

Research Article

Availability, Cost and Affordability of Antimalarial Medicines in India!

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ABSTRACT

Amidst millions of malarial cases witnessed in India every year, access to quality anti-malarial medications is a problem. The availability, price and affordability of medications are the three important determinants of patients receiving effective healthcare services. The present study was conducted to evaluate the availability, cost and affordability of anti-malarials in India. This prospective, observational study was conducted in Cuddalore district in Tamil Nadu, India from August to September 2011. Three types of medication costs were taken into consideration for calculation purposes, the highest and the cheapest branded medication costs in private pharmacy and the Jan-Aushadhi prices. Affordability was calculated for the agriculture workers and wages fixed by government of tamilnadu for different levels of skills categorized, who were consuming the medications at the time. Total six drugs included in the study according to new treatment guidelines of malaria. There was 15.5% to 230% price variation between minimum and maximum costs of branded anti-malarials respectively. For treating Plasmodium Vivax cases of malaria; unskilled and highly skilled workers had to spend a minimum of 0.32 and 0.28 wage days respectively and a maximum of 0.43 and 0.35 wage days respectively in private pharmacies. The ACT therapy required for treating severe malaria cases (Sulfadoxime+Pyrimethamine, Artemether, Arteether, Quinine) were unavailable in Jan-Aushadhi facilities. Challenges in improving access to essential anti-malarials persist mainly due to disparity in the prices of the branded and generic anti-malarials, lack of these medications in Jan-aushadhi stores which provide them lower cost to poor people and inability of Indians earning low wages to purchase them at high prices from private pharmacies who stockpile them.

Keywords: Availability cost of medicines, affordability, malaria, Jan Aushadhi.

INTRODUCTION

India, better known as the pharmacy of the third world, exports medicine to more than 200 nations. With more than half the population without access to essential medications provided by the government, major reliance on private health sector is evidenced.² Almost 90% Indians cover their healthcare expenditures by shelling out money out of their own pockets. About 60-90% of this money is spent on medications and procuring health services. The main focus of the pharmaceutical health policies implemented by the Indian government is on the production and supply of medication via the private sector rather than improving access to essential medications via public sector. The number of medications listed as price control drugs were reduced by the Indian government from 347 in 1978 to 74 in 1995. There are more than 20,000 formulations available in India and to the contrary, the pricing of

medications and healthcare at a constant high. Many are formulations of unproven efficacy.^{3,4} Very little attention has been given to explore this poor medication access despite the fact that we are one of the largest producers of medicines. Medications in India are overpriced and unaffordable. The margins in medication sales are extremely high, often reaching 1000-4000%. Demand is supplier induced. The health market creates and promotes wants.²

Although medicine prices in India are quoted as one of the lowest in the world, the absolute price has no value unless the poorest of the poor has the purchasing power to possess it. There are fewer studies who have looked at the overpricing and unaffordability of medications in the domestic market. With a view to make medications affordable to the common man, the Department of pharmaceuticals Government of India has launched the

Table 1: Recommended drug of choice and prices of antimalarial medications in private retail pharmacy and Jan-Aushadhi price

CONDITION	DRUGS	Minimum MRP. Rs.	Maximum MRP. Rs.	Difference Rs. (%)	Janaushadhi Price
1. Treatment of Plasmodium Vivax cases	Cloroquine Primaquine	48.81	65.41	16.60 (34)	4.05 18
2. TREATMENT OF UNCOMPLICATED PLASMODIUM FALCIPARUM CASES					
ARTEMISININ BASED COMBINATION THERAPY (ACT)	Artesunate Sulfadoxime + Pyrimethamine Primaquine	263.45	459.26	195.81 (74)	11.80 NA NA
3. Treatment of Uncomplicated Plasmodium Vivax Cases in Pregnancy					
1 st Trimester	Quinine Salt	210	336	126 (60)	NA
2 nd Trimester ACT	Artesunate Sulfadoxime+ Pyrimethamine	243.65	432.86	189 (78)	NA
3 rd Trimester	Artesunate Sulfadoxime+ Pyrimethamine Primaquine	263.45	459.26	195.81 (74)	NA
4. Treatment of mixed infection Cases	Full course of ACT + Primaquine	263.45	459.26	195.81 (74)	NA
5. Treatment of severe malaria cases	Artesunate 60 mg OR Artemether 80 mg OR Arteether 150 mg OR Quinine 300 mg	1680 233.80 90 400	2697.60 633.50 297 462	1018 (61) 400 (171) 207 (230) 62 (15.5)	NA NA NA NA

