Do health care providers adhere to the revised malaria control guidelines?

Sujoy Ray, Suma Nair

International Journal of Collaborative Research on Internal Medicine & Public Health (IJCRIMPH)

Correspondence concerning this article should be addressed to Sujoy Ray; Kasturba Medical College, Manipal, Karnataka-576104, India / Email: sujoyray@rediffmail.com

Do health care providers adhere to the revised malaria control guidelines?

Sujoy Ray (1) [*], Suma Nair (2)

1) Kasturba Medical College, Manipal, Karnataka, India
2) Associate Professor; Department of Community Medicine, Kasturba Medical College, Manipal, Karnataka, India

* Corresponding Author

ABSTRACT

Introduction: Malaria is a public health problem worldwide with India contributing to 77% cases in the South East Asian region of World Health Organization (WHO). Karnataka is one of the project states under World Bank with API>2. Statistics from the district of Udupi, which is the setting for this study, shows a rise in malaria cases from January-May 2009. There were a total of 1189 malaria cases reported of which 103 were positive for *P. falciparum*. The National Programme to control malaria has recently revised its strategies, thus involved personnel need to be aware of it for the programme to be effective.

Objectives: Keeping in mind the emergence of Choloroquine resistant malaria, The National Malaria Control Programme has revised its strategy. This cross-sectional study was conducted to assess the awareness and practice of National Guidelines for malaria among health care providers in Urban Udupi, Karnataka (which is one of the project states under the World Bank for malaria control) and the problems in implementation of these guidelines.

Settings and design: Cross sectional study, Udupi district.

Methods: Data was collected by personal interview (structured questionnaire) after obtaining due consent.

Statistical analysis used: Data was analyzed by SPSS software.

Observations\Results: Most respondents were from both Manipal and Udupi and had been practicing for over 5 years. Chills and headache were used as main guiding symptoms for diagnosis, all insisted on lab diagnosis with QBC being the most preferred test followed by smear. Cases were treated on pure clinical diagnosis in case of typical signs, unresponsiveness to other therapy, unwillingness or non-affordability of tests. Both species of Plasmodium were prevalent, Chloroquine being first line treatment for P. Vivax and Artemisinin compounds for Falciparum. Clinical failure was encountered against Falciparum due to chloroquine resistance and quinine was mainly used to combat it. Medical journals were the most important source of information. Non-availability and increasing costs were the main problems in ACT prescription; notably some physicians had never used ACT. About one-third of the physicians were aware of specific government initiatives for implementation of the revised malaria control guidelines.

Conclusion: Despite the implementation of national guidelines for over two years, it was still to be uniformly followed. Chloroquine resistance was found to be the main cause for clinical failure. Cost and availability of ACT were the main hurdles for its use.
Access to information about new guidelines could be improved by IEC (information education communication) techniques, CMEs or workshops. Studies to address these issues and studies to test the efficacy of these techniques should be undertaken to ensure adherence to the revised malaria control guidelines.

Keywords: Malaria, National guidelines, awareness, Udupi, healthcare provider

Introduction

Malaria is a public health problem worldwide and India contributes to about 77% of cases in the South East Asian Region of WHO[1]. Annually India reports about two million cases and 1000 deaths attributable to malaria[1]. The two species widely responsible for the disease are *Plasmodium falciparum & Plasmodium vivax* with *P. falciparum* malaria causing more than one million deaths each year, mostly in children under five [2].

There are regional variations in the prevalence pattern & transmission of the disease. This variation occurs due to different species of malarial parasites, mosquito vectors, ecological conditions, and socioeconomic factors[3]. The Annual Parasite Incidence (API) an indicator of the disease incidence is reportedly less than 2 in most parts of India. However, the endemic regions with an API greater than 5 are scattered in the states of Rajasthan, Gujarat, Karnataka, Goa, Southern Madhya Pradesh, Chhattisgarh, Jharkhand, Orissa and the northeastern states [4].

Andhra Pradesh and Karnataka are the two endemic states in the south. Karnataka which is one of the project states under the World Bank for malaria control[2] has twelve high risk districts for the disease. Statistics from the district of Udupi, which is the setting for this study, shows a rise in malaria cases from January-May 2009. There were a total of 1189 malaria cases reported of which 103 were positive for *P. falciparum*. The high risk PHCs identified in the district (as per the National Vector Borne Disease Control Programme NVDCP) are Hiriadka, Malpe and Urban Udupi.

The National Programme to control malaria has recently revised its strategies owing to the widespread problem of drug resistance especially to chloroquine which was the mainstay of the control programme. This change is expected to improve diagnosis and treatment especially in the identified high risk regions. However, for a policy to be effective the personnel involved should be well versed with it. This study aims to look into this operational area which is an important determinant as to how the programme would function.

Review of Literature

Plasmodium falciparum malaria causes more than one million deaths each year, mostly in children under five [2]. Chloroquine was the first line of treatment [5]. However, now chloroqine resistance is fast becoming a reality especially in cases of P. falciparum infections.

Chloroquine resistance

In one study [6], efficacy of chloroquine in treatment of uncomplicated *falciparum* malaria was investigated using standard World Health Organization (WHO) procedures in three distinct epidemiological settings. Treatment failure was observed in 15.8% of the cases, probably due to the semi-immune nature of the population.

Clinical trials conducted by TDR (Training and research in tropical Diseases, Geneva), as early as 2003 have proved the efficacy and superiority of Artemisinin combination therapy (ACT) for chloroquine resistant malaria[7].

Following this, all endemic countries have changed their guidelines. However adherence to the guidelines is very important, since without it, changing guidelines would not be of any use. Since India has endemic regions for malaria, a study to assess the adherence to guidelines is very essential.

Adherence to National Guidelines in other malaria endemic regions

A study conducted in Tanzania showed that in spite of the guidelines laid down by the government to change from Choloroquine to Sulphadoxine and Pyremethamine and then subsequently to Artemisinin combination therapy these were not being followed in PHCs and by private practitioners [8].

In one study a survey of the prescription practices of private medical practitioners (PMPs) in four local government areas in Kwara State, Nigeria, was carried out using a self-administered pre-tested questionnaire. The prescription practice of a significant number of PMPs was not in conformity with the National Malaria Treatment policy. There was inadequate knowledge of the classification of malaria; hence, many of the respondents could not recognize severe malaria. Thus regular CMEs and distribution of IEC materials on malaria to private health facilities was strongly recommended [9]. Another Nigerian study showed that chloroquine was mostly used for treating severe malaria from 2000-2006 in children less than 5 years despite recommendation by the National Treatment Policy (2005)[10] to switch over to quinine and parenteral artemisinins.

An indicator-based study in the state of Khartoum, assessed antimalarial drug prescribing and dispensing practices of health care providers at health centers, and compared these with national guidelines for malaria treatment. Prescribers adhered to national treatment guidelines for only 38.6% of patients. Although all were treated for malaria, only 77.6% patients had fever or history of fever and only 64.6% had fever and positive blood films. More than 90% of prescriptions prescribed antimalarial drugs by generic names but dosage forms were correctly written in only 23.5%. There was a high rate of prescribing antimalarial injections. Only half the patients had adequate knowledge of their treatment.[11]

A recent study in Nigeria has special significance as regards ACT therapy. This study was devoted to evaluating the prescribing practices prior to introduction of the artemisinin based combination therapy (ACT) in Nigeria and its potential contribution to emergence of chloroquine resistant malaria in south-west Nigeria, in order to forestall a similar situation with ACT. The results from this study describe a lack of adherence to national guidelines as regards dosage especially in the private sector, and a relationship between prescription practices and dissemination of drug resistant falciparum malaria[12].

