

Assessment of the pattern of drug prescribing in pediatrics ward in tertiary setting hospital in Addis Ababa, Ethiopia

Etiyopya Adis Ababa'da üçüncü basamak hastanenin pediatri servisinde ilaç reçeteleme şeklinin değerlendirilmesi

Mustefa Bergicho¹, Mohammed Adem Mohammed¹, Nasir Tajure Wabe²

¹Department of Public Health, Faculty of Health Science, Jigjiga University, Jigjiga

²Clinical Pharmacy Course Team, Pharmacy Department, College of Public Health and Medical Sciences, Jimma University, Jimma

Abstract

Drugs have to be safe, effective and be used nationally and may require a special concern due to their unwanted side effects. Safely and effective use of drugs depend on prescribing pattern. The aim of the study was to assess the drug prescribing practice in pediatrics ward of St. Paul Specialized Hospital in Addis Ababa, Ethiopia. A retrospective study had been conducted from January 20 to February 15, 2009. Structured data collection formats were used to obtain data from patient records using stratified and random sampling techniques. Data were analyzed using SPSS for Windows version 16.0. Sums of 384 patient cards were included to the study in which 468 drugs were prescribed. Cotrimoxazole (18.87%), amoxicillin (14.50%), and paracetamol (10.4%) were the most commonly prescribed medications. Average number of drugs per encounter was 1.22. About 71.35%, 59.4%, 45.73% and 15.17% of drugs were prescribed with correct indication, frequency, dosage and duration respectively. There has been an inappropriate use of drugs in the hospital. Many drugs were prescribed without information regarding dosage, frequency and duration of treatment. Pharmacy professionals and physicians should check the completeness of patient cards and prescriptions to promote rational use of medications.

Keywords: Addis Ababa; adverse drug reaction; pediatrics; prescription

Özet

İlaçlar emniyetli, etkili olmalı, ulusal olarak kullanılmalı ve istenmeyen yan etkilerinden dolayı özel özen gerektirebilmektedir. İlaçların güvenli ve etkin kullanımı reçeteleme şekline bağlıdır. Bu çalışmanın amacı, Etiyopya Adis Ababa'da St. Paul Specialized Hospital'ın pediatri servisinde ilaç reçeteleme uygulamasının değerlendirilmesi idi. Yirmi Ocak'dan 15 Şubat 2009'a kadar bir retrospektif çalışma gerçekleştirildi. Tabakalı ve random örneklem teknikleri kullanılarak hasta kayıtlarından data elde etmek için yapılandırılmış data toplama formatları kullanıldı. Data, Windows için SPSS (sürüm 16.0) kullanılarak analiz edildi. Dört yüz altmış sekiz ilacın reçetelendiği toplam 384 hasta kartları çalışmaya dahil edildi. Kotrimoksazol (%18.87), amoksisilin (%14.50) ve parasetamol (%10.4) en yaygın reçetelenen ilaçlardı. Karşılaşılan ilaçların ortalama sayısı 1.22 idi. İlaçların sırasıyla yaklaşık %71.35, %59.4, %45.73 ve %15.17'si doğru endikasyonda, sıklıkta, dozajda ve sürede reçelendirilmişti. Hastanede ilaçların uygun olmayan kullanımı vardı. Bir çok ilaç dozaj, sıklık ve tedavi süresi ile ilgili bilgi verilmeden reçetelenmişti. Eczane uzmanları ve doktorlar, ilaçların rasyonel kullanımını artırmak için reçetelerin ve hasta kartlarının tamamlılığını kontrol etmelidir.

Anahtar kelimeler: Addis Ababa; advers ilaç reaksiyonu; pediatri; reçete

Introduction

Studies on proper drug utilization are imperative tools to evaluate whether drugs are appropriately utilized in terms of efficacy, safety, convenience and economic aspects at all stages in the chain of drug use (1). Knowledge of prescribing patterns are important tools for a rational drug therapy. For all drug users rational drug therapy is important, but it is of utmost importance for children (2). Several drugs were frequently used for children; though they were have been investigated in adults only (3-5). Nevertheless pharmacokinetics as well as pharmacodynamics in children differs from that of adults (5). Children are among the most vulnerable groups to possible harmful effects of drugs as they are physiologically different from adults. It is therefore important to establish which drugs can be used for children and to ascertain those which are not harmful. So, rational prescribing pattern and providing correct information during dispensing is good for proper

utilization of drugs (6).

