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The role of private drug vendors as malaria treatment providers in selected malaria endemic areas of Sri Lanka

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Abstract

Background & objectives: The involvement of private drug vendors in malaria treatment is particularly high in developing countries and understanding their practices and knowledge about antimalarials and malaria treatment will aid in devising strategies to increase the correct use of antimalarials and improve adherence to the government's malaria drug policy. Results of a study on the knowledge and practices of the private drug vendors conducted in seven districts in Sri Lanka, mostly in malarious areas are presented.

Methods: Data on awareness of government's malaria drug policy, practice of issuing antimalarials, knowledge about malaria and antimalarial drugs were collected from the drug vendors using pre-tested questionnaire in vernacular language. Data were statistically analysed using Stata 8.2. Chi-square test was carried out for individual explanatory variables and a logistic regression model was applied taking all response variables as binary outcome.

Results: Vendors' knowledge on antimalarials was poor with 58% of the vendors being unaware of the government malaria drug policy in the country. Also, the advice provided to customers buying antimalarials was limited. However, the majority of the private vendors emphasised that they were aware of the importance of case confirmation before treatment as stressed in the national policy. Although, the vendors did not have a high awareness of national drug policies they were only found selling chloroquine and primaquine as recommended by the Ministry of Health.

Interpretation & conclusion: In recent years Sri Lanka, as a whole, has experienced very little malaria. The reduction in demand for antimalarials due to low incidence levels may have influenced the knowledge and awareness on antimalarials and government drug policies. However, since low levels of malaria do not guarantee that epidemics will not occur, attempts to educate private drug vendors as a part of an organised control programmes are of major importance.

Key words Antimalarials – drug vendors – malaria treatment – *Plasmodium falciparum* – *Plasmodium vivax*

Introduction

Widespread use of antimalarial drugs for all types of fever and non-compliance with recommended dosage contribute markedly to drug resistance and necessitate continual change in malaria treatment guidelines. Preserving the efficacy of the antimalarial drugs in use is of critical importance to public health

in malaria endemic areas. In support of this the WHO[1] has recognised that monitoring and influencing the quality of private services are key components of effective malaria treatment. The involvement of private drug vendors in malaria treatment is particularly high in developing countries but maintaining the quality of the service and monitoring compliance with national malaria treatment guidelines is difficult[2].

In Sri Lanka, microscopically confirmed blood smears or rapid diagnostic kits are standard diagnostic procedures adopted before the prescription of malaria drugs to patients. The first line of drugs recommended is chloroquine (CQ) and primaquine (PQ) combination for *Plasmodium vivax* and *P. falciparum* infections. So far, there have been no reports of CQ-resistant *P. vivax* infections in Sri Lanka but a significant number of CQ resistant cases of *P. falciparum* have been recorded from various endemic areas[3–6]. For CQ resistant cases of *P. falciparum* the government recommended drug is sulphadoxine-pyrimethamine (SP), which is administered as an out-patient treatment only by government hospitals. The first SP resistant *P. falciparum* case was reported in 1992 from the Polonnaruwa district[7], and later in other areas of the Northern Province[8,9]. Quinine is recommended for SP resistant cases as an in-patient treatment at government hospitals.

In most of the malaria endemic areas of Sri Lanka, the services at the government health facilities with qualified staff are free. Patients and families visit government hospitals for malaria treatment where high preference is given to blood slide confirmation prior to the initiation of treatment[10]. However, limited information is available on treatment seeking behaviour in the northern and certain areas in the eastern part of the country due to the armed conflict in the region. But a study indicates that people in these areas also seek care relatively fast and initial treatment with paracetamol to reduce fever is as common as in the rest of the country[11]. One major disadvantage at government facilities is that patients often have to be in queues before seeing a doctor, especially during the high transmission seasons[12]. This has paved the way for a large number of private practitioners and drug outlets to provide treatment sometimes with laboratory facilities for diagnosis. The private facility as a treatment provider has a high acceptance among part of the community based on the perception that the treatment seeking requires less time and the attention given is more thorough[12].

