UTILIZATION AND DELIVERY OF HEALTH CARE SERVICES AS FACTORS IN MALARIA CONTROL IN KOLAR - A COMMUNITY BASED STUDY

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M.D. IN **COMMUNITY MEDICINE**

By

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UNDER THE GUIDANCE OF

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LIST OF ABBREVIATIONS

NRHM-National Rural Health Mission

ASHA-Accredited Social Health Activist

RDT-Rapid Diagnostic Tests

RBM-The Roll Back Malaria

ITN-Insecticide Treated bedNets

ACTs-Artemisinin-based combination

NVBDCP-National Vector Borne Disease Control Programme

IRS-Indoor residual spraying

PHC- Primary Health Centres

CHC-Community Health Centres

ASHA-Accredited Social Health Activist

API-Annual Parasite Incidence

ABER-Annual Blood Examination rate

SPR-Slide Positivity Rate

BPL-Below poverty line

IVM-Integrated vector management

GMAP-Global malaria action plan

ABSTRACT

INTRODUCTION AND OBJECTIVES

It is well known that people's health care seeking behavior and health service delivery in rural areas of Kolar differs with varying endemicity of malaria. This study in Mulbagal taluk of Kolar district was undertaken to know the health care utilization and delivery as factors in Malaria prevention and s control in two areas. One, where Malaria is considered as a public health problem and the other where Malaria is not perceived as a public health problem. The objectives of the study being,

1. To study the health care seeking practices for fever.
2. To study the health care delivery for malaria
3. To find the association between the socioeconomic factors and health care seeking practices

METHODOLOGY

Two villages each were randomly selected from the two PHC areas in Mulbagal taluk. PHC areas was characterized based on annual parasite incidence more than two (API>2) and less than one (API<1) consistently in the past five years. All the households were enumerated and the knowledge, attitude and practices related to Malaria and it's prevention and, the health care delivery and utilization in these areas was obtained by household survey. A total of three visits were made to all these households over a period of six month from December 2011 to May 2012 to identify fever cases in the last fortnight from the day of visit. The health care utilization practices among the fever cases and health care delivery services provided by the health care workers of the primary health care centers was studied.

RESULTS AND INFERENCES

- Around 80.6 and 83 per cent of the households could be surveyed in Devarayasamudra PHC and Nangli PHC area respectively.
- Majority of the household members belong to 19-40 years category.
- Around 48 per cent of the head of the households in the studied communities were illiterate.
- Around 41% in the households were working as labourers in agricultural fields, construction sites and in other manual work sector.
- All the households surveyed belong to either scheduled caste, scheduled tribes or other back ward community. There were none belonging to upper caste group.
- Appropriate knowledge regarding malaria transmission from person to person is more in Devarayasamudra PHC area (69.2%) compared to Nangli area (26.2).
- Knowledge regarding causes of malaria is more in Devarayasamudra PHC area (81.7%) compared to Nangli area.
- Number of households (59.6%) in Devarayasamudra PHC area had one or more bed nets compared to 25% in Nangli PHC area.
- A total of 65 fever cases were identified in these four communities.
- None of the people above 40 years belonging to Devarayasamudra PHC area had been to a private health care provider.
- Around 60% of people have asked for specific drugs from pharmacy and petty shops. Around 29% of them purchased the drugs after telling the symptoms to the chemist and 25% of them had seeked treatment from private health service provider.

- Visit by the health care workers to the households in the last fortnight of fever was more in Devarayasamudra PHC area (48.5%) compared to Nangli PHC area (27.5%).
- Blood smear collection in in the last fortnight for fever cases was more in Devarayasamudra PHC area (47.2%) compared to Nangli PHC area (13.7%).
- Receipt of tablets for fever after blood smear collection was more in Devarayasamudra PHC area(36.1%) compared to Nangli PHC area(10.4%).

CONCLUSION

This study on the health care seeking behavior for fever and community based health care delivery for malaria was undertaken in the malaria problematic and non-problematic communities in Mulbagal taluk of Kolar district in Karnataka.