Even though, this issue has been increasingly well-awared, current data on drug therapy has yet to be seen (7-9). Except some studies (5,9-12), most drug utilization studies were carried out prior to the early nineties (13-19). The administration of drugs to children requires a knowledge and expertise primarily because the doses prescribed for children are often in an amount which is not commercially available in pediatric label. Guidelines are available for extemporaneous preparations of medications that are available only in adult strengths and/or dosage forms (20).

FDA requires pediatric studies of a drug submitted in a new application to determine if the product would provide a meaningful benefit in the pediatric population over existing treatment (21). Prescribing generically equivalent medications can reduce the cost of drugs. Such an aspect should be taken stand only when it is clearly known that the generic and brand products, shall afford equivalent bioavailability, bio effectiveness, and patient acceptability. However, complete bioequivalence

İletişim/Correspondence to: Nasir Tajure Wabe, Clinical Pharmacy Course Team, Pharmacy Department, College of Public Health and Medical Sciences, Jimma University, P.O. box 251 1480, Jimma, ETHIOPIA
Tel: +251 911 68 0576 zenastaj@yahoo.com

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data will not be for all drugs and when in doubt the prescribers should consult a pharmacist (20).

Several barriers exist in rational prescribing of drugs ranging from lack of objective information, continuing education, training in rational drug use and the method of promotion employed for pharmaceutical products. For instance, because of irrational antibiotic use, resistance to recent antibacterials have been steadily increased to a higher level of resistance tends to be found in developing countries (22). According to some studies in North West Ethiopia inadequate adherence of prescribers to the basic principles of prescription writing and over consumption of anti-infective agents (23), have been reported. However, so few is known regarding the overall rational drug use in Ethiopian hospitals, particularly at outpatient health care levels.

Some studies have assessed the general drug prescribing patterns among outpatients (24), dispensaries (25), with specific classes of drugs (26-28), and in pediatric inpatients (29). However majority of these studies are not concurrent to both the patients and diagnosis as well.

The limited information available on drug use pattern throughout the world indicated that drugs are not optimally used, where inappropriate use has serious health and economic consequences for individuals, community has negatively affects the success of national health care system (31). As a result of the above critical study on prescribing pattern for pediatrics, identified irrational prescribing and dispensing and its consequences is precursor to train practitioners to improve their proper selection of drugs (28). In Ethiopia the discriminate practice that prevail in pediatric drug prescribing, dispensing and promotion prepare the way to the use of self medication as few studies that has been done on pediatrics prescribing aspects revealed the problem of irrationality of the practice (31).

As a result, lack of information may broaden the overuse and/ or under use of drugs, use of unlicensed and off-labeled drugs and polypharmacy which are indicators of irrational use (28). Drug prescribing in pediatrics ward is done by various types of health professionals. Due to this fact, the assessment of prescribing pattern has an important relevance to identify problems regarding rational use of drugs and to propose interventions. The aim of this present study is to evaluate and compare patterns of drug prescribing practice.

Participants and Methods

Study setting

A hospital based cross sectional survey was conducted from January 20th to February 15th of 2009 at St. Paul Specialized Hospital. It is a general hospital located in Gullele suburban city of Addis Ababa, Ethiopia. It is one of specialized hospitals in Ethiopia.

Study design

A retrospective study was conducted to assess patient cards registered in pediatrics ward during period of January 2007 to December 31st of 2009. Patient records

were selected using stratified random sampling technique. All the records were taken and have been divided in to two main strata considering records collected in one year as one main stratum started and each main stratum was divided in to twelve substrata by considering records, collected in one month as one substratum. A structured and pre-tested questionnaire was prepared to collect the information and its validity was assessed through in-depth discussion with experienced researchers in the field and data was collected by the principal investigator.

Data analysis

The collected data was cleared, categorized, and coded. All data collected were then analyzed using the Statistical Package for the Social Sciences (SPSS), version 16.0 software. Data was presented using frequency tables. Descriptive statistics such as mean, frequencies and percentages were used to describe and summarize the data.

Ethics

This study was approved by the Ethics Committee of Jimma University. Then official letter was written to the hospital to obtain their permission to undertake the research. The collected data from the patients' medical records was kept confidential and code number rather than name was used in the data collection process.

Results

Three hundred and sixty eight (368) participants were included to the study, in which 197 (51.30%) of them were females and 171 (44.54%) of them were males and about 16 (4.17%) of the study subjects the sex was not mentioned.

