Journal of Medical Sciences

ISSN 1682-4474

science alert

ANSInet
an open access publisher
http://ansinet.com

Research Paper

J. Med. Sci., 8 (2): 111-117
15th February, 2008

JMS (ISSN 1682-4474) is an International, peer-reviewed scientific journal that publishes original article in experimental & clinical medicine and related disciplines such as molecular biology, biochemistry, genetics, biophysics, bio-and medical technology. JMS is issued eight times per year on paper and in electronic format.

For further information about this article or if you need reprints, please contact:

Dr. K.A. Oshikoya
Department of Pharmacology and Therapeutics,
Lagos State University College of Medicine,
P.M.B. 21266, Ikeja, Lagos, Nigeria

Tel: +234-802-337-5801

The Use of Prescribed and Non-Prescribed Drugs in Infants in Lagos, Nigeria

[1,2]K.A. Oshikoya, [2]O.F. Njokanma, [1]J.A. Bello and [1]E.O. Ayorinde

This study is aimed at determining the prevalence in Nigeria of parental use of prescribed and non-prescribed drugs to their infants, to identify the drugs involved and the determinants that promote the act amongst Nigerian mothers. A total of 736 mothers, selected from 20 Primary Health Care (PHC) centres during the immunization of their infants, were randomly selected and interviewed with a structured questionnaire filled by trained personnel and the researchers. 336 (45.65%) infants suffered one ailment or the other in the last one month their mothers were interviewed. One hundred and seventy six (52.38%) of these mothers sought medical intervention in the hospital for their infants' ailment. Antibiotics 343 (22.46%), vitamin supplements 259 (16.96%) and analgesics 152 (9.95%) were the most common group of non- prescribed drugs used by the infants. Ascorbic acid 472 (64.13%) and paracetamol 440 (59.78%) were the most commonly kept drugs at home by the mothers. There is a need for health education talk, particularly to discourage mothers from self-medication and to encourage them in seeking hospital based-care during their infants' ailments. Government should review the policies on public sales of prescribed drugs as non-prescribed drugs so as to ensure rational sale and use in infants.

Key words: Nigerian mothers, infants, prescribed drugs, non-prescribed drugs, Nigeria

ANSInet
Asian Network for Scientific Information

[1]Department of Pharmacology and Therapeutics, Lagos State University College of Medicine, P.M.B. 21266, Ikeja, Lagos, Nigeria
[2]Paediatrics and Child Health, Lagos State University Teaching Hospital, Ikeja, Lagos, Nigeria

INTRODUCTION

Children constitute a very large proportion of the population in developing countries (Lee *et al*., 1993). Over the past decade; many studies had been conducted on drug use patterns in children from developing countries (Bonati, 1994; Nwolisa *et al*., 2005; Oshikoya *et al*., 2006), but only very few focused exclusively on drug use pattern in infants (Lee *et al*., 1993; Zaki *et al*., 1999).

Most paediatric drugs are used outside of hospitals, both as prescribed and non-prescribed drugs (Zaki *et al*., 1999; Okumura *et al*., 2002). Most families first respond to most cases of illnesses by using non-prescribed drugs which may include traditional therapies (Fawole and Onadeko, 2001; Adegboyega *et al*., 2005). The use of drugs in infants presents difficulties and peculiarities relating to their age and development (Matheson, 1992). Based on several studies of children from 0 to 14 years, drug exposure seems to have a peak at approximately one year of age (Wessling *et al*., 1991; Matheson, 1992).

In Nigeria and other developing countries, much work had been done on drug utilisation in children at both the primary health care centres (Odusanya and Oyediran, 2000; Pavin *et al*., 2003; Nsimba *et al*., 2004; Olayemi *et al*., 2006) and tertiary health care centres (Nwolisa *et al*., 2005; Oshikoya *et al*., 2006) but none has focused on the use, the determinants and rationale for the drug use among infants in Nigeria. Fever, cough and catarrh have been reported in Nigeria as the leading presenting symptoms in children necessitating self-medication by their mothers before presenting to hospitals (Fawole and Onadeko, 2001; Adegboyega *et al*., 2005; Ezechukwu *et al*., 2005; Ibeh *et al*., 2005).

