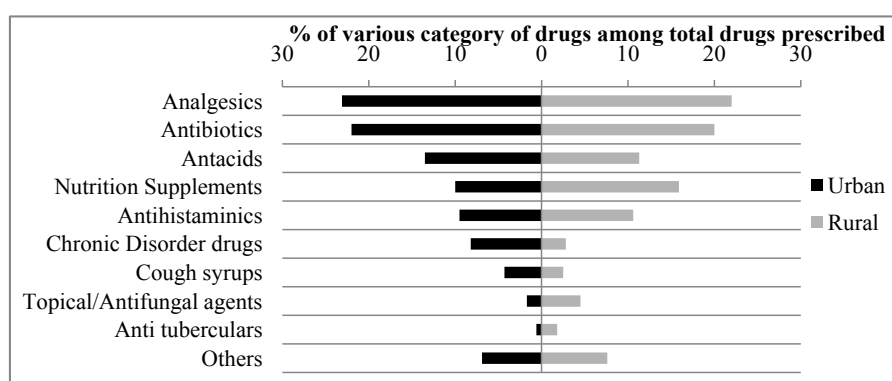**Figure 1:** Profile of self-prescription at retail outlets.

Figure 2: Category of drugs prescribed in urban and rural area.

Table 1: Cost analysis of various categories of drugs dispensed in urban and rural area.

Parameter	Urban (Mean ± SD)	Rural(Mean ± SD)
Mean cost per encounter(INR)	111.4 ± 120.67*	77.7 ± 59.13*
Mean cost per Antibiotics(INR)	51.7 ± 52.38	55.7 ± 47.78
Mean cost per Analgesics(INR)	14.9 ± 12.19	13.8 ± 14.59
Mean cost per Nutrition Supplements(INR)	34.2 ± 42.75	20.5 ± 18.59

Note: There was a significant difference in mean cost per prescription between urban and rural area (p value ≤ 0.001) as per Kolmogorov–Smirnov test.
*Range in urban area varies from 6-1400 INR and in rural area 6-492 INR

Opioids together constitute to around 7-15% in urban and rural area.

Antibiotics

Cephalosporins (41%, 28%), synthetic penicillins (21%, 38%) and Quinolones (23%, 17%) were the major prescribed antibiotics in urban and rural area respectively. Broad spectrum antibiotics include 40-50% of total antibiotics. Among all the antibiotics, Cefixime is more preferred in urban area (27%) and amoxicillin+clavulanic acid combination is more prescribed in rural area (24%). Major symptoms recorded for antibiotic prescription were cough and cold, fever, diarrhoea and skin infections. As per the standard therapeutic guidelines of WHO, prescription of antibiotics in relevance to symptom and duration shows that patients suffering with cough and cold (27-34%), fever (32-45%) and diarrhoea (41-51%) patients were irrationally prescribed with antibiotics in urban and rural area respectively Table 2. Financial constraints (34-52%) remain the major reason for the partial prescription Figure 3.

Nutrition Supplements

Multivitamin with mineral tablets are more preferred in urban area (46%) whereas vitamin B complex combinations were more preferred in rural area (40%). Majority of prescription for nutrition

Table 2: Reasons for partial prescription.

S.No.	Reasons	Urban (%)	Rural (%)
1	Financial Constraints	34	52
2	Drug(s) unnecessary	12	5
3	Drugs not Available	12	10
4	Preliminary therapeutic Testing	24	23
5	Drug available at home	12	5
6	Others	12	5

supplementsinclude fixed dose combinations i.e., 60-80% in both urban and rural areas. Iron+folic acid combination includes only 1-3% in urban and rural areas Figure 4.

Fixed Dose Combinations (FDC)

The fixed dose combinations (FDC) constitute 35% of total drugs. Most of the FDC include analgesics in urban area (16%) and nutrition supplements in rural area (18%). 10-15% of the total FDC includes antibiotics in urban and rural areas. Antihypertensive, antidiabetic drugs occupy one of the most prescribed categories of FDC drugs in urban area (14%) and comparatively less in rural area (3%). Even drugs which are not approved by D.C.G.I are being prescribed by private doctors which are listed in the following table Table 3.