Abbreviations: NA= not available, ACT= artisiminin based combination therapy

Table 2: Affordability of Medicines for Full Treatment of Malaria (in Year 2011)

CONDITION OF THE DISEASE	No. of wage days required for full Course of Treatment (Days)			
	Unskilled Min /Max	Semiskilled Min /Max	Skilled Min/Max	Highly Skilled Min /Max
Treatment of Plasmodium Vivax Cases	0.32/0.43	0.31/0.41	0.28/0.38	0.26/0.35
Treatment of Uncomplicated P. Falciparum Cases	1.74/3.04	1.68/2.94	1.54/2.70	1.42/2.48
Treatment of Uncomplicated P. Falciparum Cases in Pregnancy				
1 ST Trimester of Pregnancy	1.39/2.22	1.34/2.15	1.23/1.97	1.13/1.81
2 ND Trimester of Pregnancy	1.61/2.86	1.56/2.77	1.43/2.54	1.31/2.33
3 RD Trimester of Pregnancy	1.74/3.04	1.68/2.94	1.54/2.70	1.42/2.48
Treatment of Mixed Infection (P. Vivax + P. Falciparum) Cases	1.74/3.04	1.68/2.94	1.54/2.70	1.42/2.48
Treatment of Severe Cases				
Artesunate Injection IM OR IV OR	11.1/17.86	10.76/17.29	9.9/15.86	9.08/14.58
Artemether IM OR IV OR	1.49/4.19	1.49/4.06	1.37/3.72	1.26/3.42
Arteether Injection OR	0.59/1.96	0.57/1.90	0.52/1.74	0.48/1.60
Quinine	2.64/3.05	2.56/2.96	2.35/2.71	2.16/2.49

'Jan-Aushadhi campaign' in April 2008, to provide quality generic medicines at lower prices than their expensive brands available in the market. The department of pharmaceuticals has opened the public generic drug store in cooperation with various state governments. The Red Cross Society and a few other NGOs run these Jan-Aushadhi stores to provide quality generic medicine to the people at reasonable costs. The India government plans to establish at least one Jan Aushadhi store in each of the 600

districts of the country to improve access to quality medications at an affordable rate to the underprivileged people.^{1,2}

The high cost of medications affects the most prevalent illness of India, which is Malaria. Malaria still remains a major public health problem worldwide. It is estimated that between 190 and 311 million cases occurred worldwide in 2008 and In India each year 1.5 million cases reported.^{7,9} Malaria and its complications are controlled by preventing infection, early diagnosis and

Table 3: Shelf-Availability of Selected Antimalarial medicines at Healthcare Facility

Name of the Selected Medicines	Jan-aushadhi Stores	Zones, stock availability on 1 st , 15 th and 30 th day							
		Cuddalore		Chidambarm		Neyveli		Panhauti	
		I	II	I	II	I	II	I	II
Chloroquine	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Primaquine	Yes	No	No	No	No	No	No	No	No
Artesunate	Yes	Yes	No	Yes	No	Yes	No	Yes	No
Sulfadoxime + Pyrimethamine	No	Yes	No	Yes	Yes/No	Yes	No	Yes	No
Artemether	No		No		No		No		No
Arteether	No	Yes	No	Yes	No	Yes	No	Yes	No
Quinine	No	Yes	No	Yes	No	Yes	No	Yes	No