A similar problem of ACT resistance can develop in India if appropriate doses are not prescribed. A study in India in 2001 was carried out in Mumbai and Navi Mumbai on private general practitioners (GPs) and their role in the management of malaria at a time when these two neighboring cities were in the midst of the worst malaria epidemic in over 60 years.[13]

Majority of the practitioners adopted diagnostic and treatment practices that were not in accordance with the   WHO or the

national guidelines. Moreover very few practitioners, especially those practicing in low-income areas, relied on a peripheral blood smear test to make a diagnosis.

A study in Kenya[14] examined the quality of care provided to febrile children in rural private clinics. It was found that 74% of childhood fevers were diagnosed as malaria, and 88% of all prescriptions contained an antimalarial drug. Blood slides for malaria parasites were performed in only 60% of the children. Of those with a positive blood slide 52% and 48% were treated with a nationally recommended first or second line antimalarial drug, respectively.

Barriers to using ACT

A study in Kenya[15] found insufficient supply of the drug, fears of stock outs and concern about drug cost being main reasons to impede the prescription of ACT by health workers. Training messages that contradicted the recommended guidelines also led to health worker non-adherence, compounded by a lack of follow-up supervision. In addition, the availability of non-recommended antimalarials such as amodiaquine caused prescription confusion. Some health workers maintained that shortage of staff had resulted in increased patient case load affecting the delivery of the desirable quality of care and adherence to guidelines. This scenario is most likely to be true for malaria endemic areas on Karnataka, India as well.

OBJECTIVES

To study among health care providers:

1. Awareness regarding the revised national malaria control guidelines with respect to:

   a.   Diagnostic criteria

   b.   Treatment regimens

2. The extent of adherence to the guidelines

3. Any barriers to implementation of the revised guidelines

Materials & Methods

Materials

Study Design: This was a cross-sectional study

Study Population: consisted of health care providers in the public and private sectors. These were identified as the target population since the bulk of the malaria cases are managed by them.

Inclusion Criteria:

a. Registered Private Practitioners

b. Specialists (Internal Medicine & Pediatrics) from private & government hospitals.

c. Should have been in practice for a minimum of one year following their graduation or post graduation.

Exclusion Criteria:

Post graduates and interns working in the above mentioned departments.

The **Study Area** was Urban Udupi, identified to be one of the high risk regions by the National Vector Borne Disease Control Programme (NVBDCP). This comes under the jurisdiction of Udupi Taluk and Includes Udupi town as well as the nearby university town of Manipal.

The **Study period** was a total of 2 months (July-August) from the time of conception to completion of the report.

Methods

Sample size & Sampling Method: The study as mentioned earlier included all such medical personnel whether private or institutional who would be the first line of approach for an individual with fever or common malaria symptoms at any age. This included 17 private practitioners from Udupi town and Manipal (as specified by the register of medical practitioners) and a total of 50 Internal Medicine and Pediatric specialists from the two secondary care centers at Udupi and the tertiary care centre at Manipal. . The number of patients with fever seen by the health care providers varied between ten to fifty per day depending upon the season and whether they were in private or institutional practice. In addition most of the fever cases which did not respond to medications on an OPD basis or needed admission due to other reasons were seen as indoor patients by the institutional practitioners Thus in all, the health care providers who would deal with cases of suspected malaria in this endemic region were all comprehensively covered in this study

Data Collection Methodology

Data was collected using a structured proforma (Annexure I). The investigator

personally interviewed the participants after explaining the objectives of the study and obtaining due consent.

Statistical methodology: The data so collected was entered and analyzed using SPSS (Statistical Package for Social Sciences) version 11.5. Results were expressed in terms of proportions and percentages were used wherever applicable.

Ethical Considerations: Ethical approval was obtained from the Institutional Ethics Committee and the relevant form is attached.

Observations and Results

Majority (73%) of the health care providers were from Manipal and involved in institutional practice. Most of the practitioners (58.2%) had been practicing for over 5 years.77.6% of the physicians kept malaria as a differential diagnosis in mind on encountering the symptom of fever(Fig 1).Chills with fever was considered a prominent symptom and almost 60% relied on it to make a presumptive diagnosis of malaria. Headache as a guiding symptom was endorsed by 21% of the practitioners (Fig. 2).

QBC was the preferred diagnostic tool with 83% opting for this modality. Another 70% also opted for the **smear** but usually as a compliment to QBC. Only 7% of the participants relied on **RDT** and almost all of them were private practitioners (Fig 3).

47.8% practitioners had treated a case purely on clinical diagnosis without confirmatory investigations (Fig 4). The reasons for doing so were cited as:

"Patient with classical signs and symptoms but not willing for investigation,

Patients living in interior areas who could not go for tests

Patients who could not do tests due to monetary reasons

Patients having travelled to or coming from endemic areas"

Both species of plasmodium were prevalent in this area as 49% of the respondents came across both in their practice and 35% encountered mixed infections routinely (Fig5). Chloroquine was still the first line of management in vivax with 94% of health care providers vouching for its use (Fig 6). When dealing with falciparum malaria chloroquine was still resorted to by 24%, although majority (45%) preferred the Artemesinin compounds in combination and 6% preferred quinine. However as many as 25% used Artemesinin alone (Fig 7).

82.1% of the physicians believed the guidelines to be rational, giving reasons as patient responding to treatment(especially with ACT), the guidelines being according to the" Books" or the guidelines matching with preferred line of treatment.11.9% preferred to follow other guidelines namely the WHO or the American society guidelines.6% physicians said that the national guidelines were not rational because they felt that they were not effective and that regimen for P. Falciparum should include Artemether compound.(Fig 8)

32.8% physicians were aware of specific initiatives from the government to spread

awareness about national guidelines specifying them as

"Distribution of pamphlets

Issuing of gazettes

Conducting CMEs by malaria research personnel and malaria control officers" 29.9%physicians said that there were no initiatives from the government to spread awareness about national guidelines.

37.3% physicians were not aware of any government initiatives (Fig 9).

Out of the various sources of information for malaria treatment guidelines, medical journals were the most popular (65.5%), followed by trainings/CME (53.7%), and MOHFW bulletins (22.3%). Media and medical representatives were important sources for 13.4%and 8.9% of the physicians respectively. Many physicians used more than one source of information (Fig10).

71.6% physicians had faced no barriers to ACT usage, 14.9% had faced problems but 13.4% of them had never even used them (Fig11).

Out of the physicians who faced barriers to prescribing ACT, 80% said that they were too expensive, 20% cited non-availability as a barrier and 10% physician believed that other drugs(like quinine) were more effective (Fig 12).

Clinical failure was seen by 49.3% of the physicians in their practice.(Fig13) Out of the physicians who saw clinical failure as many as54.5% physicians encountered clinical failure only against Falciparum,21.2% saw it only against Vivax,whereas 24.3% physicians encountered clinical failures against both

Vivax and Falciparum.(Fig14)***Resistance to chloroquine was seen in all cases of clinical failures***.

Out of the physicians who had seen chloroquine resistant Falciparum and chloroquine resistant mixed infections, response was seen to Artemisininin in 62.4% cases, to ACT in 27.7% and to other drugs, (sulfadoxine-pyrimethamine) in 5.5% of cases.