The community knowledge on malaria, its transmission and it's prevalence and control clearly depends on the endemicity of malaria. The communities studied under Devarayasamudra PHC area which is problematic for malaria had a better knowledge on malaria transmission and it's prevention. Similarly the health care delivery services for fever cases provided by the staff of the primary health centers in Devarayasamudra PHC area was directed towards malaria prevention and control. The knowledge on malaria transmission, it's prevention and control was relatively poor in Nangli PHC area. Similarly he community based health care services for cases of fever directed towards malaria prevention and control was also relatively poor in Nangli PHC area where malaria is not perceived as a public health problem.

The results of the present study highlights the need to do local research on Malaria in terms of one: as a disease of National priority in terms of local health seeking behavior, local quality control in health care service, local case management of malaria and on local vector control, two: service delivery problems namely, local health facilities coverage, evaluation of health education strategies, coverage and efficiency of existing malaria surveillance services locally and, three: socio-cultural determinants to health namely study of various malaria preventive practices, use of self-treatment in fever, and impact of socio-economic status on health locally.

KEY WORDS: malaria, health care utilization, health care delivery, Kolar

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INTRODUCTION

There were an estimated 216 million episodes of malaria in 2010. Approximately, 174 million (81%) cases were in the African Region and the South-East Asian Region accounting for another 13%. There were an estimated 655 000 malaria deaths in 2010, of which 91% were in the African Region. Approximately 86% of malaria deaths globally were of children under 5 years of age. Of the estimated 3.3 billion people who were at risk of malaria in 2010, 2.1 billion were at low risk (< 1 reported case per 1000 population) and 1.2 billion at high risk (> 1 case per 1000 population).[1]

Early diagnosis and treatment of malaria cases, integrated vector control measures, behaviour change communication and health systems strengthening are the strategies being followed by countries worldwide to control malaria. The malaria control measures have produced exciting results in the last decade. Around 50% of the 99 countries with malaria have reported a 50% decline in transmission. Eight countries are in the pre-elimination stage of malaria control and 9 countries are implementing elimination programmes. A further 8 countries (Bahamas, Egypt, Georgia, Iraq, Jamaica, Oman, Russian Federation and Syrian Arab Republic) have interrupted transmission and are in the prevention of reintroduction phase. The countries of Armenia, United Arab Emirates, Morocco and Turkmenistan have been certified as malaria free by the WHO in the last five years.[1]

Malaria is a public health problem in several parts of the country. About 95% population in the country resides in malaria endemic areas and 80% of malaria reported in the country is confined to areas consisting

20% of population residing in tribal, hilly, difficult and inaccessible areas. There is an overall improvement in malaria situation observed with a declining trend of total malaria cases, Pf cases and deaths due to malaria in India.[2]

Around 1.5 million malaria cases and 1000 deaths due to malaria are reported annually in the country. Areas with an API above 2 cases per 1000 population per year have been classified as high risk and thereby eligible for vector control. In the year 2009-10, 85% of malaria cases in the country were reported from 10 states.[3]

Karnataka and few other states have API of < 2 per 1000 population. Much of the malaria reported is from few districts. Many districts are low endemic for malaria. It is important to maintain surveillance and other preventive and control measures to reach the stage of elimination. Local factors including social, cultural, environmental and health care seeking practices play a major role in malaria transmission and its prevention and control efforts. It is therefore essential to study locally the social and cultural factors influencing malaria prevention and control measures including the communities knowledge and practices, the health care seeking behaviours for fever which influences early malaria identification and effective treatment strategy and health service delivery efficiency which is crucial for elimination of malaria.[4]

The National Vector Borne Disease Control Programme (NVBDCP) for prevention and control of vector borne diseasesias an integral part of the National Rural Health Mission (NRHM) of India. The programme activities are directed to halting and reversing the incidence of malaria and other vector borne diseases by the year 2015. It is planned to ensure that the right diagnostics and treatment are available to all people, integrated vector control measures are implemented and behaviour change and communication programmes are carried out.[5]

Under this programme screening of fever cases for malaria is done covering about 10% of the population annually. In the rural areas the multipurpose health workers conducts active screening for malaria at household level periodically. Accredited Social Health Activist (ASHA) - a village volunteer is also involved in the programme to provide diagnostic and treatment services at the village level as a part of introduction of newer intervention like rapid diagnostic tests (RDT) and use of artemisinin combination therapy (ACT) for the treatment of Pf cases. The centres of health care delivery namely, the primary and community health centres and referral centres screens fever cases for malaria.[6]