Table 1. Top 10 diagnosis in pediatrics ward of St. Paul specialized hospital, Addis Ababa, Ethiopia.

S. No	Diagnosis	Number	%
1	AGE	104	25.37
2	URTI	47	11.45
3	Pneumonia	38	9.27
4	UTI	36	7.56
5	Tinea capitis	31	8.78
6	Acute tonsillopharyngitis	29	7.07
7	Conjunctivitis	23	5.61
8	Diarrhea	15	3.68
9	Allergic rhinitis	11	2.68
10	Contact dermatitis	6	1.46
11	Other	70	17.07
12	Total	410	100

The most common diagnosis were acute gastroenteritis (AGE), upper respiratory tract infection (URTI), pneumonia, urinary tract infection (UTI), Tinea capitis and less commonly anemia, otitis media and generalized seizure (Table 1). Among the different categories of drugs prescribed antibiotics accounts 250 (53.42%) of them where analgesic and/ antipyretics accounts 71 (15.17%) of them. The study also shows that out of the most commonly prescribed class of drugs antibiotics accounts 250 (53.42%) of them followed by analgesics / antipyretics 71 (15.17%) of them where dermatological, anticonvulsants, respiratory and antidiabetic drugs

prescribed less commonly (Table 2). The average number of drugs prescribed per encounter was 1.22, where 218 (56.77%) of prescriptions contained one drug and 98 (25.52%) of prescriptions contained two drugs.

However, prescriptions with no drug were found to be 20 (5.2%). However, these prescriptions contained electrolytes (oral rehydration solution, etc) or solutions (Ringer solution, etc).

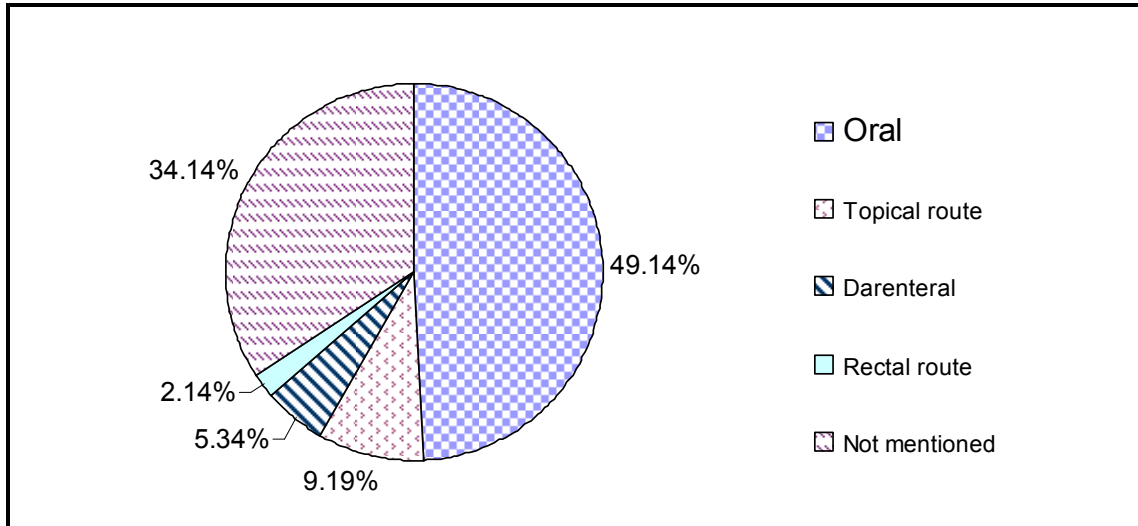


Figure 1. Route of drug administration in pediatrics ward of St Paul specialized higher hospital Addis Ababa, Ethiopia.

Table 2. Therapeutic class of drugs prescribed in pediatrics ward of St. Paul Specialized Hospital, Addis Ababa, Ethiopia

S.No	Therapeutic class	Number (%)
1	Antibiotics	250 (53.42%)
2	Analgesics Antipyretic	71 (15.17%)
3	Antifungal	36 (7.6%)
4	Antihelmentic	27 (5.71%)
5	Fluids & electrolytes	24 (5.15%)
6	Anti-inflammatory	21 (4.49%)
7	Mineral & vitamins	15 (3.20%)
8	Other	24 (5.13%)
9	Total	465 (100%)

Table 3. Top 10 prescribed drugs, in pediatrics wards of St. Paul specialized higher hospital Addis Ababa, Ethiopia

S.No	Drugs	Number	%
1	Cotrimoxazole	93	18.87
2	Amoxicillin	70	14.50
3	Paracetamole	49	10.47
4	Chloramphenicol	26	3.42
5	ORS	21	2.99
6	Erythromycin	17	2.35
7	Metronidazole	16	2.14
8	Phenytoin	14	30.77
9	Hydrocortisone	11	2.35
10	Miconazole ointment	10	2.14
11	Other	141	30.77
12	Total	468	100

Table 4. Duration of drug treatment for drugs prescribed in pediatrics ward of St. Paul Specialized Hospital, Addis Ababa, Ethiopia.