Private or government drug outlets are permitted by law not to issue any antimalarial drugs without a prescription or a confirmed blood slide (Cosmetic Devices and Drug Act (1979). In recognition of the practice of direct treatment-seeking at pharmacies for prescription drugs in Sri Lanka, it is important to assess the knowledge and drug dispensing practices of private vendors. Other malaria endemic countries have shown that the level of technical knowledge of private drug vendors is low[2,13]. Here, we present results of a survey on the therapeutic knowledge of malaria and awareness of the treatment policy and practices of private drug vendors in selected endemic districts in Sri Lanka. Understanding the practices of those who sell antimalarial drugs, their knowledge about the antimalarials and malaria treatment will aid in devising strategies to increase the appropriate use of antimalarials and enable the designing of programmes to improve on the services of the private drug vendor. This will in turn constrain the spread of antimalarial drug resistance in the country.

Methodology

Study area: This study was conducted among pharmacies located in seven districts of Sri Lanka—Anuradhapura, Ampara, Vavuniya, Mannar, Moneragala, Hambantota and Badulla over a period of three months from November 2004 to February 2005. The transmission levels of malaria within the selected districts vary slightly with parasite confirmed malaria cases per 1000 population[14]

Table 1. Population, number of government health care facilities and malaria incidence in the seven surveyed districts

District	Population in 2001	Government health care facilities							Malaria incidence*	
		GH	BH	DH	PU	RH	CD	Total	*Pf*	*Pv*
Anuradhapura	746,466	1	2	5	5	33	14	60	0.025–0.5	0.2–0.4
Ampara	589,344	1	2	1	1	3	17	25	0.2–0.4	0.4–0.8
Vavuniya	149,835	1	–	1	1	4	2	09	0.025–0.05	0.05–0.1
Mannar	151,577	1	–	2	1	2	5	11	0.2–0.4	0.1–0.2
Moneragala	396,173	–	1	9	1	7	9	17	0.025–0.05	0.2–0.4
Hambantota	525,370	1	3	3	4	7	8	26	0–0.025	0.05–0.1
Badulla	774,555	1	2	11	1	13	6	34	0–0.025	0.025–0.05

GH = General hospital; BH = Base hospital; DH = District hospital; PU = Peripheral unit; RH = Rural hospital; CD = Central dispensary; *Parasite incidence per 1,000 population[14].

ranging from 0.025–0.8 (Table 1). In Badulla district the incidences are much lower with less than 0.025 per 1,000 population and this district is not considered as a malaria endemic district (Table 1). However, patients from neighbouring districts with comparatively high malaria incidences are known to visit hospitals and pharmacies in the Badulla district.

Data collection: All drug outlets in small towns were visited and, in large cities, outlets were randomly selected (every other outlet along a market street). These outlets were categorised as pharmacies selling only drugs or a drug outlet found within a grocery/general store. The responding sales person was defined as the drug vendor who was present at the time of the visit and was responsible for issuing drugs. A verbal consent was sought before the interview. After explaining the objectives of the study, structured interviews were conducted with each drug vendor in the vernacular (Sinhala or Tamil with a translator), using a pre-tested questionnaire. Information about the drug vendor (age, sex, educational background and training of the respondent), drug outlet (age, registration status, distance to the closest government health facility, antimalarials available etc.), and antimalarial drugs (price, expiry date, storage practices) and the types and frequency of interactions with the government health care services were collected. For some of this information an observation checklist was applied and filled out immediately after leaving the drug outlet.

Specific questions were asked from the vendor to assess his/her knowledge about antimalarial drugs, awareness of the importance of case confirmation before issuing drugs, awareness of the government malaria drug policy and whether the vendors provide sufficient advice to the customers after dispensing drugs. An interview lasted 20–60 min depending on the number of customers visiting the shop during the interview. By combining several questions four aggregate variables were generated.