I – Private Pharmacies, II – Government Hospital

effectivetreatment.^{8,9}Due to the widespread resistance to chloroquine and sulphadoxine pyrimethamine (SP), the current recommendation provided by World Health Organization (WHO) states that artemisinin-based combination therapy (ACT) be used treating Plasmodium falciparum infection and Plasmodium vivax infection resistant to chloroquine.¹⁰The government of India, introduced first National Drug Policy on Malaria (NDPM) in the year 1982 and in revised subsequently and current policy is revised in 2010.⁷

The medicines are available in NDPM 2010, are artemether, artesunate, arteether, sulphadoxime and pyrimethamine combination, quinine, primaquine, 6,10

OBJECTIVE

The objectives of the present study are:

- determine the availability of medicines for the treatment of malaria in the Government hospital and community pharmacies in India
- calculate community pharmacy medicine prices and assess their affordability
- calculate Jan-aushadhi (an NGO venture) medicine prices and assess their affordability.

METHODOLOGY

This Prospective, observational study was conducted in Cuddalore, District of Tamilnadu, from August to September 2011. The methodology was adapted from previous studies, after a critical review by all study authors.^{2,4,5}

Survey sites: The district Cuddalore, state of Tamilnadu, a rural district with population of 2600880 and literacy rate 79.04%.¹¹The selection of sample and pharmacies was based as per the WHO manual comprising of indicators for assessing national drug policies.^{2,4} The geographical region i.e. the study site was divided into four units. Out of each unit, a sample of at least 20 pharmacy units is required (in each Zone 5 retail pharmacy and minimum one government hospital included in the study). The Cuddalore district divided into four zones, central Cuddalore, south Chidambaram, west Neyveli, north west Panruti and East side is sea situated. The private pharmacies were selected based on the following criteria: first- the proximity of the

private pharmacy to a public health facility, second the willingness of the pharmacy owner to allow the survey. Initially 10 pharmacies were identified in each zones, then screened to 5 pharmacies which are located in 5 km radius. Out of which 5 selected on the basis of stock maintenance, reputation, accessibility and sales turn over were considered while selecting the community pharmacies (private pharmacies).

Availability: For one calendar month, i.e., 15 August- 15 September 2011, data was collected by studying the availability of anti-malarial medication stock at the study sites i.e. government hospitals and community pharmacies. The medication stock was accounted for thrice during the study, on the 1st day, at the end of 2 weeks and at the end of 4 weeks.²⁵From the National Drug Policy on Malaria (2010)⁷ identify 7 medicines that are used in the treatment of malaria with their dosage forms including artemisinin based combination therapy (ACT). The medicines include in the survey are, cloroquine, primaquine, artesunate, combination of Sulfadoxine and Pyrimethamine, Artemether, Arteether and Quinine.

Affordability and Cost of Medicines: The cost of the medicine was calculated based on the specific condition of the patient and the dosage of the medication proposed by the National Drug Policy on Malaria (2010),⁷Government of India. The prices of the medicines we recategorized as highest price, lowest price and Janaushadhi price. The highest and lowest prices of the brands were taken from CIMS (April-July 2011).⁶ The Jan-aushadhi price was obtained from Jan-aushadhi stores located in New Delhi.¹³ The total prices of medications were calculated for full course of treatment.

The affordability of medicines in the private sector was assessed by comparing the cost of treatment of malaria and the minimum wages earned per day by different categories of workers; as specified by the Labour Ministry, Government of Tamilnadu, Chennai for the year 2011.¹⁴ The number of days a daily wage earns would have to work to procure the cost of treatment of malaria was accessed, lowest, highest and Jan-Aushadhi costs of medications obtained in the survey.