Duration of drug administration	Number (%)
Correct	71 (15.17%)
Incorrect	48 (10.26%)
Not mentioned	349 (74.17%)
Total	468 (100)

The most common route of drug administration was per oral (PO) 230 (49.41%) followed by topical 43 (9.19%) (Figure 1). Of all the therapeutic indications majority of the drugs 274 (71.35%) were indicated correctly to the diagnosis. Except that, about 63 (16.40%), 28 (7.29%), and 19 (4.55%) of drugs were indicated wrongly, non-drug indication or drug without disease respectively.

Cotrimoxazole was the most commonly prescribed drugs 93 (18.87%) followed by amoxicillin 50 (14.50%) (Table 3). Two hundred and seventy eight 278 (59.40%) of drugs, were correctly given and in about 137(29.28%) of drugs the frequency was not mentioned. About 53 (11.32%) of drugs were incorrect from what is specified in Standard Treatment Guideline (STG) regarding the duration of drug treatment for almost all drugs. The duration of drug treatment was not mentioned 349 (74.57%) of them and where in 71 (15.17%) of them the duration of drug treatment was correct but for 48 (10.26%) of drugs the duration was erroneous.

Table 4 shows that 214 (45.73%) of drugs were given by correct dosage but 205 (43.85%) of drugs were given without mentioning the dose and the rest 49 (10.47%) of them were given with incorrect dosage. Moreover, 420 (89.74%) of drugs were prescribed by generic name and 48 (10.26%) of them were prescribed by brand name. Of all dugs 427 (91.25%) of drugs were prescribed from essential drug list (EDL) and about 41 (8.75%) of them were prescribed out of EDC of Ethiopia.

Discussion

Drugs prescribed within an institution might reflect the disease prevalence in the population, the availability of different drugs and the attitude of the prescribers as well. The former may explain the agreement between drugs

prescribing and diagnosis in several cases additionally; prescribing tendency of drugs reflects the clinical judgment of the clinicians. In this study the most common category of drugs prescribed were antibiotics (53.42%) followed by analgesics/antipyretics (15.17%). The tendency of prescribing was different from those researches conducted in India which reported analgesics/antipyretics (43%), antibiotic (17.2%) and antiallergic drug (7%) (32). But it was comparable with the study done in pediatrics ward of three Ethiopian hospitals in 1999 in which antibiotics and analgesics /antipyretics drug were frequently prescribed (29%) (6). The difference in the tendency of prescribing practice may occur due to the difference in prevalence of disease. Larger value of antibiotics in the present study might occur due to higher amount of infectious diseases such as upper respiratory tract infection, pneumonia and empirical treatment based on signs and symptoms which itself differs between practitioners.

The findings presented in this study demonstrate a total of 468 drugs were prescribed which means that average number of 1.22 drugs was given per encounter. The number of drugs in one card ranges from 1 to 6. The average of number of drugs per encounter was very low compared to the research was conducted in Nepal (5.5) (23), Cameroon (3.0) and Ethiopia (3.2) (28). The number of drugs prescribed per patient was also found to be low compared with studies done in three Ethiopia hospitals (Gonder hospital (0-16), Debre Tabor hospital (0-15) and Bahir Dar hospital (0-10)) (28). Other studies also showed that the average number of drugs per prescription was found to be between 3.13-4.1 (30,34-36). This variation possibly indicates that some drugs were prescribed by the brand names which may be related to vigorous promotional strategies by pharmaceutical promoters which might have influenced the clinicians, and multiple medical illnesses which lead the clinicians to prescribe several drugs.

Lesser number of drugs is a positive sign as polypharmacy is known to be a contributing factor for hospitalizations (37). Hence, this way of prescribing is advisable as it reduces the risk of drug interaction, pill burden and thus provides patient compliance.

