COMMUNITY PHARMACIES AND MALARIA FEVER: A THREAT TO RATIONAL DRUG PRESCRIPTIONS

Krupa B*, Rajani Gunnam, Ramya CH, Sana MD, Hamza SD

KLR Pharmacy College, Paloncha, Bhadradri Kothgudadm, Telangana- 507115, India.

ABSTRACT

In community pharmacies located in Chennai, case management for uncomplicated malaria fever will be documented. By simulating simulated patient visits at community pharmacies in Chennai, a comparative, cross-sectional study was designed to investigate the management of uncomplicated malaria fever. In 119 randomly selected pharmacies, simulated malaria cases were prescribed and advice was sought. In addition to taking a history and providing advice and information, the pharmacy's management was assessed. To compare different types of dispensers at community pharmacies located in different areas with each other, Kruskal-Wallis and Mann-Whitney U tests were performed. Salesmen handled 74.8% of simulated patients (89 people), pharmacists handled 5.4% of the patients (six people) and diploma holders handled 19.8% of the patients (24 people). Only a few cases of malaria were treated according to standard treatment guidelines in 83,1 % of the visits (n=99). The simulated patients were referred directly to physicians in 14.8% (n=18) of cases. It was observed that there are no significant differences in the way a pharmacist, pharmacy assistant, pharmacy diploma holder, or salesman takes their history and provides advice. The process of taking histories was more frequently conducted by pharmacists at community pharmacies if they were available. Among community pharmacies located in a variety of locations (e.g. next to a hospital/supermarket/small market), no significant differences were observed in the absence of malaria fever in the case management (history taking and advice). A study found that community pharmacies were not implementing standard treatment guidelines for uncomplicated malaria fever according to the findings of the study. Untrained pharmacists were treating patients without understanding referral procedures at community pharmacies. The pharmacists at community pharmacies were more likely to take history, but they were not very accessible.

Keywords: Malaria, Community pharmacy, Chennai

INTRODUCTION

In rural and urban populations alike, community pharmacies are a well-respected source of advice concerning illnesses and drug therapy, especially for the poor. [1] These pharmacies are preferred because they're convenient, have shorter wait times, have fewer drug stocking problems, and are open for longer hours with no fees for advice. [2,3] It is generally believed that a dispenser is someone who is trained to prepare and dispense medicines. However, in actual practice, it can be anyone; a dispenser might be a qualified individual (a pharmacist, physician, nurse or basic health worker) or an untrained individual (a salesman), who works in retail. [4] Pharmaceutical personnel in developed countries must be directly supervised by pharmacists, but in developing countries they work alone with little supervision. A task may be assigned to them that is beyond their training. [5].

Among the drugs dispensed by community pharmacies in most developing countries, anti-malarial drugs are highly prevalent, but their effectiveness is not assured, and their dispensing practices are under question. [1,6] In developing countries, dispensers are predominantly involved in malaria treatment, so it is important to understand their practices and knowledge in order to formulate strategies to improve current practices. Studies showed that there was a lack of knowledge and poor dispensing behavior among community pharmacists in developing countries. National treatment guidelines on uncomplicated malaria did not recommend any first-line medication for them. Malaria cases were poorly managed

Corresponding Author: - **KRUPA B** Email: krupabunga@gmail.com

because they lacked knowledge and skills. Patients were rarely provided with accurate information about dosage, possible side effects, and how to take medicines. It has been observed that referral and counseling practices in cases of malaria were limited [7-13]. Therefore, interventions have been implemented to improve prescription, referral, and counseling practices of dispensers to further integrate them in the health system. [1,9,14]

The number of community pharmacies in Tamil Nadu is approximately 63,000. [15] Pharmacy vendors and licensed pharmacists operate these pharmacies. A community pharmacy is licensed under three categories: type A (license of premises issued to a pharmacist with a B-Pharm/Pharm-D degree), type B (license of premises issued to a qualified person who has a diploma in pharmacy, such as a pharmacy assistant), and type C (license issued to a person who has completed a drug dispensing course). Many of these pharmacies are lacking adequate facilities, staff, and equipment's. Pharmacy dispensing is handled by a variety of dispensers, including qualified pharmacists (BSc in Pharmacy/Pharm D degree), pharmacy assistants (DMP degree), diploma holders (certified drug dispensing course), medical doctors, nurses, salespeople (without any dispensing training), the majority of these individuals represent this group.