RESULTS

Table 1 indicates the recommended drug of choice to treat malaria, according to the condition of the patients. According to 2010 National Treatment Guidelines for malaria treatment, 5 categories have been proposed and each category requires different treatment. The minimum and maximum prices of the branded and their difference and Jan-Aushadhi prices are summarized in table 1. The total minimum and maximum cost required for treating plasmodium vivax cases using chloroquine and primaquine in 2011 were Rs.48.81 and Rs.65.41 respectively and the price difference was Rs. 16.60 (34%) whereas the Jan-aushadhi store price of the same medications were Rs.4.05. Similarly, wage days were calculated for treating using antimalarial drugs for specific conditions. The Jan-aushadhi price was less compared to branded drugs. The difference between minimum price brand and maximum price brand ranged from 15.5 to 230%. Unfortunately the ACT medications were not available in Jan-aushadhi store nor in Tamil Nadu medical service corporation (TNMSC).

Table 2 represents the affordability of antimalarial agents for different categories of workers in the year 2011 in the state of Tamilnadu. Agriculture workers were divided into 3 categories as per the areas they worked in: area A, area B and area C. Area C covered most of the small cities and villages comes under this category. For treating plasmodium vivax cases of malaria; unskilled, semiskilled, skilled and highly skilled workers required minimum and maximum of 0.32 and 0.43, 0.31 and 0.41, 0.28 and 0.38 and 0.26 and 0.35 wage days respectively in private pharmacies respectively. Similarly, wage days were calculated for treating malaria using ACT medications.

Table 3: contains the detail of shelf-availability of selected antimalarial drugs (recommended by WHO and National Drug Policy on malaria 2010) at primary health care facility. Oral Chloroquine was available in both private and government hospitals. The combination of Sulfadoxime and Pyrimethamine was available in private pharmacies and in Chidambaram medical college pharmacy, but not available in government hospitals/pharmacy. In the private pharmacies only Artesunate tablet 50 mg and Arteether injection were available. The Artemisinin based combination (ACT) therapy was not available in government facilities. The quinine tablets were available in private pharmacies but not available in government hospitals. In Jan-Aushadhi, Chloroquine, Primaquine and Artesunate were available, but Artesunate was not available in general and private pharmacies.

DISCUSSION

The results of this study highlight the need to improve medication availability, reduce prices and increase affordability of medicine for malaria, particularly in the public sector. Although many medicines for malaria as well as other common health problems are theoretically

provided for free or at low cost in the public sector, they are scarcely available in the public institutions, leading to patients purchasing them from private community pharmacies at higher costs. Certain medications like ACT was not available in sufficient quantities even in private community pharmacies as per our study, further emphasizing the non availability of medications in general. Branded medications are more costly than their generic equivalents, but in India many branded medications are not available, as a result of which their generic counterparts are overtly pricey. In our study the price difference comparison was minimum for quinine 15.5% and maximum for Arteether 230%. This huge gap is mainly because of the resistance developed to quinines which constitute the first line of treatment and are less effective versus Arteether which constitutes the second line of treatment and is used for more severe cases of malaria. Generic medications are cheaper compared to brand medications but they are scarcely available in the government and private healthcare institutions. As a result, the same cheap generic medications are sold in the market at a high price and thus are unaffordable for the poor patients who wish to procure them.^{1,16}

In India, more than 68 % (Census 2011)¹⁷ populations live in rural area and they work on farms or perform other menial jobs which pay on a day to day basis. The poor people heavily depend on the government hospitals for procuring healthcare. Rural areas comprising of villages and small towns have primary health centers and community health centers which are run by the state government of each individual state. Our study also posits that the price of antimalarial in the private sector is very high compared to the public sector. Surveys assessing the hospital availability of medications have revealed very poor availability of essential medicines in public sector hospitals.^{11,18} Since public facilities providing free or subsidized care, are inadequate in number and infrastructure, the private health sector provides 81% of outpatient and 45% of inpatient care in India, . Affordability of medicines thus is a major issue. To treat plasmodium vivax cases, unskilled workers spent 0.32-0.43, semiskilled 0.31-0.41, skilled 0.28-0.38 and highly skilled 0.26-0.35 days wage. So the affordability of malaria caused by plasmodium vivax for a unskilled worker was 1.74-3.04 days wage require from minimum price brand to maximum price in private pharmacies similarly for other category of workers. (Table 2)