The focus of this study was to know the extent of infantile self-medication in Lagos, to identify the drugs involved and the determinants that promote the act amongst Nigerian mothers. Infants are defined as children in their first year of life when they are unable to walk or feed themselves.

MATERIALS AND METHODS

Lagos is the smallest state but the most populous city in Nigeria with an estimated population of about 15 million inhabitants as of 1991 national census. It is divided into five divisions and twenty Local Government Areas (LGAs). There is at least a minimum of three Primary Health Care (PHC) centres in each LGA. One PHC centre was selected randomly from each LGA, thus a total of twenty PHC centres were used for data collection.

This cross-sectional descriptive study was conducted prospectively between January and May, 2007. Mothers who brought their infants for immunisation were randomly selected (40 from each PHC) for interview. Only at one PHC were 36 mothers interviewed due to low patronage of the facility. Ethical clearance and informed consent were obtained from the Lagos State Ministry of Local Government and Chieftaincy Affairs and the parents, respectively. A simple questionnaire was designed to interview the mothers. It contained questions pertaining to the socio-demography of the mothers; age and gender of the infant, family history, ailments experienced by the infant in the last one month and the intervention sought, practice of self medication by the mothers, commonly used drugs as non- prescribed drugs, knowledge of the mothers regarding dose, duration and side effects of some of the drugs; sources of the drugs and information about them. A recall period of one month was sought. The mothers were interviewed and the questionnaire filled by trained personnel and the researchers. A total of 736 mothers were interviewed.

Non-prescribed drug in the context of this study refers to the use of a previously prescribed drug or drug not recommended by a doctor for a particular ailment. It is synonymous with self-medication in infants.

Data was analysed with SPSS version 13. Differences between the prescribed and non-prescribed drugs were compared using Chi-square test and $p<0.05$ were considered statistically significant.

RESULTS

Demography of the mothers and their infants: Most of the mothers were between 26 and 30 years (35.87%). Two hundred and forty eight (33.70%) mothers were 31-35 years old, 128 (17.39%) were 21-25 years old, 55 (7.47%) were 36-40 years old and 41 (5.57%) were 15-20 years old. Two hundred and seventy two (36.96%) mothers were professionals; their occupations include teaching, nursing, civil service, banking, laboratory technology, secretary and broad caster. One hundred and forty four (19.56%) mothers were unemployed, 16 (2.17%) were students, the rest were artisans and traders. Most of the mothers have one child and two children (42.26 vs 32.74%, respectively), 136 (18.48%) have three children, 32 (4.35%) have four children and 16 (2.17%) have more than four children.

The infants were in the age range of one day to 12 months. Majority of them (52.31%) were 6 to 12 months old. Two hundred and seventy one (36.82%) infants were one to six months old and 80 (10.87%) were

Table 1: Drugs prescribed by doctors and the non-prescribed drugs used by the infants for their ailments