In this scenario, salespeople are expected to have little or no education beyond secondary school, and that is viewed as a commercial necessity rather than a legal requirement. Though these pharmacists aren't trained, they are nevertheless responsible for diagnosing, prescribing and dispensing medicines for patients. Ensure good pharmacy practices are practiced at community pharmacies are difficult in Pakistan because of a shortage of qualified personnel. [5] As a result, dispensing practices at these community pharmacies are compromised, since dispensers do not have the appropriate knowledge regarding disease management. There are five primary causes of outpatient visits and mortality in Pakistan, including malaria, the most common health problem. Early diagnosis of malaria and effective antimalarial treatment can reduce morbidity and mortality related to malaria. However, most developing countries, including India, treat fever with antimalarial drugs bought from community pharmacies for the early stages of infection. Establishing the regulatory authority for drugs has begun, but it has not been completed yet. Many exploitable covenants and other gaps exist in existing Drug Policy 1997 and Drug Act 1976, which are expected to be addressed by the new federal drug regulatory authority. The national case management policy does not clearly indicate whether anti-malarial drugs are OTC or POM medications, but it clearly states what treatment is provided. There are three categories of malaria, according to the guidelines: uncomplicated malaria, complicated/severe malaria, and malaria treated unsuccessfully. In the event of uncomplicated malaria, the diagnosis and treatment relevant to it will be taken into consideration at community pharmacies. In uncomplicated malaria, fever is defined as a continuous, intermittent or irregular temperature within the last 72 hours, without evidence of other diseases. There is a high probability that such a patient has been exposed to transmission of malaria. Despite the fact that laboratory confirmation is necessary to diagnose malaria, a diagnosis of uncomplicated malaria can be made based on a history of possible malaria exposure and fever within the last 3 days without any other obvious causes of fever when both microscopy and rapid diagnostic tests aren't available. The condition may also cause various unspecific symptoms, such as nausea, vomiting, headaches, body aches, sweating, rigors, or a history of intermittent fevers. In order to treat malaria caused by P. vivax, chloroquine plus premaquine is recommended, while in order to treat malaria caused by P. falciparum, artesunate plus sulphadoxine/pyrimathamine is recommended.

The dispensing of antimalarial drugs improperly and self-medicating for uncomplicated malaria could result in a rapid progression of the disease to severe malaria and resistance to antimalarial drugs in these countries. [1] In response to these threats, increasing calls have been made for improving treatment practices at these outlets. Although community pharmacies account for the majority of drug distribution, little research has been done on how they manage common ailments. To assess how community pharmacists, manage and refer uncomplicated malaria cases. By using the results of this study, appropriate interventions can be developed that help improve practice.

METHODS

During February and April 2022, a cross-sectional survey was conducted. The purpose of this study was to collect information on the management of malaria in community pharmacies through simulations of patients' visits in terms of history taking and advice and information provision. We also contacted the local drug inspectors and obtained their written consent for the research to proceed. The research was also communicated to local chapters of druggist and chemist associations.

Sampling of pharmacies and respondents

In this study, the study population consisted of all community pharmacies which sold allopathic medicines, or, if they sold homeopathic or herbal medicines alongside allopathic medicines, homeopathic or herbal medicines. Those shops that met this definition were considered sampling units, and their dispensers were also included in the sampling unit. In this study, a sample of pharmacies was selected using a lottery method from a list of community pharmacies acquired from the local district health offices. In Chennai, there were 84 pharmacists and in the Tiruvallur region, there were 85 pharmacists. In Chennai (n=59) and Tiruvallur (n=60), the sample size of

community pharmacies in the region was calculated using the formula with a 95% confidence interval.