The study showed that (29.21%) of drugs were prescribed without any information regarding the frequency of drug administration when compared with research done in Jimma University Specialized Hospital in 77% (38), the value for correct frequency of drug administration was so much low. This might be because of inexperience and/or professional negligence which lead to significant number of drugs prescribing without specifying the frequency. The current study also showed that for the vast majority of drugs (74.57%) the duration of treatment was not specified and (10.26%) the rest drugs were given with incorrect duration. When compared with other study 53% (39), the value for correct duration of drug administration was very low. This probably indicates irrational way of prescribing practice because professionals do not consider duration of drug treatment important as such.

In the present study, there was no information regarding the dose in 43.80% of drugs and the dose was found to be inappropriate in 10.47% of the case. The finding is not in agreement when compared with previous study (38). This is probably due to the presence of more medical specialists in the hospital compared to Jimma University Specialized Hospital.

The percentage of drugs prescribed by generic name and brand name was 89.74% and 10.26% respectively. When compared with the study done in Cameroon 56.1% the value for generically prescribed drugs was higher. However, according to Ethiopia health policy which accepts 100% generic prescription this value was not satisfactory. Increasing prescribing by generic name would promote rationale drug use and reduce the cost of drugs. Of the prescribed drugs, (91.24%) of them were included in EDL of Ethiopia which is still lower than national target which is 99%.

In conclusion, there is irrational prescribing practice in pediatrics ward of the hospital. Especially analysis of dosage frequency and duration of drug administration, indication of drugs have been indicating the irrationality of prescribing on practice. The completeness of the patient cards such as patient history and drug related variables should be regularly checked and supervised by physicians and pharmacy personnel to more advanced rational practicing practice.

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References

1. Dukes MNG (ed.). Drug utilization studies: methods and uses. WHO Regional Publications. Eur Ser No 45. WHO regional Office for Europe, WHO, Copenhagen, 1993.
2. Sanz EJ. Drug use in non-hospitalized children. *Pharm Weekbl Sci* 1992;14(1):1-8.
3. Impicciatore P, Choonara I. Status of new medicines approved by the European Medicines Evaluation Agency regarding paediatric use. *Br J Clin Pharmacol* 1999;48(1):15-8.
4. Wilton LV, Pearce G, Mann RD. The use of newly marketed drugs in children and adolescents prescribed in general practice. *Pharmacoepidemiol Drug Saf* 1999;8(Suppl 1):S37-45.
5. Conroy S, Choonara I, Impicciatore P, Mohn A, Arnell H, Rane A, et al. Survey of unlicensed and off label drug use in paediatric wards in European countries. *European Network for Drug Investigation in Children. Br Med J* 2000;320(7227):79-82.
6. Drug Administration and Control Authority of Ethiopia. Introduction Standard Treatment Guide lines for Zonal hospitals. First edition. Addis Ababa, Ethiopia: Chamber printing House, 2004.
7. Bonati M. Epidemiologic evaluation of drug use in children. *J Clin Pharmacol* 1994;34(4):300-5.
8. Schirm E, van den Berg P, Gebben H, Sauer P, De Jong-van den Berg L. Drug use of children in the community assessed through pharmacy dispensing data. *Br J Clin Pharmacol* 2000; 50(5):473-8.
9. Sanz EJ. Drug prescribing for children in general practice. *Acta Paediatr* 1998;87(5):489-90.