Types of drugs	Prescribed drugs n = 176	Non-prescribed drugs n =160	p-value	Percentage of total drug (%)
Vitamin supplement				
Ascorbic acid	171	144	0.018	315 (12.07)
Vitamin B complex	43	101	<0.001	144 (5.51)
Multivitamins	49	11	<0.001	60 (2.29)
Abidec®	40	3	<0.001	43 (1.64)
Analgesics				
Paracetamol	158	152	0.074	310 (11.88)
Ibuprofen	11	-	-	11 (0.42)
Aspirin	5	-	-	5 (0.19)
Antibiotics				
Ampicillin/ cloxacillin	102	116	0.005	218 (8.35)
Cotrimoxazole	55	125	<0.001	180 (6.89)
Cefuroxime	25	27	0.466	52 (1.99)
Erythromycin	16	28	0.042	44 (16.86)
Metronidazole	16	27	0.048	43 (16.48)
Ampicillin	15	12	0.755	27 (10.35)
Amoxicillin	-	20	-	20 (0.77)
Amoxicillin/ clavulanic acid	9	8	0.945	17 (0.65)
Antimalarials				
Chloroquine	40	116	0.002	156 (5.98)
Artesunate	56	67	0.048	123 (4.71)
Sulphadoxime/ primethamine	33	16	0.021	49 (1.88)
Antihistamines				
Promethazine	7	68	0.002	75 (2.87)
Diphenyhydramine	24	43	0.001	67 (2.57)
Others				
Cough mixture	48	106	<0.001	154 (5.90)
Nospamin®	33	38	0.265	71 (2.72)
Piccan®	32	29	0.995	61 (2.34)
Blood tonic	8	48	<0.001	56 (2.15)
Bonababe®	48	7	<0.001	55 (2.11)
ORS	16	36	<0.001	52 (1.99)
Kid care®	-	38	-	38 (1.46)
Herbal medicines	-	31	-	31 (1.19)
Topical antifungal agents	-	29	-	29 (1.11)
Gripe water®	16	13	0.756	29 (1.11)
Ear drop	7	15	-	22 (0.84)
Salbutamol	20	-	-	20 (0.77)
Topical antibiotics	-	20	-	20 (0.77)
Cod liver oil®	9	-	-	9 (0.35)
Phenobarbitone	-	5	-	5 (0.19)
'Gbomoro'®	-	5	-	5 (0.19)
Mist kaolin	-	3	-	3 (0.11)
Grand total of drugs	1082	1527		2609 (100.0)

Abidec: A multivitamin, Bonababe: Contains paracetamol and diphenhydramine, Nospamin: An anticholinergic (homatropine methylbromide), Piccan: Contains paracetamol and diphenhydramine, Gripe water: contains Terpendess dill seed oil, sodium bicarbonate, ginger tincture and alcohol 0.221 mL, Gbomoro: Contains chloroquine, ORS: Oral Rehydration Solution, Kidcare: Contains chloroquine, Cod liver oil: Contains vitamin A, D and E

less than one month old. Their mean age was 5.63±1.14 months. Four hundred (54.35%) were females and 336 (45.65%) males.

Ailments and the interventions sought: Three hundred and thirty six (45.65%) infants suffered one ailment or the other in the last one month their mothers were interviewed. Symptoms of their ailments were catarrh 273 (81.25%), cough 256 (76.19%), fever 240 (71.43%), diarrhoea 73 (21.73%), skin rashes 72 (21.43%), vomiting 72 (21.43%), irritability 65 (19.35%), eye discharge 36 (10.71%), ear discharge 33 (9.82%) and constipation 7 (2.08%). One hundred and seventy six (52.38%) mothers sought medical intervention in the hospital for their children's ailment, 89 (26.49%) resorted to self-medication, 32 (9.52%) sought the intervention of a nurse, 23 (6.85%) sought the intervention of chemist/pharmacist and 16 (4.76%) sought the intervention of traditional healers.

Drug utilisation: Table 1 shows the list of drugs prescribed by doctors and the non-prescribed drugs used by the infants for the ailment they suffered in the last one month. The patterns of drug prescribed by the doctors were similar to those used as non-prescribed drugs. Ascorbic acid 315 (12.07%), paracetamol 310 (11.88%), ampicillin/cloxacillin 218 (8.35%) and chloroquine 156 (5.98%) were the most commonly used drugs during the ailments. The mean total drug used per infant was 7.76.

The parental sources of information about the non-prescribed drugs, the knowledge of their potential adverse effects and the reasons why these drugs were used without prescription are shown in Table 2. Friends and family 60 (37.50%) and previously obtained prescriptions from doctors 58 (36.25%) were the major sources of knowledge of the non-prescribed drugs to the mothers. Poor knowledge of drug dose and duration of use, side effects and the tendency of the drugs to adversely interact were exhibited by the mothers. Similarly, adverse reactions to the antibiotics and antimalarials used during the infants' ailments were rarely observed by the mothers. High cost of consultation with doctors in private clinics 74 (69.81%), perceived poor quality of care from public hospitals 62 (58.47%) and insignificance of doctors' advice 61 (57.55%) were the main reasons for using non-prescribed drugs by the mothers.