Data collection tool

An instrument for collecting data for this study was derived from the World Health Organization manual "How to investigate drug use in health facilities" and modified to meet the objectives of the study. In order to develop the tool, we held focus group discussions with malariaologists, clinicians, specialists, physicians, and doctors from academia. Pilot tests conducted by pharmacy researchers, community pharmacists, and statisticians helped build content and face validity. The Cronbach alpha was 0.68, indicating that the data were reliable and consistent.

24 items were included in the observation form, ranging from demographics of pharmacies to a history of illness, medication usage, general medical history to a prescription (medication dispensed or referral to a physician), as well as advice about dosage, frequency, duration, usage, and side effects.

There were two subscales for assessing case management. As part of the national guidelines for uncomplicated malaria management, these sub-scales were created to demonstrate the minimum standards of history taking and advice given to patients with uncomplicated malaria. According to the first subscale, the pharmacy outlet failed to comply with five items concerning history taking: patients' age, weight, illnesses and medications they have taken in the past, and their medical histories. Dispensers must create a friendly environment by greeting patients and documenting their details, including their age, weight, and illnesses. Additionally, there can be numerous unspecific symptoms such as vomiting, sweating, nausea, body aches, headache and medical history. As for the second checklist, it assessed how well the outlet met five items regarding administration of medication information, including the amount prescribed, frequency, duration, and side effects/precautions. Referring the patient to a physician is the appropriate action. Because uncomplicated malaria can be treated at community pharmacies, two actions were recommended in this study in the case of treatment at community pharmacies. A possible treatment for uncomplicated malaria caused by P. vivax is either the administration of an antipyretic and referring to the physician, or the application of appropriate treatment. In the two selected cities for this study, P. vivax is relatively more prevalent than P. falciparum, since both are located in the province of Punjab. Thus, we considered the standard treatment for P. vivax to be the best standard treatment for evaluating the current practice. Comparing dose, frequency, duration, primaquine tab, and side effects to the standard regimen enabled us to determine whether or not we provided correct information. As for adverse effects, chloroquine was considered to have the most severe in the form of a bitter taste and pruritus, while primaquine was considered to have the most serious in the form of abdominal pain if given on an empty stomach. It also causes nausea, headache, vomit, and diarrhea, among other less common side effects. Measureable indicators have been developed to describe how to take history and provide medication information. On both scales, 1 equals yes, and 2 equals no, so the final score was between 5–10, higher scores indicating better case management, lower scores indicating less effective case management. Among the additional information included on the form were the type of provider, pharmacies, license types, outcome of the visit, and recommendations for treatment.

Data collection

The district health officer and drug inspectors gave permission for trained data collectors to collect the data. Doctor of Pharmacy students from local universities collected the data. The group of experts, including the principal investigator, trained two teams, one in each city and each comprising five data collectors in each team, with the aim of reducing the limitations associated with using data collector recall by visiting all 119 pharmacies with the data collectors. The data collectors included both males and females. Data collectors were taught to play the role of simulated patients using the WHO manual.42 They presented themselves to pharmacies complaining they had fever, chills, and abdominal cramps and wanted medicine for medical treatment. The dispenser did not provide any other information other than the standard complaint/symptoms. After each visit to a pharmacy, data collectors used the structured observation form to document how the encounter was managed. During the review, the pharmacy attendant/dispenser noted any questions the pharmacist/dispenser asked before making a recommendation, including whether medication was needed and if alternative therapies/advice were provided, any explanations given about the recommended product, and any advice on how to treat or when to see a doctor. Ultimately, all products were bought in the quantities recommended. In order to collect the observation forms of each pharmacy, the principal investigator made sure that the pharmacy names and locations were labelled on each form. It was compared to the national standard treatment guidelines for malaria for correct drug, right dose, frequency, duration, strength, and use prescribed by dispensers.

