Research Letters

use or to give it to someone else who has similar problem with them. Furthermore, these medications may be a result of non-adherence to therapy. The most common classes of medicines found in households were analgesics, antibiotics, and nutrition/blood preparations. In Nigeria, analgesics are the most commonly procured medicines and self-medication with them is high. They are usually the first line of medicines used by community members in an event of illness. This is because most illnesses present with pain and fever, and households keep analgesics for use in an event of illness. The high amount of antibiotics found in households is an indication of inappropriate use of antibiotics and can lead to resistance which is a major challenge in the treatment of infectious diseases in developing countries. Nutrition/blood preparations are common in households because people take them as supplements for promoting health, preventing illness, boosting the immune system, prevention of stress, and to supplement regular nutrition.[4] Hence, their use is usually seen as part of a healthy lifestyle. In Nigeria, medicines are commonly dispensed without appropriate labeling. Most dispensing envelopes do not contain names and expiry dates of dispensed medicine. Household members only identify these medicines with certain symptoms and diseases. This can lead to the administration of wrong medicines for a disease condition. This calls for appropriate labeling of medicines during dispensing. Basic education on appropriate disposal of medicines is lacking in Nigeria. Unused/expired medications are not returned to pharmacies for appropriate disposal as obtainable in developed countries. The accumulations of pharmaceuticals in the soil, ground water, and drinking water have been reported.[5] However, no such studies have been done in Nigeria, but it is likely that these compounds are accumulating in the environment, since they are mostly disposed in refuse dump. Hence, there is a need for public education on appropriate disposal of medicines. In addition, government should encourage reverse distribution network in which community members are encouraged to return unwanted medications to pharmacies which then arrange for approved agents/bodies to collect and destroy them.

Asa Auta, Simeon Omale, David Shalkur, Abanishe Hakeem Abiodun
Department of Clinical Pharmacy, University of Jos, Jos, Nigeria
Address for correspondence:
Asa Auta, Department of Clinical Pharmacy, University of Jos, Jos, Nigeria. E-mail: asaauta@yahoo.com

REFERENCES
1. De-Bolle L, Muhuys E, Andriaens E, Remon J, Bortel LV, Christiaens T. Home medication cabinets and self-medication: A source of potential health threats? Ann Pharmacother 2008;42:572-9.
2. James TH, Helms ML, Braund R. Analysis of medicines returned to community pharmacies. Ann Pharmacother 2009;43:1631-5.
3. Federal Ministry of Health. Medicine prices in Nigeria: Prices people pay for medicines. Abuja: Federal Ministry of Health; 2006.
4. Linden KA. Pharmacoepidemiological study of medicine use among finish conscripts. Annales Medicinae Militaris Fenni 2005;2:6-113.
5. Tong AY, Peake BM, Braund R. Disposal practices for unused medications around the world. Environ Int 2011;37:292-8.

Table 1: Classes of medicines found in households

| Class          | Percentage (%) |
|---------------|---------------|
| Antihistamines| 5.9           |
| Analgesics    | 18.6          |
| Nutrition and blood preparations | 14.9          |
| Antacids      | 2.2           |
| Antidiarrheals| 0.6           |
| Antihypertensives | 5.6         |
| Antipsychotics| 3.4           |
| Antibiotics   | 16.8          |
| Antidiabetics | 1.6           |
| Antimalarials | 7.5           |
| Antispasmodics| 1.2           |
| Contraceptives| 0.9           |
| Eye preparations | 1.5      |
| Others        | 19.3          |

Sir,

Adverse drug reaction (ADR) contributes to the burden of drug-related morbidity and mortality.[1] The incidence of ADRs in inpatients of hospital has been reported to be in between 1.7% to 25.1%.[2] ADRs are seen frequently in hospitals due to a combination of factors such as, complexity of diseases, drug interactions, polypharmacy, and possible negligence. The aim of this study was to undertake ADR monitoring in various departments of a tertiary care government hospital.
and to cultivate the culture of ADR reporting among fellow physicians.

This was a prospective spontaneous reporting study conducted by the Department of Pharmacology, Maulana Azad Medical College, New Delhi, on inpatients of Lok Nayak Hospital, a tertiary care teaching hospital in New Delhi. ADRs in patients admitted in these wards during the period of 8 months from June 2008 to Jan 2009 were noted. All suspected spontaneous ADRs were initially assessed by the respective consultants and subsequently the information was collected and analysed by the pharmacologists for causality assessment.

Detailed drug and clinical history, and relevant information about suspected reaction, its onset, duration, temporal association with drug intake if any, were recorded in an ADR reporting form. The causality relationship among ADR and drug was assessed using WHO ADR causality assessment criteria.[3]

A total of 207 ADRs were reported from July 2008 to June 2009. The mean age of patients who experienced ADRs was 32, although ADRs were observed in both gender but slight male preponderance was seen (59%). Type of ADRs experienced and drug associated are mentioned in Table 1.

Cutaneous manifestations which included rash, urticaria, dermatitis, Steven Johnson syndrome, Toxic epidermal necrolysis etc were most common ADRs with an incidence of 42%. These side effects were more commonly observed with anti convulsant drugs like carbamazepine, phenytoin and valproate. Out of total 87 skin reactions 40(45.9%) were rash related ADRs, 25(28.7%) were Steven Johnson syndrome, 14(16%) were urticaria, 6(6.8%) cases of toxic epidermal necrolysis, and 2(2.2%) were hyper pigmentation reactions.