Economic status of the rural people in India has been identified as major factors influencing health seeking behaviors and utilization of health service.²⁴ the high costs of the medications affect the adherence to the prescription in most of the cases. Incomplete therapy and incomplete duration of treatment were very common amongst the group seeking care from government health facility; failure to buy medicines; delay in starting therapy, conscious omission of doses and premature stopping of the therapy

owing to the non-availability and unaffordable cost of medicines, are consistent with the findings of other studies.^{23,24,25} This explains to some extent, how a disadvantaged population suffers from a “disease poverty trap”. This is the phenomenon where poor availability and affordability of the medicines can lead to bad health outcomes. Cost of the treatment forces the poor in rapid switching of health care providers or seek alternative therapies or quacks providing poor quality and substandard medicines

Finally steps have been taken towards improving the said conditions. Government of India has opened Jan-Aushadhi where all essential medicines are available at affordable price. State governments have opened co-operative stores in their respective states like Kerala (Karunya Pharmacies, run by Kerala Medical Services Corporation Limited), Karnataka (Janatha Bazar by Karnataka Government with State Cooperative Consumer Federation), Andhra Pradesh (Jeevandhara run by Andhra Pradesh Medical Services and Infrastructure Development Corporation (APMSIDC) in collaboration with the Red Cross society) and Tamilnadu (Cooperative Medical Shops, run by Tamilnadu medical service corporation, TNMSC) etc., in these stores medicines are available at very low cost, stored properly according to medicine label instruction and these pharmacies managed by qualified pharmacists. This is a good initiative by government for the poor, so that they can access quality essential medicines at affordable price.

Ways to make medicines more affordable in India include:

1. Availability of unbiased information on the quality and comparative prices of all medicines in the country. Physicians could provide better services and reduce medicine costs if information about medicines prices was readily available.
2. Introduction of pharmacoeconomics in medical, nursing and pharmacy curriculum on basic aspects of pricing of medicines and cost effectiveness are needed.
3. Increasing consumer awareness about medicines, their price and alternatives through media and with the help of local NGOs.
4. Promotion of generics through educating health professionals and implementing of medicine policies and the price of the generics medicines fixed by government.
5. All medication comes under National Essential Drug List (EDL) may be put under price control and offer some incentives to the pharmaceutical companies.
6. The government has to fix the profit margins of manufacturers, wholesalers and retailer.
7. The government can try to offer some incentives to manufacturers, prescribers and dispensers to support cost effective use of medications.
8. Government can reduce taxes and duties on raw materials and price freeze.

CONCLUSION

Access to free antimalarial medicines at the government health facilities and at affordable prices at private pharmacies is essential. The availability of antimalarial medications is poor in public sector and Janaushadhi stores compared with private sectors (community pharmacies) especially the ACT combinations to treat malaria. The high cost of the medicines in India makes treatment less affordable for the poor segments of the population. The Jan Aushadhi prices are not the lowest as per the common beliefs but they are significantly lower than the highest priced branded medication available in the market. The Government may consider accelerating the process of establishing more Jan Aushadhi stores throughout the country for the benefit of the poor. The government can make sure that all essential medicines comes under DPCO, so that the price of the medicines are ultimately reduced and all the generic drugs in market have price fixed by government. Physicians should prescribe generic medications and government should generate awareness among the people about the availability and quality of generic medications. The future implementation of the Drugs Act, will translate the hope of medication price reduction into reality. Social safety nets provided to the vulnerable and underprivileged residing within communities can improve access to essential and quality medications. Modifications in pharmaceutical policy changes at the national and state level are urgently required to improve affordability and hence access to medicines for the people.

Vaccination against malaria might not see the light of the day for many years to come. At the same time drug resistance to anti-malarials is increasing at a steady pace. Hence interventions must be designed to reverse the occurrence of malaria and resurgence of resistance to anti-malarials.

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