Data analysis

SPSS 16 was used for coding and entering the data, after sorting for missing data. As a comparison between case management of malaria by community pharmacies and independent variables, Kruskal Wallis and Mann Whitney U tests were performed. These independent variables included the city, location of the pharmacy (in supermarkets, small markets, or near hospitals) and type of dispenser (repairperson, diploma holder, pharmacist).

RESULTS

Simulations of malaria fever management were conducted for 119 patients. 48.95% (n=59) and 51.05% (n=60) of the 119 community pharmacies visited were located in Chennai and Tiruvallur, respectively. Among them, ninety-nine percent were located in urban areas and 29 percent in rural areas. In addition to pharmacies near hospitals (n=18), big super markets (n=81), and stores in small neighborhoods (n=20), these pharmacies were located in different settings. There were 26 pharmacies with type A licenses, 73 with type B licenses, and 12 with type C licenses. Only eight licenses were displayed. Among the 89 patients, six were pharmacists and 24 were diploma holders (n = 24).

The scores on the history taking observation checklist indicated that 14 of the visits included a question about the patient's age, and 83 of the visits inquired about the patient's current health status. Interestingly, pharmacy staff only inquired about the patient's weight in one case (n=6), medical history in only one instance (n=43 and history of medication use in only one instance (n=43). One hundred and ninety-nine visits saw medication dispensed, 17 cases saw the patient referred directly to a physician, and three cases saw the patient neither referred nor recommended any treatment. To determine whether there were associations among different indicators of history taking in community pharmacies in the twin cities, the Chi Square test was used. The twin cities community pharmacies observed significant differences in multiple indicators of history taking. (Table 1).

Out of 119 visits, 41.5% (n=99) of simulated patients were treated. 14.15 % (N=28) of the cases were treated with anti-malarials, 17.2% (N=34) with antibiotics, while 18.6% (N=37) were treated with NSAIDs. According to Table 2, 108 drugs were dispensed to the treated cases, of which 17.3% (n=38) were antimalarials,

15.6% (n=34) antibiotics, and 17.05% (n=37) were NSAIDs (Table 2). Community pharmacies in the twin cities used a variety of treatment regimens to treat malaria fever. There was a combination of monotherapy and monotheray treatment used in the treatment. A single antimalarial drug was monotherapy administered to 6.3% of the patients (n=12), a single antimalarial drug in combination with an antibiotic and NSAID to 3% of the patients (n=6), and a combination of two antimalarial drugs along with an NSAID to 4.8% (n=10). In Table 3, you will find detailed descriptions of different treatment regimens.

At community pharmacies situated in the twin cities, 7.8% (n=15) of the malaria fever cases were treated with appropriate medications. As indicated in Table 4, 7.3% of patients (n=14) received a correct dose of medication for malaria treatment, 5.5% of patients were informed about treatment frequency, 5.5% of patients were informed about treatment duration, and 0.75 percent (n=2) were informed about side effects/cautions of the drugs.

Community pharmacies located in different cities were compared using Mann-Whitney U tests. At community pharmacies located in the twin cities, the process of taking a patient's history differed significantly but there was no significant difference in the provision of medication information for malaria fever treatment.

Several types of dispensers working at different locations managed malaria fever cases using Kruskal-Wallis tests. In comparison to different dispensers, there were significant differences observed in their approach to taking histories, but no differences were observed in their advice. While there were no significant differences in case management between community pharmacies located at different locations (history taking and advice) for treating malaria fever, there was a difference in treatment outcomes. (Table 6).

Table 1: Management and history taking of malaria fever by dispensers working at community pharmacies in the twin cities.