4.4% of such patients had expired in the hospital, so the drugs were not mentioned. (Fig 15)

Out of the physicians who saw chloroquine resistant Vivax, response was seen to Artemisinin in71.4% of cases to Quinine in14.3% cases and to others (sulfadoxine-pyrimethamine) in 14.3% cases (Fig 16).

Discussion

As per the survey, following facts have come to light as regards clinical features, diagnostic tools, treatment regimes, awareness and adherence to National Guidelines for malaria control among health care providers in this area.

Clinical Features

The frequency of physicians suspecting malaria in fever is 77.6% which is in accordance with the national guidelines which instruct to suspect fever as a presenting symptom of malaria in endemic areas though there are some physicians (22.4%) who still do not do so. As for other symptoms, 64% of the physicians cited chills as a guiding symptom. 21%also used headache as a

symptom.19% of the physicians relied on more than 3 symptoms. Among them were vomiting, sweating, myalgia, bleeding manifestation and loose stools.

Vomiting, myalgia, chills and headache have been included as symptoms in the guidelines, but the guidelines do not mention bleeding manifestations, loose stools and sweating (Loose stools have been cited as a reason to suspect other causes except malaria). Though a small percentage of physicians use these symptoms as a reason for suspecting malaria it is still worth mentioning

Investigations

As regards diagnostic tools, all physicians unanimously stated that they insisted on a lab diagnosis, which is in accordance with the guidelines. According to the national guidelines, smear is the gold standard for malaria detection owing to its high sensitivity, ability to quantify the parasite load and distinguish between the different species, yet about 30% of the physicians in this study do not use it as their preferred modality of diagnosis of malaria.

In a study conducted in Mumbai[13(p754)] it was found that hardly any practitioners used smear as a diagnosis, however, the statistics here are much better as regards usage of smear is concerned.

In a related study in Kenya [14(p755)], it was found that although many of the cases were diagnosed as malaria on the basis of clinical features only 60% underwent slide examination. Kenya has 25 million people at risk for malaria and malaria accounts for 30-50% of all outpatient attendance. The reason for discussing this study would be that as the situation there is similar to India, the approach

to malaria would also be significantly similar. In both cases, malaria was an important differential diagnosis, slide examination was done quite often but not in all cases. So this problem of not using smear in all cases of suspected malaria is prevalent in other endemic countries too. The reason for this needs to be explored although this may be due to the fact that this test requires adequate lab facilities and the results come out late.

RDT kits (supplied by the NVBDCP for rapid diagnosis) are being used by only 7.5% of the physicians in the study area. The national guidelines recommend it but also state that it is important to read the manual properly, follow instructions meticulously, and take care of transport. Also these RDT kits are temperature sensitive and expensive. However the advantage of the RDT test kits are that they are simple to use and give the result almost immediately which is a distinct advantage in areas which are far from adequate laboratory facilities. RDTs are been supplied by NVBDCP for use in remote areas which were not covered in this study .This study was limited to urban areas where laboratory facilities are readily available so RDT use may not be necessary. Another argument that can be given in favor of non use of RDT s is that in endemic areas, as this area under study, these kits may be unnecessarily cumbersome

As regards QBC, this diagnostic modality was being used by as much as 83.6% physicians in the study area. This diagnostic modality is not recommended by the guidelines as it is more expensive and is not very specific. The reason why such a large number of physicians are still using QBC needs to be explored .The probable explanation could be that it is easier to do and results are available sooner as compared to Smear

47.8% physicians in this study had treated patients on a purely clinical basis without

investigations, citing reasons such as patient not willing for or able to afford investigation, during epidemics, patients living in interior and not able to come again, typical signs and symptoms, a group of patients from the same area with similar symptoms and patients travelling to and from endemic areas.

Though the guidelines state that all clinically suspected cases of malaria should be investigated immediately by microscopy and /or RDT they also state that in the scenario of unavailability of conclusive test results, 'Clinical malaria' cases should be treated with chloroquine in full therapeutic dose. However, there is a need to address the problem of affordability of tests and further reasons for unwillingness to do the test on the part of patients should be found out.

Recent guidelines released by WHO (2010) say that the move should be towards universal diagnostic testing of malaria and this would be a critical step forward in the fight against malaria as it will allow for the targeted use of ACTs. This will help to reduce the emergence and spread of drug resistance. It will also help identify patients who do not have malaria, so that alternative diagnoses can be made and appropriate treatment provided.

Both species of plasmodium seem to be prevalent since 49% of the respondents came across both in their practice. Of these nearly 35% encountered mixed infections routinely.

Treatment

In this study it came to light that the first line of treatment for Vivax is Chloroquine for 94% and in the correct dose as per the national guidelines. However, some physicians also preferred ACT, Artemisinin and quinine as first line drugs along with chloroquine. A

minority of the physicians did not use Chloroquine against vivax at all. . They either used artemisinin alone or ACT. This either indicates a lack of awareness or adherence to the guidelines

Another reason for this finding could be resistance of vivax to chloroquine. This may not be an isolated situation. A study as early as 1996 has also pointed towards chloroquine resistant vivax in India[16]

The use of Artemesenin alone for vivax as was seen in a minority of physicians is alarming as both National guideline and the WHO guidelines have warned against it for fear of developing resistance to this new group of drugs.

First line treatment for Falciparum was ACT for 45% of the physicians only, whereas a substantial percentage of physicians 24% are still using Chloroquine as a first line treatment for Falciparum. Dakshina Kannada has been identified for the use of ACT combination because it is an area of chloroquine resistance as per the National guidelines. There may also be problems in ACT usage which have been discussed later.

Here again as in vivax Artemisinin alone is being used by 25% of physicians for falciparum which is clearly prohibited by the guidelines for fear of resistance development, thus it is a matter of concern. A small number of physicians namely 6% are using quinine as the first line against falciparum

Clinical Failure

All universally agreed that clinical failure was due to resistance to chloroquine

Physicians have seen clinical failure against Vivax, even though choroquine is the main

drug and being used in the correct dosage, which is in accordance with the national guidelines. This indicates Chloroquine resistance. Vivax.

Resistance of Falciparum to chloroquine was also seen by majority of the physicians, which is to be expected as per the national guidelines. Though the most popular drug to be used in case of clinical failure was ACT, the response has been maximum to Artemisinin. However, such prescription of Artemisinin, though appearing to be effective now, can lead to resistance in the long run, (the National guidelines prohibit the use of Artemisinin alone for this reason).

Awareness and Rationality As Regards Guidelines

82.1% (55) of the physicians felt that the guidelines were rational, whereas 11.9 % (8) were not aware of the guidelines and 6% (4) said the guidelines were not rational

Specifications provided by those who felt that guidelines were rational were that:

The patient responds to the treatment given in the guidelines, they are book based, and they match with their preferred line of treatment. They also felt that empirically treating on basis of diagnosis in endemic areas is rational, as told by the guidelines. Most importantly, ACT especially has been found to be very effective as defined by the guidelines.

Superiority of ACT has also been proved before[6(p753)], so the patients' response to treatment and ACT's effectiveness is expected.

Out of the physicians who were not aware of the national guidelines, some said that they

check the International guidelines (American Society etc.), or followed the WHO guidelines

The WHO has recommended that artemisinin alone therapy should be removed and ACT should be used instead which is similar to what has been said in the National Guidelines, therefore, following WHO guidelines would also be beneficial to the patients and these physicians will also be in accordance with the national guidelines.