Drugs kept at home: Table 3 shows the types of drugs kept at home by the mothers and the reasons for doing so. Ascorbic acid 472 (64.13%) and paracetamol 440 (59.78%) were the most commonly kept drugs at home by the mothers. Keeping drugs at home for first aid 324 (44.02%) and for emergency need 246 (33.42%) were the reasons proffered by the mothers for keeping drugs at home. The mean numbers of stored drugs at home per patient was 3.24.

Table 2: Mothers' sources of information about non-prescribed drugs, their potential adverse effects and reasons for using them

Parameters	Total response (n =160)	(%)
Source of information about the drugs		
Friends/family	60	37.50
Doctor	58	36.25
Nurses	20	12.50
Chemist/pharmacist	14	8.75
Drug advertisement	8	5.00
Good knowledge about antimalarials and antibiotics:		
Dose/duration	44	27.50
Side-effects	12	7.50
Drug interactions	5	3.13
ADR reported		
Antimalarials		
Body itching	22	13.75
Restlessness	10	6.25
Rashes	7	4.38
Sedation	6	3.75
Diarrhoea	2	1.25
Antibiotics		
Rashes	27	16.88
Diarrhoea	17	10.63
Body itching	13	8.13
Sedation	2	1.25
Reasons for self medication		
High cost of consultation in private hospitals/clinics	74	69.81
Poor quality of care in government hospitals and PHC	62	58.49
Doctor's advice not needed	61	57.55
Habits of self medications	56	52.83
Lack of time to visit doctors	40	37.74

Table 3: Distribution of medications kept at home by the mothers

Drugs	No. of mothers involved in keeping drugs at home (n = 736)	Percentage of drugs relative to the total mothers (%)
Ascorbic acid	472	64.13
Paracetamol	440	59.78
Cough mixture	232	31.52
Chloroquine	216	29.35
Vitamin B complex	192	26.09
Iron blood tonic	160	21.74
Nospamin®	152	20.65
Antibiotics	136	18.48
Gripe water®	88	11.96
Piccan®	56	7.61
Chlorpheniramine	48	6.52
Cod liver oil®	50	6.79
Promethazine	36	4.89
Artesunate	24	3.26
Sulphadoxime/ pyrimethamine	24	3.26
ORS	24	3.26
Aspirin	24	3.26
Kid care®	16	2.17
Ibuprofen	8	1.09
Grand total of drugs	2388	
Reasons for keeping drugs		**Percentage response (%)**
First aid treatment	324	44.02
Exigency need	246	33.42
Preferred self medications	108	14.67
Preventive measure	84	11.41
Unnecessary to see doctor for common ailments	142	19.29
As food supplement	18	2.44
To promote good health	12	1.63

ORS: Oral Rehydration Solution, Kidcare: Contains chloroquine, Nospamin: Homatropine methylbromide (an anticholinergic), Piccan: Contains paracetamol and diphenhydramine, Gripe water: Contains Terpeneless dill seed oil, sodium bicarbonate, ginger tincture and alcohol 0.221 mL

DISCUSSION

The study showed that 45.65% infants had suffered some ailments in the last one month that necessitated intervention. This value is far less than the 89.60% reported in Egypt. The difference in these values may be explained by the different disease patterns affecting the infants from the two countries and the different population sizes studied. Catarrh (81.25%), cough (76.19%) and fever (71.43%) were the major symptoms the infants presented with during their ailments. These are symptoms of upper respiratory tract infection and are quite different from bronchitis, pharyngitis, tonsillitis and pneumonia reported in infants from other study (Zaki *et al*., 1999). Upper respiratory tract infection and malaria, characterised by catarrh, cough and fever, have been reported as the most common diseases affecting older children in Nigeria (Fawole and Onadeko, 2001; Adegboyega *et al*., 2005; Ezechukwu *et al*., 2005; Ibeh *et al*., 2005), therefore the pattern of diseases affecting older children and infants in Nigeria are similar, irrespective of their ages.