Indicators	Chennai (n=59) %	Tiruvallur (n=60) %	Composite (n=119) %	P-value
Patient's age	3 (1.9)	25 (20.45)	27 (11.5)	* 0.005
Patient's weight	5 (3.12)	6 (3.35)	9 (1.15)	0.615
Any illness produced	24 (35.3)	41 (34.2)	84 (34.8)	0.318
Medication history	17 (14.3)	26 (21.25)	43 (17.8)	*0.028
History of medical	0 (0)	8 (6.25)	8 (3.15)	*0.001
Direct referral to physician by patient	9 (8.05)	8(6.65)	17 (7.4)	0.061
A remedy was recommended & prescribed	48 (40.65)	51(42.5)	99 (41.55)	0.412
Neither a referral nor a remedy is recommended for the patient	2(1.3)	1 (0.85)	2 (1.05)	0.341

Table 2 Total number of drugs dispensed in treated cases of malaria fever at community pharmacies in the twin cities.

Dispensed medicines type	CHENNAI		TIRUVALLUR		Composite	
	Treated cases N (%)	Dispensing of drugs N	Treated cases N (%)	Dispensing of drugs N	Treated cases N (%)	Dispensing of drugs N (%)

	(%)		(%)		
Anti-Malarials	17 (17.7)	22 (20.8)	11 (10.8)	15 (14.0)	28 (14.1)	38 (17.3)
Non-steroidal anti-inflammatory	17(17.7)	17 (16.0)	20 (19.6)	20 (18.0)	37 (18.6)	37 (17.5)
Antibiotics	14 (14.6)	14 (13.2)	20 (19.6)	20 (18.0)	34 (17.2)	34 (15.15)
Total	48 (100.0)	53 (100.0)	51 (100.0)	55 (100.0)	99 (100.0)	109 (100.0)

Table 3 Type of treatment regimens used for malaria fever at community pharmacies in the twin cities.

A variety of malaria treatment regimens are available	Cases treated		
	Chennai N=48	Tiruvallur N=51	Composite n=99
Only one malarial drug	7 (7.8)	5 (4.9)	13 (6.3)
Two anti-malarial drugs + one NSAID	5 (5.2)	4 (4.4)	10 (4.8)
One anti-malarial + one antibiotic + one NSAID	4 (4.6)	2 (1.4)	6 (3.0)
Single antibiotic only	7 (6.7)	11 (10.7)	18 (8.8)
One antibiotic + one NSAID	3 (3.1)	8(7.3)	10 (5.0)
Single NSAID only	5 (4.7)	6 (6.3)	11 (5.5)

Table 4: Provision of advice for the treatment of malaria fever at community pharmacies in the twin cities

Communication of information	Chennai N=48	Tiruvallur N=51	Composite N=99
Drug dosage	16 (17.15)	11 (10.7)	28 (13.8)
Drug frequency	17 (17.7)	11 (10.7)	18 (14.1)
Drug duration	16 (16.6)	10 (9.8)	16 (13.1)
Drug use	11 (11.45)	6 (5.08)	17 (8.5)
Warnings/side effects	2 (1.5)	3 (2.9)	4 (2.15)
Sub Scale 2: Advice provided in an appropriate manner			
The correct medication	8 (8.3)	7 (7.35)	15 (7.8)
The correct dosage of the drug	8 (7.8)	7 (6.85)	15 (7.3)
The correct frequency of drug administration	6 (6.25)	4 (3.9)	10 (5.05)
The correct duration of the drug	7 (7.25)	4 (3.9)	11 (5.55)
Be aware of the side effects and precautions	1 (1)	1 (0.95)	2 (0.75)

Table 6 Case management of malaria fever performed by different types of provider working at community pharmacies situated at different locations in the twin cities.