Malaria is unique among diseases because its roots lie so deep within human communities. The vertically organised anti-malaria programmes that were launched before the 1990s could be conducted largely without reference to the behaviour and the belief systems of the affected populations. Indoor residual insecticides, the hallmark of the eradication era, were applied uniformly across entire continents. Although residents frequently denied the governments spray team's entry to their homes and removed the insecticidal sprays from treated walls, their active participation was largely irrelevant to the intervention. Current antimalaria programmes, however, generally are organised horizontally and depend heavily on resident participation.[7]

The Roll Back Malaria (RBM) Programme relies mainly on insecticide impregnated bednets (ITNs) and combination drug therapy (CT). ITNs were to be hung by the people who are to sleep under them and reimpregnated in a timely manner, frequently at the user's expense.[8]

Failure to sustain this intervention would result in increased sickness and death due to exposure of relatively non-immune people to new infections. CT required a standard schedule of drug administration that relied on the cooperation and understanding of each affected person.

Failure to adhere to the prescribed regimen would endanger the long-term efficacy of the regimen[5]. Resident cooperation was even more crucial when environmental management or housing improvement became the intervention modality. No longer could interventions be conducted uniformly across broad regions; the problems tended to be local.[7]

Individual and community behaviour are important factors influencing the population effects of malaria and are crucial in determining the success of malaria control. The great diversity of cultures is well known. Understanding and acting in accord with the prevailing culture and systems are essential; otherwise, these beliefs serve as barriers to adoption of effective interventions.[9]

Health seeking behaviour is a key for obtaining timely treatment and depends on understanding the need for treatment. Thus understanding people's perception of malaria and its causes are important. Lack of understanding on the part of the people concerning what factors contribute to malaria is a barrier to the development of antimalaria program that requires cooperation.[9]

Although Western therapeutic regimens and case-management systems dominate in planned anti-malaria interventions, traditional practices and informally blended Western regimens comprise a large part of the mix. The remedy-seeking attitudes of affected populations therefore become central to anti-malaria policy. Traditional case-management practices may render the strategy of CT unsustainable.[7]An understanding of these social forces is essential. Community-based anti-malaria interventions depend on the ability of the operating agency to overcome cultural barriers and to institutionalize new practices within the village environment.

Hence it becomes necessary to identify the local factors determining people's knowledge, attitudes and actions, taking malaria occurrence into account.

This study looks into the factors that may have contributed to a reduction in malaria in some of the communities in Kolar by analyzing various factors such as education experiences, knowledge, individual preventive behavior and communal behavior directed at reducing mosquitoes and to seek effective ways to promote malaria prevention in the study area. This study aims to find the health care seeking practices for fever and the health care delivery services for malaria in rural Kolar.

OBJECTIVES

The objectives of this study are

1. To study the health care seeking practices for fever.
2. To study the health care delivery for malaria
3. To find the association between the socioeconomic factors and health care seeking practices

LITERATURE REVIEW

GLOBAL MALARIA SITUATION

Ninety-nine countries have reported ongoing malaria transmission in 2010. There were 216 million cases of malaria in 2010 and 81% of these were in the WHO African Region. An estimated 3.3 billion people were at risk of malaria in 2010. Of this total, 2.1 billion were at low risk (< 1 reported case per 1000 population), 94% of whom were living in geographic regions other than the WHO African Region. The 1.2 billion at high risk (> 1 case per 1000 population) were living mostly in the WHO African (47%) and South-East Asia Regions (37%).[1]

An estimated 655 000 persons died of malaria. Eighty six percent of the victims were children under 5 years of age and 91% of malaria deaths occurred in the WHO African Region. Six countries - Nigeria, the Democratic Republic of Congo, Burkina Faso, Mozambique, Cote d'Ivoire and Mali - account for 60%, or 390,000, of malaria deaths. Malaria mortality rates have fallen by more than 25% since 2000, with the largest percentage reductions seen in the European (99%), American (55%) and Western Pacific (42%) and African Regions (33%).[2]

Out of 99 countries with ongoing malaria transmission, 43 recorded decreases of more than 50% in the number of malaria cases between 2000 and 2010. Another 8 countries recorded decreases of more than 25%. There were 8 countries in the pre-elimination stage of malaria control in 2011 and 9 countries are implementing elimination programmes nationwide (8 having entered the elimination phase in 2008). A further 8 countries (Bahamas, Egypt, Georgia, Iraq, Jamaica, Oman, Russian Federation, and Syrian Arab Republic) have interrupted transmission and are in the prevention of reintroduction phase. In October 2011, Armenia was certified as free of malaria by WHO, becoming the

fourth country in five years to be certified. The other three were the United Arab Emirates in 2007, Morocco in 2010, and Turkmenistan in 2010.