In a similar study done in Egypt (Zaki *et al*., 1999), 72.50% of the sick infants sought medical intervention but only 52.38% sought medical intervention in this study. This result clearly showed that hospital is less utilised in Nigeria for infantile ailments, consequently the infants may not be properly treated and this may lead to protracted ailments. The 47.62% infants treated with non-prescribed drugs from maternal self-medication and prescriptions from non-medical practitioners were at risk of Adverse Drug Reactions (ADRs) since these prescribers have been reported to have poor knowledge of adverse reactions to the drugs they recommended (Oshikoya *et al*., 2007a).

The 47.62% prevalence rate of self-medication observed in this study is similar to the 43.54% reported in older children in Nigeria (Oshikoya *et al*., 2007b), more than 37% reported in urban population in India (Dineshkumar *et al*., 1995), but falls in between 12.7 to 95% reported in other developing countries (Figueiras *et al*., 2000; Shankar *et al*., 2002). Paracetamol has been reported to be the most frequently used prescribed and non-prescribed drug in children in Nigeria (Odusanya and Oyediran, 2000; Fawole and Onadeko, 2001; Ezechukwu *et al*., 2005; Ibeh *et al*., 2005; Nwolisa *et al*., 2005; Oshikoya *et al*., 2006; Olayemi *et al*., 2006) and the most frequently used over-the-counter drug in children in the United States (Kogan *et al*., 1994). Therefore, it is not surprising that paracetamol was the most prescribed and non-prescribed drug used by the infants in this study (Table 1). Fever is one of the

conditions for which paracetamol is used in Nigerian children (Fawole and Onadeko, 2001; Ajayi and Falade, 2006; Oshikoya, 2007) and was one of the commonest symptoms (71.43%) presented by the infants in this study. At therapeutic dose of paracetamol, cases of toxicity are rare (Krozer *et al*., 2006) but its prescription in a teaching hospital in Nigeria has been associated with overdosage error (Oshikoya and Ojo, 2007), thus the infants are at the risk of acute liver failure from chronic use or supratherapeutic dose (Ostapowicz *et al*., 2002; Brandsaeter *et al*., 2002). Antibiotics were very much utilised in this study both as prescribed and non-prescribed drugs (Table 1). This class of drugs is the leading cause of adverse reactions in children all over the world (Impicciatore *et al*., 2001; Weiss *et al*., 2002; Pirmohamed, 2005; Oshikoya *et al*., 2007a). Cotrimoxazole was used more as a prescribed drug than non-prescribed drug; therefore the risk of fixed drug eruption and Stevens Johnson Syndrome associated with its use in Nigerian children (Oshikoya *et al*., 2007a) is likely to be higher in these infants. Despite the reports of resistance of malaria parasites to chloroquine and sulphadoxime/pyrimethamine in Nigeria (Federal Republic of Nigeria, 2005), they still remained the most prescribed and non-prescribed antimalarials used by the infants (Table 1, 2); consequently the infants are the risk of treatment failure, morbidity and mortality from malaria and further propagation of resistant malaria (Oshikoya, 2007). The use of artesunate as prescribed and non-prescribed drug is however commendable and further showed that compliance with the national guidelines for malaria treatment in Nigeria (Federal Republic of Nigeria, 2005) and the WHO's recommendations for malaria treatment (WHO, 2001) could be achieved in Nigeria. Efforts should however be made at encouraging the use of artemisinin based combined therapy rather than artemesinin monotherapy.