Also, another opinion expressed was that the guidelines are rational but the new drugs (ACT) are not supplied and that Falciparum treatment should include Artemether compound. Also, the problem of drugs not reaching some of the healthcare centers was powerfully emphasized by the physicians so this needs to be addressed.

6 % physicians said that the guidelines were not rational because they felt that treating as per the guidelines was not effective. This may have been due to wrong prescriptions or doses. Such physicians need to be convinced as regards the rationality of the National Guidelines which are very similar to the WHO guidelines and have been drafted after long deliberation. Repeated CMEs by Malaria researchers emphasizing their research findings on which guidelines are based may go a long way in convincing such physicians

As regards initiative from Government, only 32.8% physicians said they had received intimation as per the new guidelines, and only 6 could provide specifications as to the nature of the guidelines. . Thus, 68% did not receive any intimation from the Government, so the Government must make efforts to spread awareness about national guidelines.

Some private practitioners in Udupi also said that they had no access, or used to receive pamphlets from government, but had not got them since last 4-5 yrs. Thus the government

should make more efforts to make sure the information about guidelines reaches out to the physicians and check why pamphlets etc. which were given have stopped now. Some physicians did not attend workshops held by malaria control officers, the reasons for that should be explored, they must be encouraged to attend workshops and the problem of drug resistance in this region and the reasons for the recommendations in the guidelines should be told to them.

Source of Information

Most of the physicians used medical journals (65.6%) as their source of their information. So, access to journals should be improved which is an initiative that can be taken up by neighboring medical colleges/institutes. Many also used trainings/CME (53.7%). Training programmes and CMEs should be conducted more often in the area. A study [9(p 754)] in Nigeria also made the same recommendations when it was found that prescription practice of private medical practitioners was not in line with the treatment policy.

Barriers to Prescribing Act

Although most physicians were comfortable with ACT .Some physicians had faced barriers in prescribing them. Surprisingly, 9 had never used them. Increased cost, non-availability, and more effectiveness of other drugs were cited as reasons.

This research would be more fruitful if it involved respective authorities, which include not just the practitioners but also others such as policy makers, pharmaceutical officers and others involved in healthcare related to malaria. It would further reflect on the

problem(s) faced by these people in implementing the national guidelines (manufacturing, giving out and distributing the drugs etc.). Already, reference has been made to the fact that some physicians have voiced concern about ACT not being supplied/available at the centers. This may in turn be due to problem in distribution of drugs or enough of them may not have been manufactured. Many physicians were not aware of new initiatives from the government's sides to spread awareness about the new guidelines. Malaria control programme officers/managers and other people responsible for spreading awareness/conducting workshops etc. for physicians may need to be interviewed so as to encourage them to conduct such workshops/ give out pamphlets etc. more frequently. In a similar study[8(p754)] national-level policy-makers, malaria control programme managers, pharmaceutical officers, general medical practitioners, medical research library and publications officers, university academicians, heads of medical research institutions and district and regional medical officers were involved to see the challenges faced in convincing them on the need for change. Even if researches prove that certain drugs are effective/not effective, they will be of no use unless we know the problems faced in implementation of the new recommendations. The increased cost that had been cited as a major barrier to prescribing ACT, may also be linked to problems in manufacturing, distribution etc.

Increased effectiveness of other drugs was cited by a small minority.

Another study highlighting the barriers to ACT prescription in Kenya [15(p 755)] states that insufficient supply was a major concern (similar to the view expressed by some of the physicians here). This study also emphasizes on decreased staff that resulted in increased patient workload is causing non- adherence to

guidelines. Although there is no such problem mentioned by the physicians here, given the high amount of patients here owing to the prevalence of malaria in this region, it might be worth investigating. In the Kenyan study, training messages contradicting the correct guidelines had been passed out, however, here such contradictory messages had not been passed out to practitioners. There was also a lack of supervision in the Kenyan study which is found to be lacking in this case as well.

Spreading awareness about ACT/the new regimen becomes even more important in the light of fact that 9 physicians have never even used it which means they are clearly not aware of the recommendations that the area is now chloroquine-resistant.

Conclusion

Many physicians kept malaria as a differential diagnosis considering chills as the main guiding symptom. Everyone insists on a lab diagnosis, treating on clinical basis only in cases of non-responsiveness, endemic area travel, typical symptoms, non-affordability or non-willingness of patient. Smear though recommended by the guidelines as "gold standard" is not used by all physicians, this needs to be explored. QBC is the most preferred investigation. RDT used very rarely. Both Vivax and Falciparum are seen almost equally. Mixed infections were seen in a substantial number of cases. The main treatment for Vivax is chloroquine and that for Falciparum is ACT. However, chloroquine and Artemisinin alone also were used in substantial no. of cases for Falciparum, which is against the national guidelines and should be investigated. National guidelines are thought to be rational but access/ awareness lacks in substantial number of physicians, thus it should be improved by pamphlets,

workshops by officers and Government representatives. Studies to check efficacy of the methods used to dispatch information should be conducted. Some physicians have never used ACT citing increased expense, unavailability and more effectiveness of other drugs. About half the physicians came across clinical failure using chloroquine and it was seen mostly in case of Falciparum which responded to Artemisinin and ACT but also seen in some cases of Vivax which responded to Artemisinin. The sample size for this study should be increased as it is small and practitioners in more rural/remote areas (who see considerable malaria cases) have not been included. Their awareness about national guidelines may be low and they might not be getting access to the drugs this problem has already been seen in the practitioners in this study. Survey should also be carried out among the drug manufacturers, policy makers, pharmaceutical officers etc. to learn about the problems they face in the implementation of the new guidelines and they should be made aware of the need to change to new drugs and encouraged to manufacture and distribute them effectively.

Conflict of Interest: None declared.

References

1.Kumar A, Valecha N, Jain T, Dash PA. "Burden of Malaria in India: Retrospective and Prospective View" *Am. J. Trop. Med. Hyg.* 2007; 77(suppl 6):69-78

2.World Health Organization. World Malaria Report 2008. Available at: http://apps.who.int/malaria/wmr2008/malariaAccessed Feb 2009.

3. World Health Organization, World malaria report: 2005. Available at http://apps.who.int/malaria/wmr2005/malaria : Accessed Feb 2009

4.Tyagi P, Roy A, Malhotra M S. Knowledge, awareness and practices towards malaria in communities of rural, semi-rural and bordering areas of east Delhi India. *J Vect Borne Dis.* 2005; 42: 30–35

5. Sharma VP.Battling the malaria iceberg with chloroquine in India. *Malar J* 2007 ;6:105

6. Valecha N , Joshi H, Mallick PK, . Sharma SK, . Kumar A, . Tyagi KP, Low efficacy of chloroquine: Time to switch over to artemisinin-based combination therapy for falciparum malaria in India. *Acta Trop* 2009 :111(1) 21-28

7. Taylor WR, Rigal J, Olliaro PL .Drug resistant falciparum malaria and the use of artesunate based combinations: focus on clinical trials sponsored by TDR. *J. Vect Borne Dis*.2003 40:65-67

8. Mubayazi GM , Gonzalez- Block MA . Research influence on antimalarial drug policy change in Tanzania:a study of replacing chloroquine with sulfadoxine-pyrimethamine as the first-line drug. *Malar J. 2005:4* : 51-53

9. Ologe OM, Mokuolu OA, Adedoyin OT. Pattern of antimalarial prescriptions for children and pregnant mothers by private medical practitioners in Ilorin, Nigeria. *Trop Doct* 2007 ; 37(4):212-4.