(a) *Knowledge of the antimalarial drugs:* The vendors were asked eight questions including, ability to identify antimalarials, ability to identify SP derivatives, knowledge of adult and child doses of CQ and PQ (e.g. 10 tablets of CQ per adult), ability to mention at least one side effect of the drug CQ and PQ, storage practices (drugs stored away from sun and dust regarded as good storage). One point was assigned to each correct answer and a zero for incorrect or ‘don’t know’ answer. If a vendor scored more than 50% (i.e. 4 or more correct answers) he/she was considered as having sufficient knowledge about antimalarials drugs.

(b) *Awareness of case confirmation before issuing drugs:* This was assessed by the awareness of the vendor recommending the customer to consult a doctor or a blood test prior to issuing of antimalarials. Vendors were asked what general practice they followed when patients asked for antimalarials without producing a prescription or a positive blood slide confirmation. If the vendor claimed that he/she either recommended a blood test or consulting a doctor before issuing antimalarials, he/she was considered as having sufficient awareness of the importance of case confirmation before issuing antimalarials.

(c) *Awareness of a government malaria drug policy:* Four questions, including knowledge of the existence of a policy and ability to mention first, second and third lines of drugs respectively, were asked to assess awareness. If a vendor scored more than 50% (i.e. 2 or more correct answers) he/she was considered being sufficiently aware of the government malaria drug policy.

(d) *Providing sufficient advice to customers buying antimalarials:* Six questions on knowledge about recommended adult and child dosages of CQ and PQ (e.g. 4+4+2 tablets for three consecutive days in case of CQ for adults), advising the patient to complete the dose and instructing the patient to see a doctor if symptoms persist, were asked. If a vendor scored more than three of the six questions asked he/she was considered as providing sufficient advice to the customers after issuing antimalarials.

Data analysis: Twelve explanatory variables were included in the analysis to explain differences found in the four aggregated response variables. These included sex, age, formal training, educational level, his/her position in the shop, and the type of city where the outlet was located, type of shop, distance to the nearest government health facility, age of the outlet, availability and sources of antimalarials and whether the pharmacy was registered or not. Statistical analysis was conducted using Stata 8.2. Chi-square test was carried out for individual explanatory variables and a logistic regression model was applied taking all response variables as binary outcome. A comparison on vendors from high and low transmission areas and also of conflict affected and non-affected areas was carried out. The results of the logistic regression analysis were reported as odds ratios (OR) together with their 95% confidence intervals (CI).

Results

Profile of the vendors: Majority of the vendors (67%) in the 113 drug outlets interviewed were males. More than half of the vendors were between the age of 18 and 30 years (53%) with very few (2%) being under the age of 18. Most of the vendors (56%) had secondary education and above, with 11% having completed only primary education or less. Only 31% of the vendors were qualified pharmacists and the rest were employed either as sales persons, cashiers, owner or the wife of the owner of the outlet. Of the all the vendors interviewed, only 9% of them had undergone formal training on malaria, malaria treatment and antimalarial drugs.

Profile of the drug outlet: A high percentage of the outlets examined (91%) were registered and the certificate of registration was displayed. All drug outlets were located in urban areas either in big cities (district capitals, 36%) or small towns (64%) and no private vendors were found in rural areas in the seven districts studied. Except for two outlets, all others were clustered within a kilometer of a government health facility. The period of existence of the outlets could be categorised into three groups with 18% having existed for less than one year; 31% between one and five years; and the balance 51% for more than five years. Eighteen percent of the outlets visited were pharmacies selling only drugs. However, the majority of the outlets (82%) were either in a grocery store or in another type of general store. Antimalarials

were not sold in all the outlets despite the fact that these were malaria endemic regions, having only 57% of the outlets surveyed selling antimalarials. None of the outlets displayed posters about antimalarials or carried any other information about the disease.