Irrational use of vitamin supplements, such as ascorbic acid and vitamin B complex, is well documented in Nigeria (Nwolisa *et al*., 2005; Oshikoya *et al*., 2006) and equally practiced in this study. Their sporadic use could be as a result of no risk of ADRs so far reported with their use or a wrongful belief that it stimulates the appetite of children during ailments (Odusanya and Oyediran, 2000; Oshikoya *et al*., 2006). Cough is also a common symptom presented by the infants in this study; this therefore explains the 66.25% use of cough mixture in this study. Cough is one of the major symptoms of upper respiratory tract infections which is often times self-limiting and may not require any medication (Oshikoya *et al*., 2006). In a situation where the cough is as a result of pneumonia or other lower respiratory tract infections, treating the symptom rather than the underlying cause may result in morbidity and mortality. Herbal medicines were not prescribed by doctors to the infants probably as a result of lack of their clinical trials in humans (Tyagi and Delanty, 2003); however 19.38% infants used it as non-prescribed drugs. Even though this percentage is small, the use is of great concern because of deaths that had resulted from their use in Nigerian infants (Oshikoya *et al*., 2007a).

Low parental knowledge about dose, duration, side effects and the potentials for interactions of the commonly used drugs in the infants in this study is similar to the reports from other studies (Hughes *et al*., 2002; Sharma *et al*., 2005). Sedation, rashes, body itching and restlessness associated with the use of antimalarial drugs; and rashes, body itching and diarrhoea with antibiotics use, as observed in this study, have earlier been reported in India (Sharma *et al*., 2005). High cost of consultation in private hospitals/clinics, perceived poor quality of care in government hospitals and primary health care centres and lack of time to the mothers to visit doctors, as alluded by the mothers in this study, equally have been identified as reasons for use of non-prescribed drugs in India (Sharma *et al*., 2005).

The mean number of drugs prescribed per infant during the ailments was 6.15 and the mean number of non-prescribed drugs used per infant was 9.54 (Table 1) which were significantly higher than 2.17 to 3.58 earlier reported in older children in Nigeria (Ezechukwu *et al*., 2005; Oshikoya and Ojo, 2007d). This result clearly showed that polypharmacy is practiced more in infants than older children in Nigeria. It is therefore not impossible that Nigerian infants are more at risk of ADRs than the older ones (Oshikoya *et al*., 2007a).

Present finding of 3.24 mean numbers of stored drugs at home per patient was slightly lower than 4.55 reported in older children (Oshikoya *et al*., 2007b). This did not only reflect tendency towards polypharmacy, but also show tendency towards treatment failure from loss of potency of the drugs since shelf life and stability of drugs kept at home, especially on a warm climate, decrease over time (Taketomo *et al*., 2004).

CONCLUSION

Parental use of non-prescribed drugs to their infants is a common practice in Nigeria that is likely to be associated with adverse drug reactions development, resistance to antimicrobial and antimalarial therapies, treatment failure, increased load of mortality and morbidity, economic loss from treatment failure, re-treatment and loss of time in taking care of the ill infant.

There is need for health education talk, particularly to discourage mothers from self-medication and to encourage them in seeking hospital based-care during their children's ailments. Government should review the policies on public sales of prescribed drugs as non-prescribed drugs so as to ensure rational sale and use in infants and older children. More research into drug utilisation in infants from rural settings in Nigeria, where access to good education and health care is rare, is advocated.

The possibility of ADRs resulting from self-medication in infants and older children would necessitate the establishment of a paediatric pharmacovigilant centre in Nigeria.

REFERENCES

Adegboyega, A.A., A.A. Onayade and O. Salawu, 2005. Care-seeking behaviour of caregivers for common childhood illnesses in Lagos Island Local Government Area, Nigeria. Nig. J. Med., 14 (1): 65-71.

Ajayi, I.O. and C.O. Falade, 2006. Pre-hospital treatment of febrile illness in children attending the general outpatients' clinic. University College Hospital, Ibadan, Nigeria. Afr. J. Med. Med. Sci., 35 (1): 85-91.