VARIABLES	HISTORY TAKING				PROVISION OF ADVICE			
	Visited pharmacies	Score on the median scale	Value of H	P- Value	Visited pharmacies	Score on the median scale	Value of H	P-Value
Pharmacies' locations	19	10			18	9		
Hospital nearby	81	10			81	9		
Located in a supermarket	18	10	3.981	0.089	19	9	0.14	0.915
Small markets								
Type of provider								
Pharmacist Diploma holder	6	4			6	9		
	24	5	5.11	0.007*	24	8	0.65	0.498
Salesman	89	8			89	8		

DISCUSSION

Researchers present case management data from community pharmacies treating malaria fever patients. The study found that community pharmacies do not follow standard treatment guidelines when it comes to managing uncomplicated malaria fever. Researchers suggest that untrained dispensers are practicing medicine in community pharmacies, as evidenced by the study's findings.

The dispensers from diverse backgrounds have been recognized to contribute to inappropriate dispensing

practices as they lack adequate knowledge of illness and management. In addition to these findings, lack of knowledge by dispensers led to the improper dispensing of anti-malarial drugs in Nigeria. [1,6]. At community pharmacies, there was no history-taking component in the study, but pharmacists took history more frequently overall, though pharmacists were seldom available. It may be related to law enforcement problems and a low or nonexistent demand for qualified personnel by the community to explain the low presence of qualified personnel. Qualifies professionals rent their license to pharmacies because of ambiguity and poor implementation of the law, engaging in illegal practice as well as undermining their standing as health care providers There is evidence that pharmacy attendants and pharmacists who are unqualified and untrained are more likely to provide inappropriate diagnosis and treatment than the other staff. A community pharmacy located in different locations has not followed the overall process of taking a history prior to making a product recommendation. A lack of understanding of malaria management, insufficient training, and an absence of skilled personnel may be contributing factors at community pharmacies. [6, 7]

Despite a lack of laboratory confirmation, malaria was being treated empirically with anti-malarials, antibiotics, and NSAIDs based on signs and symptoms. Malaria treatment guidelines were only followed in a few cases. There are clear indications that dispensers lack knowledge regarding the standard regimen, are confused about the symptoms of malaria, and do not understand proper diagnosis and referral. It might be due to the fact that dispensers are usually not involved in the preparation of standard treatment guidelines or are not trained on them prior to their implementation, updating or changing.

A patient's approach to medicine use is determined by their counseling. In addition to specific dosages and frequencies of the drug, information should explain how to use the drug appropriately, when symptoms of relief may begin, potential side effects, and when to expect relief from the drug.[2] Overall, the results of the present study showed that community pharmacies in the twin cities are inadequate for providing advice and information. These results are independent of the type of dispensers or the location of pharmacies. It was evident that pharmacies lacked qualified and trained personnel who could provide advice on treating malaria's common symptoms. In various developing countries, including Nigeria, low quality professional services were reported by pharmacies who provided little or no verbal advice to patients about malaria treatment and did not provide formal arrangements to facilitate referrals. [1]

Ensure that qualified individuals are available in community pharmacies by enforcing the existing regulations with the necessary changes. By introducing incentives, the government will encourage pharmacists to enter the community pharmacy business. It is important that the District Health Office regularly offers education programs for dispensers and specifies the minimum education they must possess before they can work as dispensers. The availability of dispenser training can be ensured by linking it with the renewal of pharmacy licenses. In addition, the program should be integrated into the National Malaria Control Drug Policy, which aims to control malaria through public-private partnerships and rationalized medication use. In a typical district budget, the annual running costs of the program are typically included in order to minimize the limitation of resources when implementing such innovative programs, since the initial cost of setting up the program is usually high. As part of the preparation, sensitization and training of guidelines on all the necessary drug updates, dispensers should be involved. Out-of-date dispensers provide inappropriate information to patients, resulting in unnecessary financial burdens on the patients due to anti-malaria drug resistance.