DISCUSSION

The consumption profile of medicaments is rising every day coupled with the introduction of new chemical entities and formulations. However, monitoring of drug consumption profile on regular basis will assist in developing rational drug use policies. The results described here highlight some of the issues and practices now prevalent in urban population in comparison to rural population.

Analgesics/Antipyretics/Antiinflammatory drugs were the first most preferred category of drugs owing to their widespread therapeutic uses [14]. However, 80-90% of them are NSAIDS and its combinations with other drugs. These irrational combinations with antihistamines or other NSAIDS are highly prevalent (40%) which was also highlighted in other studies [15]. The use of these combinations especially the ones which are not approved by government authorities of India need to be evaluated Table 3. It is also noteworthy at this point that due to mandatory use of antacids with NSAIDS [16], use of antacids (15%) also substantially increased and have become one of the widely used drugs in urban area. However, there is a need to regulate the widespread use of
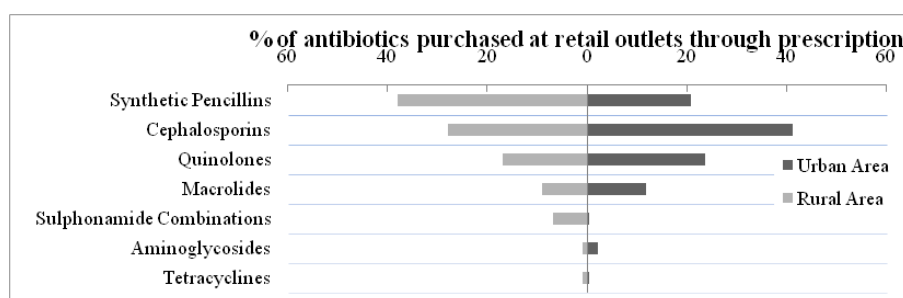

Figure 3: Purchase profile of antibiotics at retail outlets through prescription.
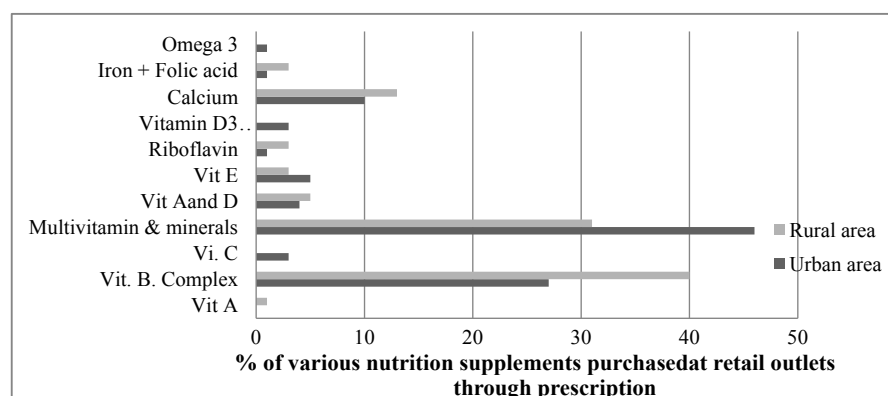

Figure 4: Purchase profile of nutrition supplements at retail outlets through prescription.

Table 3: FDC's purchased at retail outlets which are irrational.

S.No.	Irrational Fixed dose combination	No. of times prescribed	
		Rural	Urban
1	Ofloxacin+Metronidazole	3	5
2	Aceclofenac+PCM+Serratiopeptidase	10	4
3	Aceclofenac+PCM+Chloroxazone	6	12
4	Dicyclomine+Mafenamic acid	14	12
5	Mafenamicacid+PCM	10	5
6	Diclofenac+Dextropropoxyphene	3	4
7	cetrizine+PCM+pseudoephedrine	2	4
8	Levocitrizine+PCM+Phenylepinephrine	6	3
9	Methocarbamol+Ibuprofen+PCM	5	2
10	PCM+CPM+phenyephrine+Ambroxol	5	2
11	Levocetrizine+Phenylephrine	2	6
12	Chlorpheniraminemaleate+Phenylephrine+ Guaphenisin +Bromhexine	5	0
13	Diphenylhydramine+NH$_4$CL+Na. Citrate+Ethanol	3	4
14	Domperidone+PCM	3	2

Note: PCM- Paracetamol, CPM-Chlorpheniramine, NH4CL- Ammonium Chloride Na. Citrate- Sodium citrate. The drugs were listed based on observations in 2012 before ban of certain FDCs

NSAIDs as it may result in increased risk of gastrointestinal and cardiovascular complications [17-20]. Also, the irrational use of FDCs of NSAIDS with other drugs needs to be curtailed as it may pose potential health hazards.