Drugs available and prices: The main provider of the drugs was the State Pharmaceutical Corporation (SPC; 56%); a few retailers (5%) obtained drugs directly from drug companies in India. However, 39% of the respondents claimed that they were unaware of the source of drugs mainly because they purchased their goods from drug companies through sales representatives. The drug outlets had CQ and PQ in stock and only one outlet in Vavuniya district sold the S/P drug Fansidar®. The prices of drugs varied slightly in the seven districts but the average price per tablet of CQ, PQ and Fansidar® were SLR 0.40–1.60, 0.80–3.75 and 15 respectively. None of the antimalarials sold was past the expiry date indicated on the container. According to vendors, consumer misuse of antimalarials was primarily to provoke abortions by intake of high doses in the first trimester.

Knowledge of the antimalarial drugs: Out of the 113 only 37 (33%) vendors were able to score 50% or more in the eight questions regarding knowledge of antimalarial drugs. Even though 72 (64%) and 42 (37%) vendors were able to tell the correct adult dosage for CQ and PQ respectively, only 3% of them were able to tell the correct child dosage relating it to the age and/or weight of the child. A logistical regression analysis was performed to identify variables explaining differences in vendors' knowledge of antimalarial drugs controlling for the influence of confounders after adjusting for all the confounding factors (distance to the government hospital, sources of antimalarials). Vendors older than 30 years of age (OR 2.26; CI 0.89–5.7) and males more than females (OR 2.76; CI 0.94–8.07) seemed to have a better knowledge of antimalarials although this was not significant. Vendors in outlets older than one year significantly had a better knowledge of antimalarial drugs than those at outlets that were less than 1 year in existence (OR 4.86; CI 1.21–19.52). Not surprisingly, it was also found that vendors in outlets having antimalarials had a significantly better knowledge than the vendors in outlets where antimalarials were unavailable (OR 3.24; CI 1.22–8.57).

Awareness of case confirmation before issuing drugs: The majority (83%) of the vendors interviewed claimed that they requested their customers to see a doctor or have a blood test done before issuing antimalarials. However, some vendors (12%) said that they would issue antimalarial drugs, without case confirmation, if the patient was a regular customer or a friend. Generally, the statements by the vendors indicated that they followed the government recommendations of not selling antimalarials unless a confirmation had been established by a qualified health professional. In drug outlets where antimalarials were available, the respondents were more aware of this government policy as compared to respondents in outlets where antimalarials were unavailable (OR 9.01; 95% CI 2.2–36.4). None of the other explanatory variables included in the analysis could explain differences in awareness of the case confirmation including differences in transmission levels.

Awareness of the government malaria drug policy: More than half of the vendors (58%) surveyed could not provide any information on the malaria treatment policy indicating that they did not know the existence of such a policy for Sri Lanka and out of the 113 outlets only one vendor from Hambantota district was able to list all three lines of drugs correctly. Results from a logistic regression analysis (after controlling for confounding) showed that age of the vendor (> 30 years; OR 4.59; CI 1.78–11.2) had a significant effect on the awareness of the existence of a government malaria drug policy. None of the

other parameters could significantly explain differences of the vendors' awareness of the government malaria drug policy.

Providing sufficient advice to the customers buying antimalarials: It was found that many vendors (68%) provided inadequate advice to customers buying antimalarials, especially the importance of completing the dose and to see a doctor if symptoms persisted. Some vendors (18%) considered that providing advice was the duty of the doctor. A logistical analysis showed that education of the respondent (OR 3.04; CI 1.02–11.10) and the availability of the antimalarial drugs in the drug outlet (OR 3.69; CI 1.23–11.10) were the only parameters that influenced the ability of the vendor proving sufficient advice to the patient after issuing drugs.

No significant differences in the four aggregate variables assessing the knowledge and/or practices of the private vendors in the different areas considering low and high transmission areas and conflict affected vs nonconflict affected areas, were observed.