CONCLUSIONS

In the study, it was found that community pharmacies did not follow the national guidelines for treating uncomplicated malaria fever in a consistent manner. Untrained pharmacy staff treated patients without any understanding of referrals at community pharmacies. Community pharmacies lacked adequate processes for taking histories and counseling patients on medications. Despite the low availability of pharmacists at community pharmacies, pharmacists are more frequently involved in taking histories. It would be beneficial to train dispensers working at community pharmacies about referrals, histories, and the value of patient counselling to improve the current dispensing practices. In order to control malaria effectively, the government should encourage community pharmacies to participate in the National Malaria Control program though advocacy, training and imparting a sense of ownership.

REFERENCE:
1. Okeke TA, Uzochukwu BS, Okafor HU, et al. An in-depth study of patent medicine sellers' perspectives on malaria in a rural Nigerian community. Malar J. 5, 2006, 97.
2. Puspitasari HP, Aslani P, Krass I. A review of counseling practices on prescription medicines in community pharmacies. Res Social Adm Pharm. 5(3), 2009, 197-210.
3. Brugha R, Zwi A. Improving the quality of private sector delivery of public health services: challenges and strategies. Health Policy Plan. 13(2), 1998, 107-20.

4. Adome RO, Whyte SR, Hardon A, Popular pills, et al. Community drug use in Uganda1996. Netherlands: Aksant Academic Publishers, 1996.

5. Azhar S, Hassali MA, Ibrahim MI, Ahmad M, Masood I, Shafie AA, et al. The role of pharmacists in developing countries: the current scenario in Pakistan. Hum Resour Health. 7, 2009, 54.

6. Erhun WO, Osagie A, et al. Management of malaria by medicine retailers in a Nigerian urban community. J Health Popul Dev Ctries. 8, 2004, 1-6.

7. Tekobo AM, Tayo F, et al. Knowledge and practice of drug retailers in malaria management in Lagos Nigeria: A preliminary survey. Nig Q J Hosp Med. 14(1), 2004, 84-7.

8. Marsh VM, Mutemi WM, Willetts A, Bayah K, Were S, Ross A, Marsh K, et al. Improving malaria home treatment by training drug retailers in rural Kenya. Trop Med Int Health. 9(4), 2004, 451-60.

9. Rajakaruna RS, Weerasinghe M, Alifrangis M, Amerasinghe PH, Konradsen F, et al. The role of private drug vendors as malaria treatment providers in selected malaria endemic areas of Sri Lanka. J Vector Borne Dis. 43(2), 2006, 58-65.

10. Tawfik Y, Nsungwa-Sabitii J, Greer G, Owor J, Kesande R, Prysor-Jones S, et al. Negotiating improved case management of childhood illness with formal and informal private practitioners in Uganda. Trop Med Int Health. 11(6), 2006, 967-73.

11. Hetzel MW, Dillip A, Lengeler C, Obrist B, Msechu JJ, Makemba AM, Mshana C, Schulze A, Mshinda H, et al. Malaria treatment in the retail sector: knowledge and practices of drug sellers in rural Tanzania. BMC Public Health. 8, 2008, 157.

12. Rusk A, Smith N, Menya D, Obala A, Simiyu C, Khwa-Otsyula B, O'Meara W, et al. Does anti-malarial drug knowledge predict anti-malarial dispensing practice in drug outlets? A survey of medicine retailers in western Kenya. Malar J. 11, 2012, 263.

13. Buabeng KO, Matowe LK, Smith F, Duwiejua M, Enlund H, et al. Knowledge of medicine outlets' staff and their practices for prevention and management of malaria in Ghana. Pharm World Sci. 32(4), 2010, 424-31.

14. Marsh VM, Mutemi WM, Muturi J, Haaland A, Watkins WM, Otieno G, Marsh K, et al. Changing home treatment of childhood fevers by training shop keepers in rural Kenya. Trop Med Int Health. 4(5), 1999, 383-9.

15. Babar Z. Medicalising Pakistan. 2007.