Bonati, M., 1994. Epidemiological evaluation of drug utilization in children. J. Clin. Pharmacol., 34 (4): 300-305.

Brandsaeter, B., K. Höckerstedt, S. Friman, B.G. Ericzon, P. Kirkegaard and H. Isoniemi *et al.*, 2002. Fulminant hepatic failure: Outcome after listing for highly urgent liver transplantation- 12 years experience in the Nordic countries. Liver Transplant., 8 (11): 1055-1062.

Dineshkumar, B., T.C. Raghuram, G. Radhaiah and K. Rishnaswamy, 1995. Profile of drug use in urban and rural India. Pharmacoeconomics, 7: 332-346.

Ezechukwu, C.C., I. Egbuonu and J.O. Chikwuka, 2005. Drug treatment of common childhood symptoms in Nnewi: What mothers do? Niger. J. Clin. Pract., 8 (1): 1-3.

Fawole, O.I. and M.O. Onadeko, 2001. Knowledge and home management of malaria fever by mothers and care givers of under five children. W. Afr. J. Med., 20 (25): 152-157.

Federal Republic of Nigeria, 2005. National antimalarial treatment guidelines Federal Ministry of Health National malaria and vector control division. Federal Republic of Nigeria Roll Back Malaria Training Manual on Malaria Control for Primary Health Care Workers in Nigeria Federal Ministry of Health National Malaria and Vector Control Division Abuja-Nigeria March.

Figueiras, A., F. Caamano and J.J. Gestal-Otero, 2000. Socio-demographic factors related to self-medication in Spain. Eur. J. Epidemiol., 16 (1): 19-26.

Hughes, L., C. Whittlesea and D. Luscombe, 2002. Patients knowledge and perceptions of the side-effect of OTC medication. J. Clin. Pharmacol. Ther., 27 (4): 243-248.

Ibeh, C.C., I.M. Ekejindu, N.C. Ibeh, E.N. Shu and J.O. Chukwuka, 2005. The pattern of home treatment in under-fives in South Eastern Nigeria. Afr. J. Med. Med. Sci., 34 (1): 71-75.

Impicciatore, P., I. Choonara, A. Clarkson, D. Provasi, C. Pandolfini and M. Bonati, 2001. Incidence of adverse drug reactions in paediatric in/out-patients: A systematic review and meta-analysis of prospective studies. Br. J. Clin. Pharmacol., 52 (1): 77-83.

Kogan, M.D., G. Pappas, S.M. Yu and M. Kotelchuck, 1994. Over-the-counter medication use among US Pre-school age children. JAMA., 272 (13): 1025-1230.

Krozer, E., R. Greenberg, D.R. Zimmerman and M. Berkovitch, 2006. Repeated supratherapeutic doses of paracetamol in children a literature review and suggested clinical approach. Acta Pediatr., 95 (10): 1165-1171.

Lee, D., K. Balasubramaniam and H. Ali, 1993. Drug Utilization Studies: Their Transferability Between Industrialized and Developing Countries. In: Drug Utilization Studies, Dukes, M.N.G. (Ed.). Methods and Uses. Copenhagen, World Health Organisation Regional Office for Europe, WHO Regional Publications, European Series, No. 45.

Matheson, I., 1992. Drug Utilization in Non-Hospitalized Newborns, Infants and Children. In: Paediatric Pharmacology, Yaffe, S. and J. Aranda (Eds.). 2nd Edn. Therapeutic Principles in Practice, Philaldelphia, WB Saunders Company, pp: 557-565.

Nsimba, S.E., A.Y. Massele and J. Makonomalonja, 2004. Assessing prescribing practice in church-owned Primary Healthcare (PHC) institutions in Tanzania: A pilot study. Trop. Doct., 34 (4): 236-238.

Nwolisa, C.E., E.U. Erinaugha and S.I. Ofoleta, 2005. Prescribing practices of doctors attending to under fives in a children's outpatient clinic in Owerri, Nigeria. J. Trop. Pediatr., 52 (3): 197-200.