Discussion

Although this study shows that the private drug vendors lacked awareness of the overall malaria treatment guidelines of Sri Lanka they almost exclusively sell the government established first line antimalarial drugs. This is a major difference from what has been found in many malaria endemic countries in Africa[1, 13, 15] and may provide a good basis for restricting the spread of drug resistance. A majority of the private drug outlets in malaria endemic areas in Sri Lanka were registered but most of the vendors were not qualified pharmacists. They had poor knowledge of the antimalarials. They seemed unable to provide adequate advice to customers buying antimalarials. However, these private drug vendors appeared to be aware of the importance of case confirmation before treatment and hence their drug dispensing practices complied with the malaria treatment guidelines. It may not be surprising that the vendors did not know about SP drugs since private drug outlets are not supposed to sell Fansidar®. However, in the event it is decided to make SP-based products available through private outlets most likely as a response to increasing CQ resistance, a significant programme will have to be launched to educate the vendors as they have no prior knowledge of these products.

In recent years Sri Lanka, as a whole, has experienced very little malaria and this would have influenced the knowledge and awareness of antimalarials, treatment of malaria and related drug policies. The age of the vendor was important when considering the knowledge of antimalarials and the awareness of the government malaria drug policy and could be explained by the fact that vendors gained knowledge through selling these drugs for long periods.

A WHO[2] study group has shown that maintaining the quality of the private service and compliance with national malaria treatment guidelines are extremely difficult due to influence from patient demand, drug advertising and profit margins. According to the available information from this study, drug advertising and profit margins cannot be considered as factors influencing the services of the private drug vendors in Sri Lanka. None of the outlets had displayed posters of antimalarials and no other media provided information about the antimalarials in Sri Lanka. Since the reported cases for the past few years were extremely low compared to other highly endemic countries and also considering the low cost of a tablet, selling antimalarials is not very profitable for vendors. Many outlets had stopped selling antimalarials and out of the 113 drug outlets visited in this study antimalarials were not available in 49 (43%) outlets. Also some vendors claimed that misuse of CQ by pregnant women trying to provoke abortions had made them stop selling antimalarials to avoid pressure by this group of women. Results

from this study showed that private drug vendors were aware of the importance of case confirmation before issuing antimalarial drugs. Therefore, compared to the other malaria endemic countries, there is a better private sector service in dispensing antimalarials in Sri Lanka. Nevertheless, it is important to mention here that vendor claimed in an interview may not fully reflect his/her practice.

The seven districts of the study area were selected in anticipation of possible differences in knowledge and compliance with recommended treatment regimens in the different regions of the country with a diversity in transmission levels and differences in level of armed conflict. However, no significant differences in the knowledge or practices of the vendors in the different areas were observed. Moreover, if the survey had been done ten years ago when malaria prevalence in the country was very high, the results would have certainly been different.

Asymptomatic infections of *P. falciparum* and *P. vivax* and dormant stages of *P. vivax* normally provide the parasite reservoir. Thus, low levels of malaria in the recent past does not guarantee that localised or even island-wide epidemics will not occur[16]. It has been recorded in the past that even after periods of very low levels of malaria transmission, outbreaks have occurred, often following unusual rainfall patterns, by constraints placed on the public health system or by yet unexplained factors[16]. Moreover, the low transmission levels over the past years may also have made drug vendors less alert to possible outbreaks. The preparedness and the capacity of the private sector in handling a possible future outbreak especially are thus important. This should be specially targeted towards the younger vendors whose knowledge on antimalarial treatment was poor. With indications of rising prevalence of drug resistance in the country[3-6,8] attempts should be made to integrate these vendors into government health care education systems and attempt to improve the services they can offer. Studies elsewhere have shown that vendor-to-vendor education[17] and training wholesalers who can then, in turn, educate the vendors could improve treatment by private drug outlets. With the decentralisation of malaria control activities, the education of private vendors can easily be coupled with the national control activities at a district level, so that the private vendors could be groomed to be responsible service providers in the treatment of malaria.

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