Table 1: Estimated Malaria Cases and Deaths by WHO Region, 2010[1]

WHO Region	Estimated Cases	Estimated Deaths
African Region	174 million	596000
Americas	1 million	1000
Eastern Mediterranean	10 million	15000
European	200	0
South-East Asia	28 million	38000
Western Pacific	2 million	5000

The financing provided for malaria control has enabled endemic countries to greatly increase access to insecticide-treated mosquito nets (ITNs); the percentage of households owning at least one ITN in sub-Saharan Africa is estimated to have risen from 3% in 2000 to 50% in 2011 while the percentage protected by indoor residual spraying (IRS) rose from less than 5% in 2005 to 11% in 2010.

Household surveys indicate that 96% of persons with access to an ITN within the household actually use it. The number of rapid diagnostic tests (RDTs) and artemisinin-based combination therapies (ACTs) procured is increasing and the percentage of reported suspected cases receiving a parasitological test has also increased, from 67% globally in 2005 to 76% in 2010, with the largest increase in sub-Saharan Africa.

Resistance to artemisinins[10,11] –has been reported in a growing number of countries in South-East Asia. Resistance to pyrethroids, the insecticides used in ITNs – and most commonly used in IRS – has been

reported in 27 countries in Africa and 41 countries worldwide. Unless properly managed, such resistance potentially threatens future progress in malaria control.

The vision of the Roll Back Malaria (RBM) Partnership is "a world free from the burden of malaria"[12] From 2007, the United Nations (through the MDGs), the World Health Assembly and the RBM Partnership had consistent goals for intervention coverage and impact for 2010 and 2015 (2–4).

In April 2008 the United Nations Secretary-General put forward a vision of halting malaria deaths by ensuring universal coverage of malaria interventions by the end of 2010. The aim was for indoor residual spraying (IRS) and long-lasting insecticide-treated mosquito nets (LLINs) to be made available to all people at risk of malaria, especially women and children in Africa, and for all public health facilities to be able to provide effective malaria diagnosis and treatment.[13]

In September 2008 the RBM[14] Partnership added three additional targets as part of the Global Malaria Action Plan. The thrust is to reduce the total number of malaria deaths worldwide to near-zero preventable deaths by 2015. This target is more ambitious than the previous target of a 75% reduction in the number of malaria deaths by 2015, although there is no global consensus on how to measure preventable deaths. The second is that malaria should be eliminated in 8–10 countries by 2015 and afterwards in all countries that were in the pre-elimination phase in 2008. The third goal is: "in the long term, eradicate malaria worldwide by reducing the global incidence to zero through progressive elimination in countries".[15]

Malaria control forms part of MDG 6 and is central to achieving MDG 4, a two-thirds reduction in the mortality rate among children under 5 years of age. Without substantial progress in controlling malaria, which

accounted for 8% of deaths in under-5 children globally in 2008 and 16% of deaths in under-five children in Africa, MDG 4 will not be achieved.

EPIDEMIOLOGICAL STATUS OF MALARIA IN INDIA

Malaria is a public health problem in several parts of the country. The disease also inflict severe economic loss in the form of lost school days, low economic productivity and long term disability from severe illness. About 95% population in the country resides in malaria endemic areas and 80% of malaria reported in the country is confined to areas consisting 20% of population residing in tribal, hilly, difficult and inaccessible areas.[16] Directorate of National Vector Borne Disease Control Programme (NVBDCP) frames technical guidelines/ policies and provides most of the resources for the programme. Indicators have been developed at national level for monitoring of the programme, and there is uniformity in collection, compilation and onward submissions of data. Passive surveillance of malaria is carried out by primary health centres (PHC), malaria clinics, community health centres (CHC) and other secondary and tertiary level health institutions, which patients visit for treatment. Apart from that, Accredited Social Health Activist (ASHA) -a village volunteer is involved in the programme to provide diagnostic and treatment services at the village level as a part of introduction of newer intervention like rapid diagnostic tests (RDT) and use of artemisinin combination therapy (ACT) for the treatment of Pf cases.