Antibiotics, considered as magic bullets in treating many infections account for nearly 20% of prescriptions per year around the world [21-22]. They are the second most preferred category of drugs in this study, which is in conjunction with earlier studies conducted in central India [23]. In this study, special emphasis was given to comprehend antibiotic use due to high emergence of resistance [24]. Cephalosporins and Synthetic penicillins were mostly preferred in urban and rural areas respectively due to their broad therapeutic spectrum. Whereas; the use of tetracyclins and quinolones is meagre or even extinct which were once most preferred as given in earlier studies [11-12]. This is mostly due to emergence of resistance for those category of drugs [24-25]. Relevance to symptom and duration shows that around 40% of patients were prescribed antibiotics irrationally, which is evident in other studies conducted in central India [26]. Purchase of antibiotics is limited to only one to two days (40-50%) which is an alarming factor as this may result in resistance in long term. This study highlights the need for rational use of antibiotics with relevance to symptoms and bring awareness among the public on the need to complete dosage schedule thereby saving these precious drugs to serve the need of future generations.

Nutrition supplements are the third most preferred category of drugs in rural area and fourth in urban area. Although the use of multivitamin with minerals and b complex combinations is high, the use of single vitamin tablets whch are directed towards a particular deficinecy is very less. Most of the B. complex tablets contains combinations of B1, B6, B12 along with other vitamins, whereas this combination (B1, B6, B12) was banned by in 2011 [27]. It was also observed that most of the FDC of nutrition supplements are irrational. Iron deficiency anaemia (IDA) was one of the factors affecting the women health worldwide with reported prevalence of 52% in Indian women [28]. However, the prescription for Iron +folic acid includes only 1-2% of total prescriptions in this study. The prescription of nutrition supplements should be in pace with

the deficiency disorder and the unnecessary combinations must be prevented. Also, supplementation of nutrients through natural sources must be encouraged through educational interventions.

In India, it was reported that the median cost of one illness episode is more than 50% of the monthly income and the cost of drugs include 40-50% of total cost [29]. Therefore, it is important to encourage cost effective-benefit analysis of drug use. In the present study, the mean prescription cost is approximately around 111 INR in urban area and 77 INR in rural area and is significantly higher compared to the earlier studies conducted by Dinesh et al [11]. Preferential use of expensive and broad-spectrum antibiotics (56-58 INR) (like use of amoxicillin+clavulanic acid combination instead of amoxillin alone) has excalated the cost of prescription. Another salient finding is that most of the rural people quoted financial constraints as the major reason (52%) for partial prescription of antibiotics which is one of the major reasons of emergence of resistance [24]. Therefore, such observations have to be taken as a lead to investigate and confirm the results so that the poor masses will not become the victims of irrational use.

Combination products, also known as fixed dose drug combinations (FDCs) are highly popular in the Indian pharmaceutical market and have been particularly flourishing in the last few years [30]. The rationality of FDCs is accepted only when the combination has a proven advantage over single compounds administered separately in therapeutic effect, safety and compliance. In contrary to this a high use of irrational FDC was reported in this study. Among 2650 drugs purchased at retail outlets, 915 were FDC thereby, constituting 35% among total drugs which is less than Nagpur (42%) [31]. Most of the FDCs include analgesics and nutrition supplements, which warrants their requirement. The FDCs which are not approved by D.C.G.I were also documented [32]. This emphasizes the need to implement strict regulatory policies on availability of such drugs through time to time audits at retail outlets to ensure safe use of drugs and prevent adverse effects.

CONCLUSION

The study results conclude that, NSAIDS are emerging as one of the top consumed categories of medicines followed by antibiotics

and multi-mineral mutli-vitamin combinations. Incomplete dose and duration of broad-spectrum antibiotics is also high and can be one of the reasons for emergence of resistance. During the study phase, high use of FDC was a cause of concern. The study also suggests to have periodic monitoring on consumption of medicines so as to develop intervention strategies.

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