Odusanya, O.O. and M.A. Oyediran, 2000. Rational drug use at the primary health care centres in Lagos, Nigeria. Nig. Q. J. Hosp. Med., 10 (1): 4-7.

Okumura, J., S. Wakai and T. Umenai, 2002. Drug utilisation and self-medication in rural communities in Vietnam. Soc. Sci. Med., 54 (12): 1875-1886.

Olayemi, S.O., A.A. Akinyede and A.I. Oreagba, 2006. Prescription pattern at primary health care centres in Lagos State. Nig. Postgrad. Med. J., 13 (3): 220-224.

Oshikoya, K.A., H.A. Chukwura and O.I. Ojo, 2006. Evaluation of outpatient paediatric drug prescriptions in a teaching hospital in Nigeria for rational prescribing. Paed Perinat Drug Ther., 7 (4): 183-188.

Oshikoya, K.A., O.F. Njokanma, H.A. Chukwura and O.I. Ojo, 2007a. Adverse drug reactions in Nigerian children. Paed Perinat Drug Ther., 8 (2): 81-88.

Oshikoya, K.A., O.F. Njokanma, J.A. Bello and E.O. Ayorinde, 2007b. Family self-medication for their children: The situation in an urban area of Nigeria. Paed Perinat Drug Ther., 8 (3): 124-130.

Oshikoya, K.A., 2007. Antimalarial prescriptions for children presenting with uncomplicated malaria to a teaching hospital in Nigeria after the change of national guidelines for malaria treatment. W. J. Med. Sci., 2 (1): 49-53.

Oshikoya, K.A. and O.I. Ojo, 2007. Medication errors in paediatric outpatient prescriptions of a teaching hospital in Nigeria. Nig. Q. J. Hosp. Med., 17 (2): 74-78.

Ostapowicz, G., R.J. Fontana, F.V. Schiodt, A. Larson, T.J. Davern and S.H. Han *et al*., 2002. Results of a prospective acute liver failure at 17 tertiary care centres in the United States. Ann. Int. Med., 137 (12): 947-954.

Pavin, M., T. Nurgozhin, G. Hafner, F. Yusufy and R. Laing, 2003. Prescribing practices of rural primary health-care physicians in Uzbekistan. Trop. Med. Int. Health, 8 (2): 182-190.

Pirmohamed, M., 2005. Anticipating, investigating and managing the adverse effects of drugs. Clin. Med., 5: 23-25.

Shankar, P.R., P. Partha and N. Shenoy, 2002. Self-medication and non-doctor prescription practices in Pokhara valley, Western Nepal: A questionnaire based study. BMC. Fam. Pract., 3 (1): 17.

Sharma, R., U. Verma, C.L. Sharma and B. Kapoor, 2005. Self-medication among urban population of Jammu city. Indian J. Pharmacol. Res. Lett., 37 (1): 37-45.

Taketomo, C.K., J.H. Hodding and D.M. Kraus, 2004. Paediatric Dosage Handbook. 11th Edn. Lexi-Comp Inc., Ohio.

Tyagi, A. and N. Delanty, 2003. Herbal remedies, dietary supplements and seizures. Epilepsia, 44 (2): 228-235.

Weiss, J., S. Krebs, C. Hoffmann, U. Werner, A. Neubert, K. Brune and W. Rascher, 2002. Survey of adverse drug reactions on paediatric ward: A strategy for early detailed detection. Paediatrics, 110 (2): 254-257.

Wessling, A., P. Soderman and G. Boethius, 1991. Monitoring for drug prescriptions for children in the country of Jamtland and Sweden as a whole, 1977-1987. Acta Paediatr. Scand., 80 (5): 944-952.

WHO, 2001. Monitoring Antimalarial Drug Resistance. http://www.who.int/emc.

Zaki, A., M. Abdel-Fattah, A. Bassili, M. Arafa and R. Bedwani, 1999. The use of medication in infants in Alexandria, Egypt. East Mediter. Health J., 5 (2): 320-327.