10. Ukwe CV, EkwunifeOI, Drug utilization study of antimalarials for the treatment of hospitalized children under five in south-eastern Nigeria.*Pharmacoepidemiol Drug Saf* 2008;17:1183-88

11. Mannan A, ,AliK M .Antimalarial prescribing and dispensing practices in health

centers of Khartoum state.. *East Mediterr Health J* 2009 ;15(1):122-8

12..Gbotosho GO, Happi CT, Ganiyu A, Ogundahunsi OA, Sowunmi A,Oduola AM.Potential contribution of prescription practices to the emergence and spread of chloroquine resistance in south-west Nigeria: caution in the use of artemisinin combination therapy. *Malar J2009;8* :313

13 . Kamat.VR Private practitioners and their role in the resurgence of malaria in Mumbai (Bombay) and Navi Mumbai (New Bombay), India: serving the affected or aiding an epidemic? *Soc Sci Med* 2001; 52: 885-909

14. Abuya T O, Molynuex C S, Orago, A.S., Were S, Marsh V Quality of care provided to febrile children presenting in rural private clinics on the Kenyan coast:*Afr Health Sci*, 2004 4(3): 160-70

15. Wasunna B, Zurovac D, Goodman C A, and Snow R W Why don't health workers prescribe ACTS? A qualitative study of factors affecting the prescription of artemether-lumefantrine, *Malar J*. 2008; 7: 29.

16. Dua V K, Kar P. K.,Sharma V P. Chloroquine resistant Plasmodium vivax malaria in India, *Trop Med Int Health*. 1996; 1(6): 816-9.