MALARIA SITUATION

There is an overall improvement in malaria situation observed with a declining trend of total malaria cases, Pf cases and deaths due to malaria in India.[17] Significant progress was also made in the Global Fund and World Bank projects being implemented in the high endemic areas.

The countrywide malaria situation as reflected in surveillance data from 2001-2009 is given in the Table 1. The case load, though steady around 2 million cases annually in the late nineties, has shown a declining trend since 2002. When interpreting annual parasite incidence (API) - (defined as number of total confirmed malaria cases per thousand population), it is important to evaluate the level of surveillance activity indicated by the annual blood examination rate (ABER) - [defined as percentage of blood smears (including rapid diagnostic tests) examined for malaria in a year in total population]. At low levels of surveillance, the slide positivity rate (SPR) - [defined as number of slides (test) positive out of total sample examined] may be a better indicator. The reported Pf cases declined from 1.14 million in 1995 to 0.84 million cases in 2009. However, the Pf % has gradually increased from 39% in 1995 to 53.73% in 2009, which may indicate rising resistance to chloroquine in Pf cases.[18,19]

Number of reported deaths has been levelling around 1000 per year.[20] The mortality peak in 2006 was related to severe malaria epidemics affecting Assam caused by population movements and inadequate treatment in the private sector.[4]

Table 2 shows the information on indicators by which malaria prevention/ control activity in India are monitored and evaluated. The data shows that API rate has consistently come down from 2.12 per thousand in 2001 to 1.36 per thousand in 2009 but confirmed deaths due to malaria have been fluctuating during this period between 1708 and 963. SPR and slide falciparum rate (SfR) have reduced over the years 2001 -2009. The country SPR has declined from 2.31 to 1.51 and SFR has declined from 1.11 in 2001 to 0.81 in 2009. This indicates declining overall endemicity of malaria in the country. It is also observed that ABER has remained within 9.65% to 8.69 % during the period 2001 to 2009.

Malaria cases have consistently declined from 2.08 million to 1.56 million during 2001 to 2009.[21] Similarly Pf cases have declined from 1.0 to 0.84 million cases during the same period. Less than 2000 deaths[22] were reported during all the years within this period with a peak in 2006 when an epidemic was reported in NE States. The number of districts with API>2 have continuously decreased from the year 1995 to 2009. This has implications for the need for vector control coverage, although the rule of thumb is that a given area needs to have had an API below the threshold level (2 or 5 defined by State) for at least three years before a withdrawal of vector control intervention could be considered.

Table 2: Epidemiological Indicators for Malaria in India (2001 -09)

Year	Population (in thousand)	Blood smear examined	Positive cases	Pf cases	ABER	API	SPR	SFR	Deaths
2001	984579	90,389,019	2,085,484	1,005,236	9.18	2.12	2.31	1.11	1005
2002	1013942	91,617,725	1,841,229	897,446	9.04	1.82	2.01	0.98	973
2003	1027157	99,136,143	1,869,403	857,101	9.65	1.82	1.89	0.86	1006
2004	1040939	97,111,526	1,915,363	890,152	9.33	1.84	1.97	0.92	949
2005	1082882	104,143,806	1,816,569	805,077	9.62[1]	1.68	1.74	0.77	963
2006	1072713	106,725,851	1,785,129	840,360	9.95	1.66	1.67	0.79	1707
2007	1087582	94,928,090	1,508,927	741,076	8.73	1.39	1.59	0.78	1311
2008	1119624	97,316,158	1,526,210	775,523	8,69	1.36	1.57	0.80	1055
2009	1150113	103396076	1563,574	839,877	8.99	1.36	1.51	0.81	1144

ABER-Annual blood smear examination rate, API-Annual parasite incidence, SPR-Slide positivity rate, SFR-Slide falciparu/m rate

There are various ways of classifying risk areas. Since the 1970s, in India, areas with an API above 2 cases per 1000 population per year have been classified as high risk and thereby eligible for vector controll.[23] In principle, the stratification of risk levels based on epidemiological data is based on village level data. However, not all endemic districts are yet able to break down their data by village, and so far the national data management system has only made it possible to work with district wise data. Given these caveats, the distribution of districts by API is shown in Table 3. The average population of a district is around 1 million.