10. Thrane N, Sorensen HT. A one-year population-based study of drug prescriptions for Danish children. *Acta Paediatr* 1999;88(10):1131-6.
11. Maison P, Guillemot D, Vauzelle-Kervroëdan F, Balkau B, Sermet C, Thibult N, et al. Trends in aspirin, paracetamol and non-steroidal anti-inflammatory drug use in children between 1981 and 1992 in France. *Eur J Clin Pharmacol* 1998;54(8):659-64.
12. Thrane N, Steffensen FH, Mortensen JT, Schonheyder HC, Sorensen HT. A population-based study of antibiotic prescriptions for Danish children. *Pediatr Infect Dis* 1999;18(4):333-7.
13. Sanz EJ, Boada JN. Drug utilization by children in Tenerife Island. *Eur J Clin Pharmacol* 1988;34(5):495-9.
14. Sanz EJ, Bergman U, Dahlström M. Pediatric drug prescribing. A comparison of Tenerife (Canary Islands, Spain) and Sweden. *Eur J Clin Pharmacol* 1989;37(1):65-8.
15. Rasmussen F, Smedby B. Life table methods applied to the use of medical care and of prescription drugs in early childhood. *J Epidemiol Community Health* 1989; 43(2):140-6.
16. Collet JP, Bossard N, Floret D, Gillet J, Honegger D, Boissel JP. Drug prescription in young children: results of a survey in France. *Epicrèche Research Group. Eur J Clin Pharmacol* 1991;41(5):489-91.
17. Straand J, Rokstad K, Heggedal U. Drug prescribing for children in general practice. A report from the Møre & Romsdal Prescription Study. *Acta Paediatr* 1998;87(2):218-24.
18. Rylance GW, Woods CG, Cullen RE, Rylance ME. Use of drugs by children. *Br Med J* 1988;297(6646):445-7.
19. Wessling A, Söderman P, Boethius G. Monitoring of drug prescriptions for children in the county of Jamtland and in Sweden as a whole in 1977-1987. *Acta Paediatr Scand* 1991;80(10):944-52.
20. Koeller JM, van den Berg CL. The clinical use of drugs applied therapeutics. In: Yee Young L, Koda-Kimble MA, eds. *Applied Therapeutics*. 6th ed. Vancouver: Applied Therapeutics; 1995:459-502.
21. Behrman RE. *Nelson Textbook of Pediatrics*, Fourth edition, Philadelphia, W.B. Saunders Company, 1992;386-417.
22. *The world drug situation: WHO Geneva* 1998.
23. Desta Z, Abdulwhab M. Prescription writing in Gondar outpatient teaching hospital, Ethiopia. *East Afr Med J* 1996;73(2):115-9.
24. Raina RK, Pillai GK. Outpatient medication prescribing patterns in a tropical teaching hospital. *J Indian Med Assoc* 1980;74(3):62-4.
25. Sekhar C, Raina RK, Pillai GK. Some aspects of drug use in Ethiopia. *Trop Doct* 1981;11(3):116-8.
26. Aseffa A, Desta Z, Tadesse I. Prescribing pattern of antibacterial drugs in a teaching hospital in Gondar, Ethiopia. *East Afr Med J* 1995;72(1):56-9.
27. Leka T, Abadir M. Prescribing pattern of analgesic drugs in 13 rural and regional hospitals of Ethiopia. *Ethiop J Health Dev* 1990;4:15-30.
28. Abula T, Desta Z. Prescribing pattern of drugs in pediatric wards of three Ethiopian Hospitals. *Ethiop J Health Dev* 1999;13(2):135-40.
29. Riaz H, Malik F, Raza A, Hameed A, Ahmed S, Shah PA, et al. Assessment of antibiotic prescribing behavior of consultants of different localities of Pakistan. *Afr J Pharm Pharmacol* 2011;5(5):596-601.
30. Yenet W. Baseline survey on prescribing indicators. *Ethiop J Health Sci* 2005;15(2):147-56.
31. Dikisso D, Kuma G, Teklemariam S. Baseline survey on prescribing indicators and the underlying factors influencing prescribing in South West Ethiopia. *Ethiop J Health Dev* 1998;12(2):87-93.
32. Kuty KVG, Sambasivam N, Nagarajan M. A study on drug prescribing pattern in Madurat city. *Indian J Pharmacol* 2002;34:361-2.
33. Bosu WK, Ofori-Adjei D. A 1-day survey of drug prescribing patterns in the District General Hospital of the Wassa West District of Ghana. *Trop Doct* 1997;27(4):222-6.
34. Hazra A, Tripathi SK, Alam MS. Prescribing and dispensing activities at the health facilities of a non-governmental organization. *Natl Med J India* 2000;13(4):177-82.
35. Flaherty JH, Perry HM, Lynchard GS, Morley JE. Polypharmacy and hospitalization among older home care patients. *J Gerontol A Biol Sci Med Sci* 2000;55(10):M554-9.
36. Das N, Khan AN, Badini ZA, Baloch H, Parkash J. Prescribing practices of consultants at Karachi, Pakistan. *J Pak Med Assoc* 2001;51(2):74-7.
37. Najmi MH, Hafiz RA, Khan I, Fazli FR. Prescribing practices: an overview of three teaching hospitals in Pakistan. *J Pak Med Assoc* 1998;48(3):73-7.
38. Mengistu A. Patterns of drug utilization in patients department, JUSH south west Ethiopia. *Ethiop J Health Sci* 2005;15(2):139-45.