Table 1: Demographic characteristics
N= 67

Characteristic	N(number)	percentage
Type of practice		
Private	16	23.9
Institutional	51	76.1
Area of practice		
Udupi	18	26.9
Manipal	49	73.1
Years of experience		
<5	28	41.8
5-10	18	26.9
>10	21	31.3
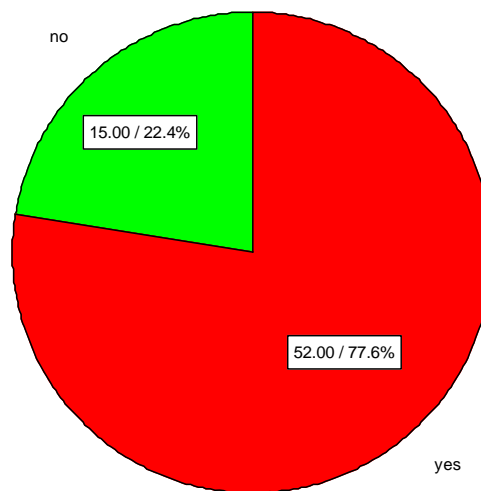
Figure 1: Suspicion of Malaria in those with fever
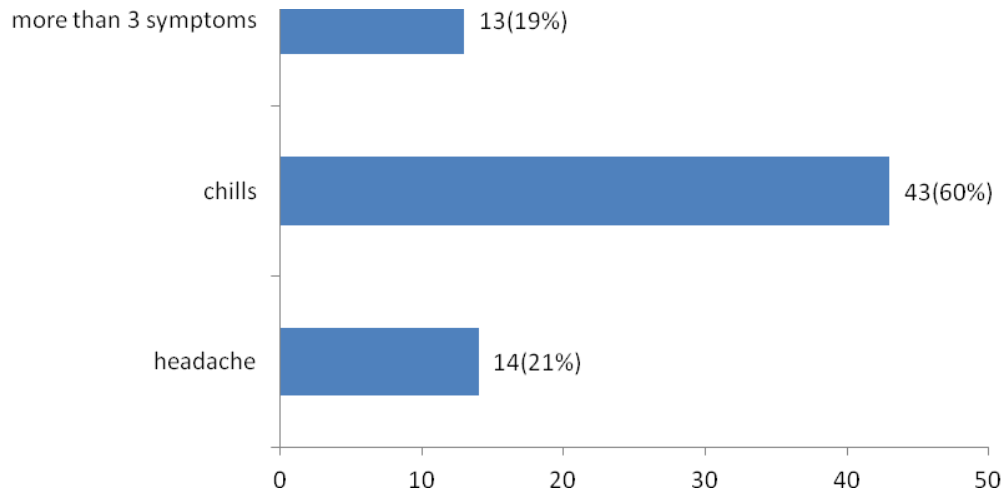
Figure 2: Additional Symptoms guiding to a presumptive diagnosis
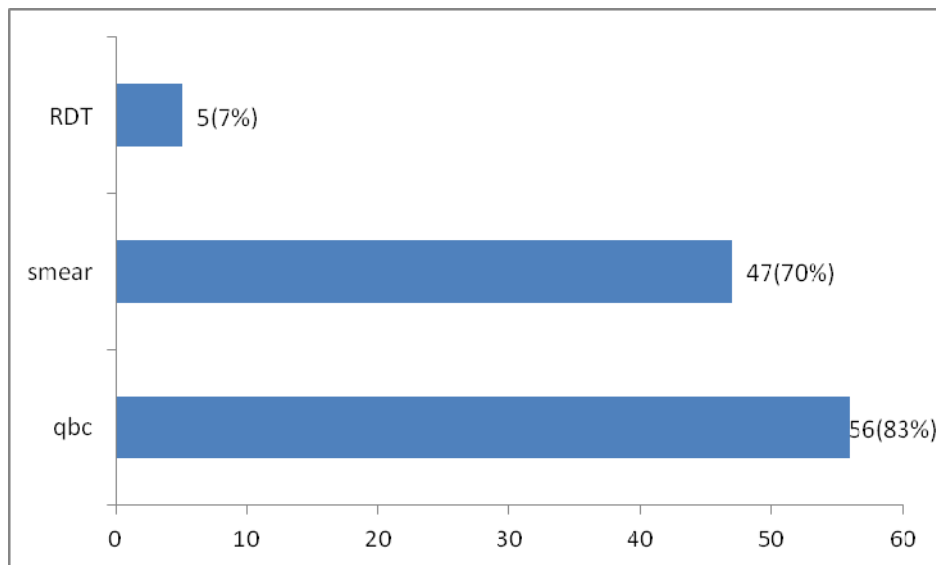
Figure 3: Preferred diagnostic technique
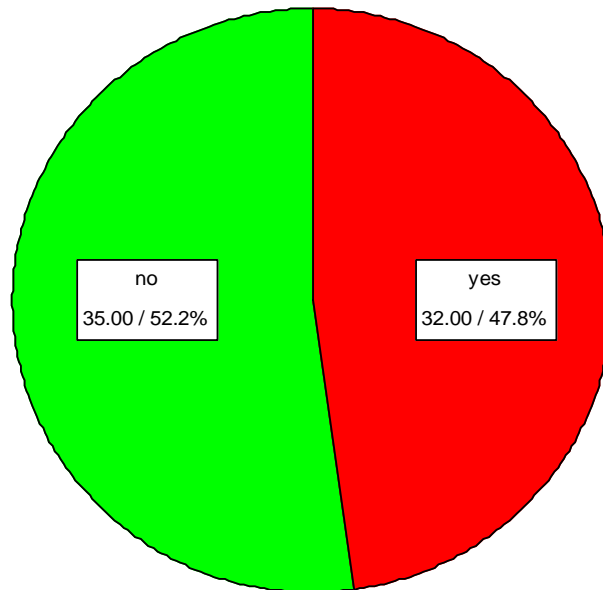
Figure 4: Treatment based on purely clinical diagnosis
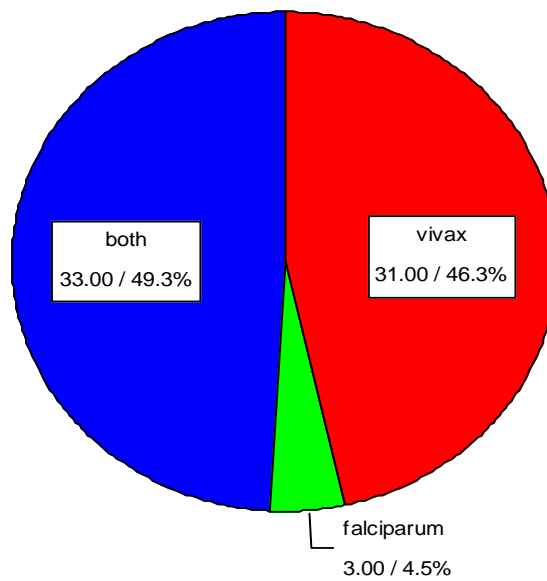
Figure 5: Species seen commonly in practice