The next most common ADR belong to gastrointestinal system which included hepatotoxicity, gastric erosions, dyspepsia, pancreatitis etc accounting for 28.5% of total ADRs. [Table 1] Gastrointestinal side effects including hepatotoxicity were mainly seen in cases who consumed Non steroida anti inflammatory drugs (NSAIDs ) and Anti tubercular therapy (ATT). Febrile neutropenia was observed in 18.3% of total 207 cases. It was observed with most of the drugs given for treatment of cancer, peripheral neuropathy was also seen with paclitaxel and vincristine administration.

Extrapyramidal side effects were seen in patients receiving antipsychotic drugs (2.8%). One of this drug like olanzapine and antidepressant mianserin were associated with weight gain. Nephrotoxicity was mainly observed in patients receiving antifungal and antibiotic treatment accounting for 1.9% of total cases. Anaphylaxis was seen with intravenous administration of ceftriaxone, ciprofloxacin and phenytoin [Table 1]. 41.9% of the total ADRs were associated with polypharmacy wherein 3 or more drugs were prescribed. We also observed that 36.5% of ADRs were seen in patients receiving drugs through intravenous route.

Causality assessment was undertaken based on WHO criteria.[3] It was seen that out of total 207 ADRs, 47.3% were found to be Probable and almost similar number i.e. 47.8% were considered as Possible where as only 0.9% were classified as Certain. ADRs were also categorized according to severity, 24.1% were found to be mild, 38.6% and 37.1% were classified under moderate and severe category respectively [Table 2]. Most of the ADRs in severe category were of Steven Johnson syndrome due to unknown drug wherein the patient reported taking drug from private practioner without prescription. Main indication for which these unknown drugs were given were pyrexia of unknown origin and epilepsy.

In our study, as in accordance of previous reports the most common systems associated with ADRs were skin and gastrointestinal.[4] We also observed that the drugs implicated

### Table 1: Category of adverse drug reactions detected and implicated drugs

| Types of ADRs (number of ADRs) | Drugs implicated in order of frequency |
|--------------------------------|--------------------------------------|
| Cutaneous# (87)                | Unknown, carbamazepine, phenytoin, ceftriaxone, valproate, vancomycin, ciprofloxacin, NSAIDs*, ATT**, dapson, teicoplanin |
| Gastrointestinal© (38)         | NSAIDs, ciprofloxacin tinidazole combination, opioids, chloroquine, ATT, diacerin, amoxicillin |
| Hepatotoxicity (21)            | ATT |
| Nephrotoxicity (4)             | Amphotericin B, vancomycin, gentamicin, tazobactam/piperacillin |
| Chemotherapy induced febrile neutropenia (38) | Cisplatin, adriamycin, 5-FU, cyclophosphamide, paclitaxel, carboplatin, ifosfamide, vincristine, bleomycin, etoposide |
| Anaphylaxis (3)                | Ceftriaxone, ciprofloxacin, phenytoin |
| Tremor (5)                     | Lithium carbonate, salbutamol |
| Extrapyramidal side effects (6) | Risperidone, haloperidol, trifluoperazine |
| Peripheral neuropathy (2)      | Vincristine, Paclitaxel |
| Weight gain (2)                | Olanzapine, mianserin |
| Myopathy (1)                   | Atorvastatin |

# Rash, exfoliative dermatitis, urticaria, erythrodema, Steven Johnson syndrome, Toxic epidermal necrolysis, hyperpigmentation and fixed drug eruptions; ©diarrhoea, vomiting, gastritis, gastric erosions, oral ulcers and hematemesis; * Non-steroidal anti-inflammatory drugs (diclofenac, ibuprofen and piroxicam); ** Anti tubercular therapy (isoniazid, rifampicin, pyrazinamide and ethambutol);
in skin reactions were valproate, carbamazepine, vancomycin and ciprofloxacin. Our findings are similar to earlier published reports.\(^5\) We observed that gastrointestinal side effects and hepatotoxicity were mainly associated with anti tubercular drugs and NSAIDs (diclofenac and ibuprofen).

We also observed that quite a number of adverse drug reactions were with unknown drugs which could be herbal, ayurvedic or belonging to alternative medicine. ADRs observed with these drugs were of moderate to severe category. Drug induced neutropenia was seen in 18.3\% of cases. It was observed that side effects with drugs administered through intravenous route were of severe category.

The limitations of our study were its short duration with less number of ADRs and we did not assess preventability of ADRs. We conclude that anticonvulsants, analgesics, antimicrobials and anti cancer drugs are responsible for most of the ADRs. The problem of underreporting of ADRs is much bigger issue and should be addressed immediately.

Shalini Chawla, Bhupinder Singh Kalra, Pinky Dharmshaktu, Pooja Sahni

Department of Pharmacology, Maulana Azad Medical College, Bahadur Shah Zafar Marg, Delhi, India

Address for correspondence:
Bhupinder Singh Kalra, Department of Pharmacology, Maulana Azad Medical College, Bahadur Shah Zafar Marg, Delhi – 110 002, India. E-mail: drbskalra@gmail.com

REFERENCES

1. Beijer HJ, de Blaey CJ. Hospitalisations caused by adverse drug reactions: A meta-analysis of observational studies. Pharm World Sci 2002;24:46-54.
2. Chan TY, Chan JC, Tomlinson B, Critchley JA. Adverse reactions to drugs as a cause of admissions to a general teaching hospital in Hong Kong. Drug Saf 1992;7:235-40.
3. Edwards IR, Aronson JK. Adverse drug reactions: Definitions, diagnosis, and management. Lancet 2000;356:1255-9.
4. Jose J, Rao PG. Pattern of adverse drug reactions notified by spontaneous reporting in an Indian tertiary care teaching hospital. Pharmacol Res 2006;54:226-33.
5. Ding WY, Lee CK, Choon SE. Cutaneous adverse drug reactions seen in a tertiary hospital in Johor, Malaysia. Int J Dermatol 2010;49:834-41.