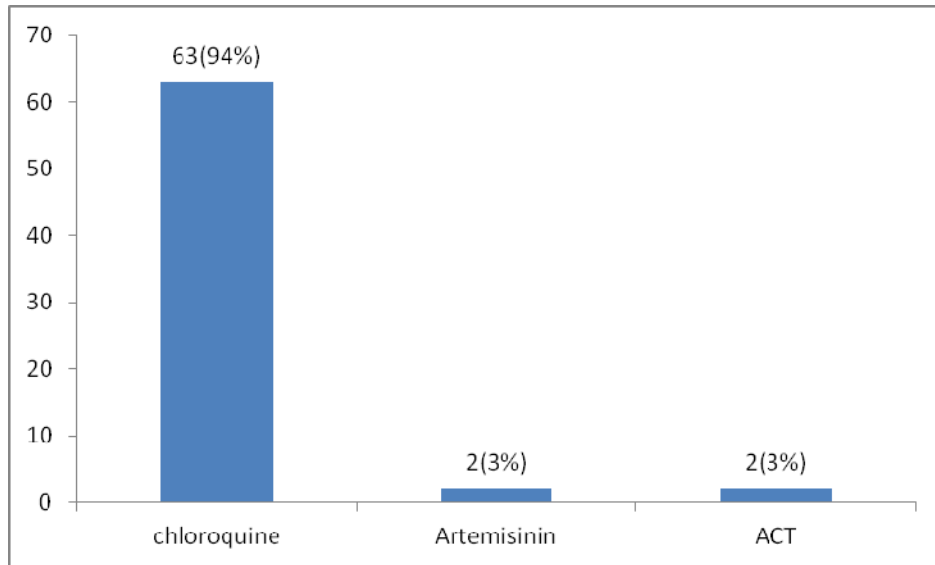
Figure 6: First line treatment for P.vivax
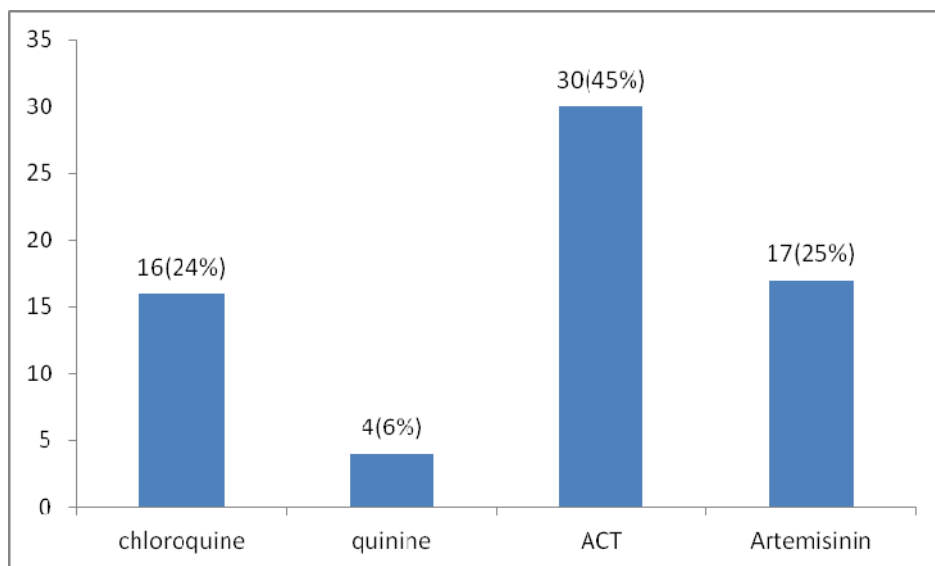
Figure 7: First line treatment for P.falciparum
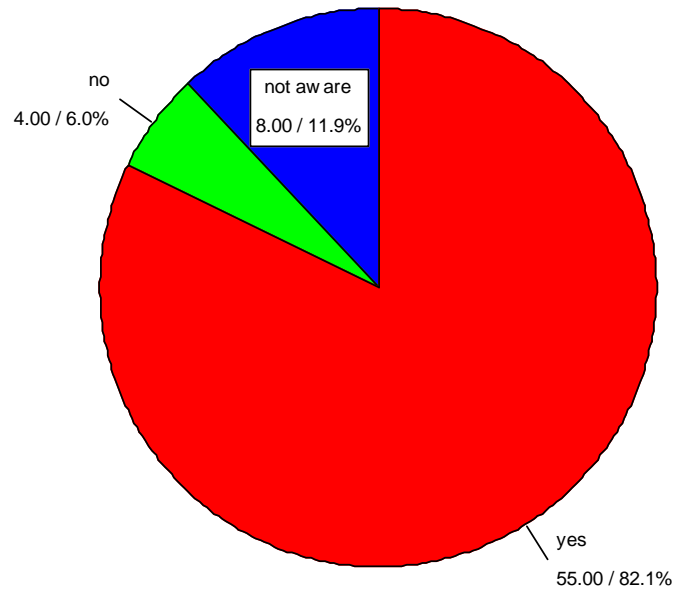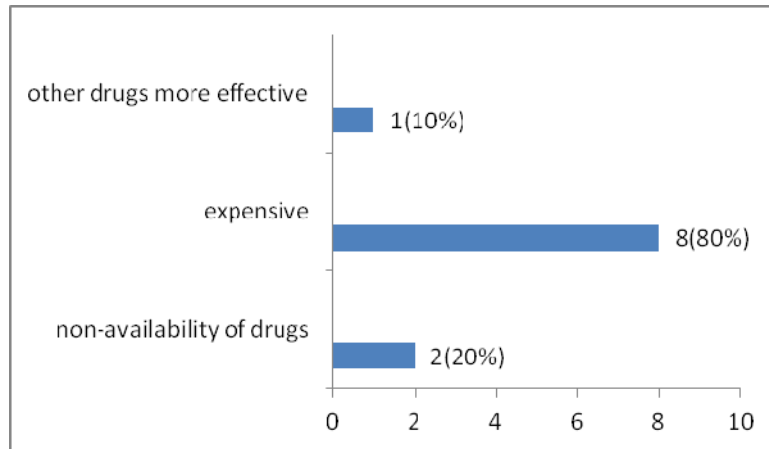
Figure 8: Whether national guidelines rational or not
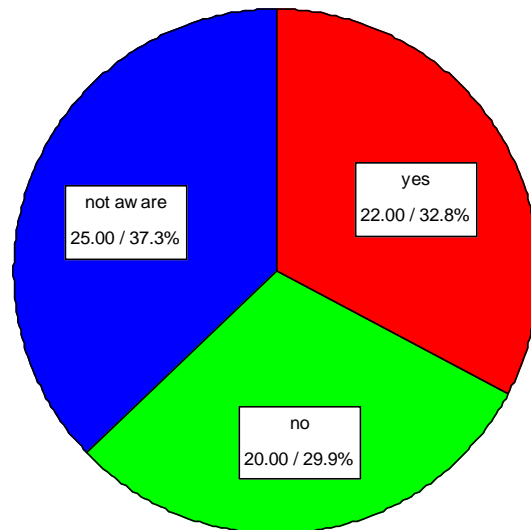
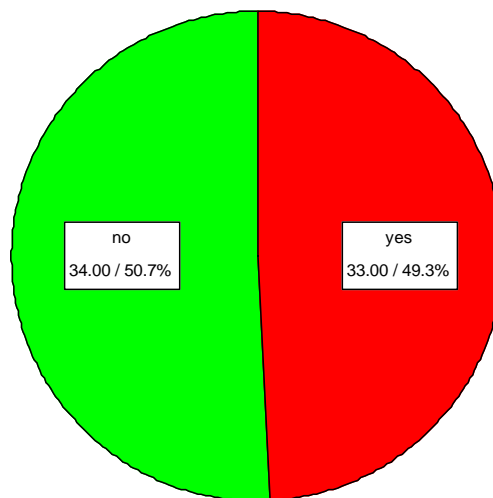**Figure 9: Initiative from the government to spread awareness**
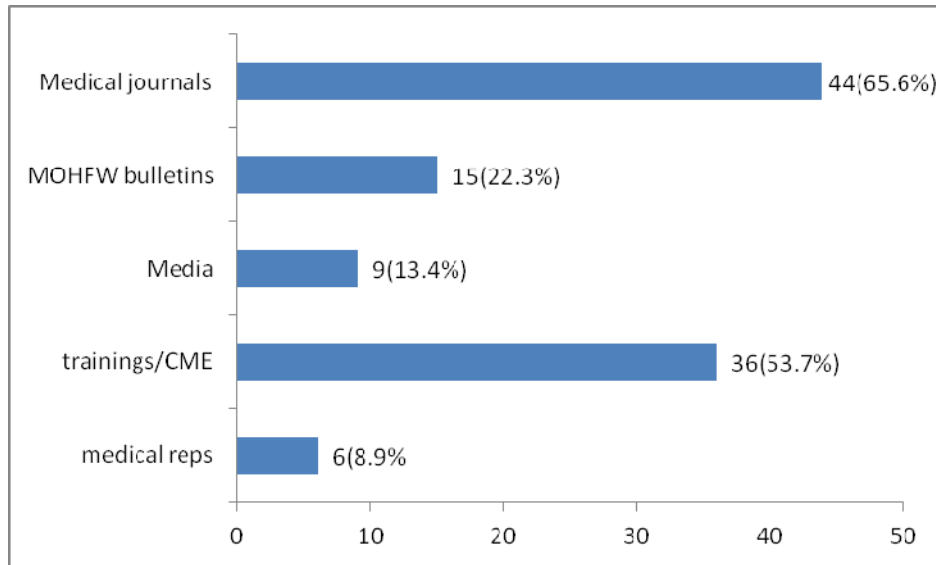
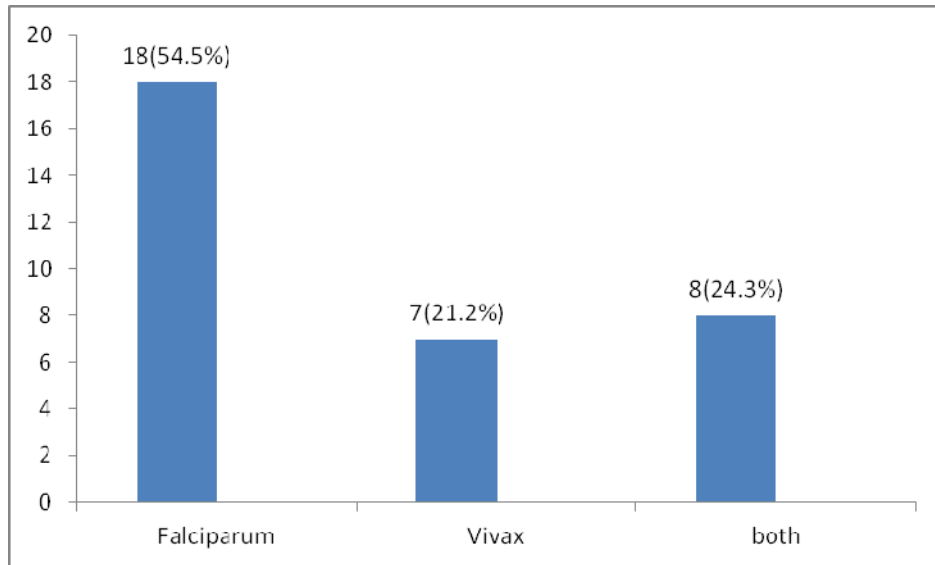**Figure 10: Source of information regarding new guidelines**
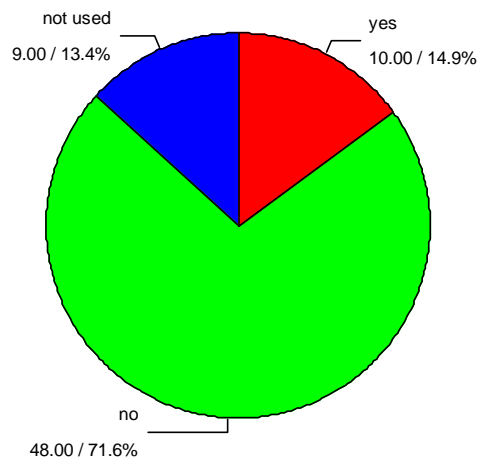
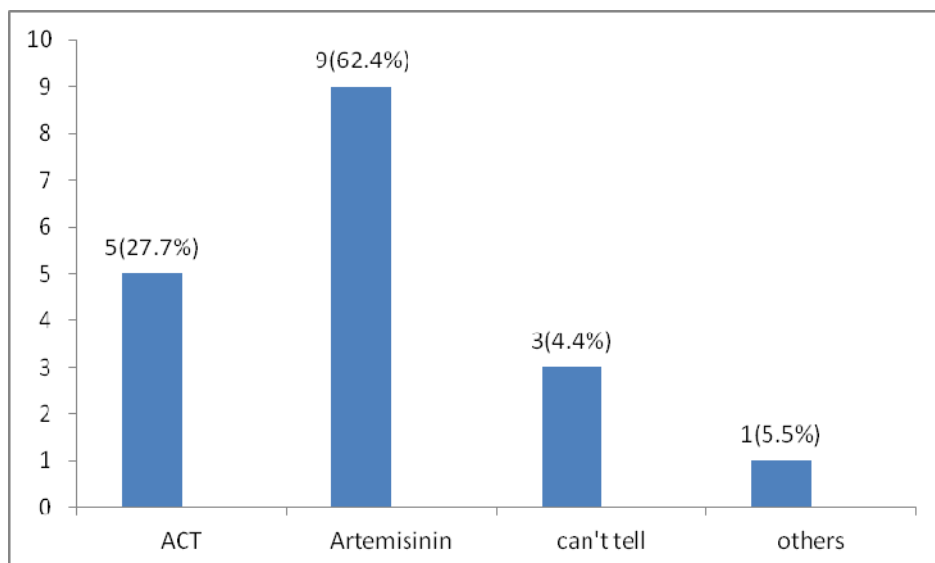**Figure 11: Whether barriers to prescribing ACT seen**

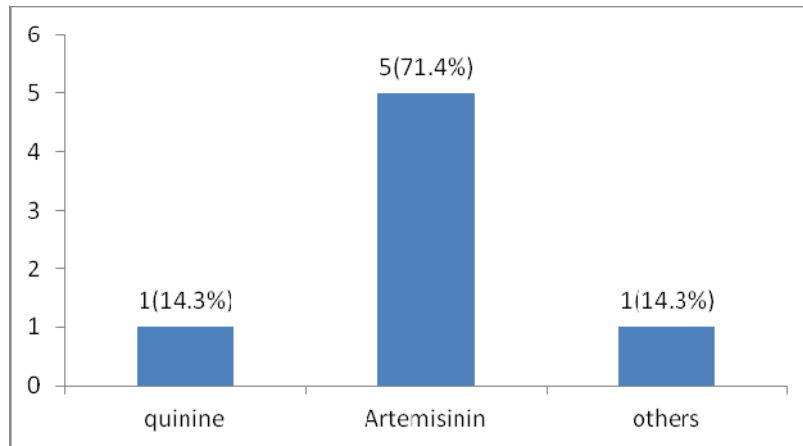**Figure 12: Types of barriers to prescribing ACT**

Figure 13: Whether clinical failure seen

Figure 14: Species against which clinical failure were seen

Figure 15: Response of chloroquine resistant Falciparum to drugs

Figure 16: Response of chloroquine resistant Vivax to drugs

APPENDIX

Questionnaire

Sl.No: _____

Designation of Health Care Provider: _____

Type of Practice: _____

Area of Practice: _____

Phone: _____Years of Experience: _____

Current practice in Malaria Management

1. Do you suspect malaria in all cases of fever?

   Yes: [   ]   No [   ]

   If yes, specify the symptoms that guide you in making a presumptive diagnosis:

   _____

2. Do you insist on a laboratory diagnosis?

   Yes [   ]   [   ]

   If yes, specify the type of laboratory test / tests

   _____
   —

   _____
   ___

3. Have you ever treated a case purely on clinical diagnosis?

Yes: ☐   N☐

If yes, details: _____

4. Which species is commonly seen in your practice?

P. vivax: ☐   P.falci☐ :   ☐ ers:

Any specific comments:_____

5.What is the first line treatment followed by you in your practice for P. vivax?

Name of the drug: Dosage & Route:

Choloroquine: ☐
_____

Quinine: ☐   _____

ACT: ☐
_____

Artemisinin alone derivativ☐   _____

Others (Specify):
_____

6.What is the first line treatment followed by you in your practice for P. falciparum?

Name of the drug: Dosage & Route

Choloroquine: ☐
_____

Quinine: ☐   _____

ACT: ☐

_____

Artemisinin alone derivative ☐   _____

Others (Specify):

_____

7.What is the second line treatment followed in case of clinical failure?

Name of the drug: Dosage & Route

Choloroquine: ☐

_____

Quinine: ☐

_____

ACT: ☐

_____

Artemisinin alone derivatives ☐   _____

Others (Specify):

_____

8. Any specific reason for using this drug regimen?

Is according to national guidelines:
_____

Is found to be effective in my practice:
_____

Is Cost Effective:
_____

Is a safe drug:
_____

Other reasons if any:
_____

Awareness regarding national guidelines:

9. Do you think the current national guidelines for malaria treatment is rational?

Yes: ☐   ☐   Not aware of the guidelines: ☐

Please specify: _____

10. Was there any specific initiative from the government to spread the awareness regarding
the revised national guidelines?

Yes: ☐   ☐:   ☐ aware:

If yes, specify the initiative:
_____

11. What is your source of information regarding new treatment regimens / guidelines?

Medical Reps: _____

Trainings / CME: _____

Media: _____

MOHFW bulletins: _____

Medical Journals: _____

Barriers to prescribing the new treatment regimen (ACT)

12. Do you find any constraints in prescribing ACT to your patients?

Yes: ☐   No: ☐

If yes, specify the reasons:

Non Availability of the drugs:
_____

Expensive:
_____

Other drugs more effective:
_____

Other drugs less expensive:
_____

Any other reason:
_____

13. Have you come across clinical failure in your practice?

Yes: ☐   ☐

If Yes, how frequent
_____

Which species?
_____

Which drug is it most resistant to?
_____

Which drug does it respond to?
_____

Informed consent form

Consent to participate in an epidemiological study project title: Awareness and practice of the National guidelines for malaria control among healthcare providers in urban Udupi, Karnataka: A cross-sectional study

Serial number of research subject:
Age of research subject:

I have read the subject information sheet and its contents were explained. I had opportunity to ask questions and got satisfactory answers. I understand that my participation in this study is voluntary and I have the right to withdraw at any time without giving any reason and without my legal rights being affected. I agree to take part in the above study and confirm that I have received a copy of the subject information sheet along with this signed and dated informed consent form.

Signature of the research subject:

Date:

Statement of the person explaining the consent: I have satisfactorily explained the subject the nature and purpose of the study. The subject signing this form has been given enough time and place to read and review this form. There has been an opportunity to ask questions and receive answers regarding participation in the study. I confirm that the subject has, as a token of his/her consent given his/her signature in my presence. I vow to keep the identity of the subject an absolute secret.

Signature of the person explaining the consent:
Name of the person explaining the consent:
Date:

Study Population: consisted of health care providers in the public and private sectors. These were identified as the target population since the bulk of the malaria cases are managed by them. Inclusion Criteria According to the national guidelines, smear is the gold standard for malaria detection owing to its high sensitivity, ability to quantify the parasite load and distinguish between the different species, yet about 30% of the physicians in this study do not use it as their preferred modality of diagnosis of malaria. In a study conducted in Mumbai[13](p754) it was found that hardly any practitioners used smear as a diagnosis, however, the statistics here are much better as regards usage of smear is concerned. The guidelines support national policy-makers and health care providers to design and implement effective national treatment policies and protocols; promote the use of safe, effective malaria treatment; and protect currently effective malaria treatment against the development of resistance. Related policy recommendations. Preventive therapies. Recommendations on intermittent screening and treatment in pregnancy and the safety of ACTs in the first trimester. WHO policy brief for the implementation of intermittent preventive treatment of malaria in pregnancy using sulfadoxine-pyrimethamine (IPTp The role of health care providers working in first-level health care facilities is central for the effective implementation of this revised malaria treatment policy. However, information about their level of ACT knowledge is inadequate. This study sought to describe frontline health care providers' knowledge about the formulations and dose regimens of nationally recommended ACT in Sudan.MethodsThis cross-sectional study took place in Gezira State, Sudan. Data were gathered from five localities comprising forty primary health care facilities. A total of 119 health care providers participated in