MALARIA SITUATION IN STATES:

Analysis of the state wise data for 2009-10 shows that 85% of malaria cases in the country are reported from 10 states namely Orissa, Jharkhand, Chattisgarh, Madhya Pradesh, West Bengal, Uttar Pradesh, Assam, Maharashtra, Rajasthan and Gujarat. Similarly, 95% of Pf cases are reported from 11 states namely Orissa, Chattisgarh, Jharkhand, Meghalaya, Assam, West Bengal, Maharashtra, Madhya Pradesh, Tripura, Andhra Pradesh and Gujarat.[24] Twelve states/UTs have reported API>2 during 2009. The API (number of positive cases per 1000 population) in 2009 is highest in Meghalaya (28.08) followed by Arunachal Pradesh, Andaman and Nicobar islands, Mizoram, Dadar and Nagar Haveli, Orissa, Jharkhand, Tripura, Chattisgarh, Nagaland, Goa and Assam. Ninety-five percent of deaths in 2009 are reported by 13 states.[25]Maharashtra was the highest contributor (19.8 %), followed by Orissa, Meghalaya, Mizoram, West Bengal, Assam, Tripura, Nagaland, Gujarat Jharkhand, Madhya Pradesh, Bihar and Rajasthan.

Table . 3 State wise distribution of districts as per API in 2009

State	No. of Districts with			
	>10	5 to10	2 to 5	<2
Andhra Pradesh	0	0	0	23
Arunachal	8	2	4	1
Assam	4	2	3	18
Bihar	0	0	0	38
Chhattisgarh	5	3	0	8
Goa	0	0	1	1
Gujarat	0	0	1	32
Haryana	0	1	3	17
Himachal	0	0	0	10
Jharkhand	7	6	7	4
Jammu &	0	0	0	12
Karnataka	0	1	4	28
Kerala	0	0	0	14
Madhya Pradesh	1	1	9	37
Maharashtra	0	1	1	34
Manipur	0	0	1	11
Meghalaya	4	1	1	1
Mizoram	4	1	2	2
Nagaland	1	2	4	4
Orissa	12	5	3	10
Punjab	0	0	0	20
Rajasthan	0	0	2	31
Sikkim	0	0	0	4
Tamilnadu	0	0	1	41
Tripura	2	0	1	1
Uttaranchal	0	0	0	13
Uttar Pradesh	0	1	1	69
West Bengal	1	0	1	18
A & N Islands	1	0	1	1
Chandigarh	0	0	0	1
D & N Haveli	1	0	0	0
Daman & Diu	0	0	0	2
Delhi	0	0	0	1
Lakshdweep	0	0	0	1
Pondicherry	0	0	0	4
All India	**51**	**27**	**51**	**512**

MALARIA PREVENTION AND CONTROL

Diagnosis and treatment of malaria cases

The early diagnosis and complete treatment (EDCT) of the malaria cases is the main strategy. Early and effective case management of malaria[26] shortens its duration and prevents complications and most deaths from malaria. .Around 100 million fever cases area screened for malaria annually mainly through blood slide examination. The RDT kits for detection of Pf cases has already been introduced in the programme since 2004-05.[27] Presently around 8 million RDT are being procured annually mainly to be used in high Pf predominant districts of 15 states which include 7 North East states and Andhra Pradesh, Chhattisgarh, Jharkhand, Gujarat, Madhya Pradesh, Maharashtra, Orissa and West Bengal. RDT are used by peripheral health workers and community volunteers like ASHAs in high Pf predominant areas where laboratory facilities are not readily available. Under National Rural Health Mission (NRHM), 5.7 lakhs ASHAs have been engaged in the above mentioned states of which 3.15 lakh have been trained on malaria diagnosis treatment including RDT. Recently the programme is examining the possibility of using bivalent RDT (diagnosis of both PV and Pf) at the field level so that quick diagnosis to all the malaria cases can be made available in the remote areas, as well as, the load of examining the large number of blood slides can be reduced.

The artemisinine-based combination therapy (ACT) ie, artesunate plus sulphadoxine-pyremethamine combination was initially rolled out for treatment of confirmed Pf cases initially in 67 Pf predominant districts of 7 NE states and 50 Pf predominant districts in the state of Andhra Pradesh, Madhya Pradesh, Chhattisgarh, Jharkhand and Orissa apart from the chloroquine resistant foci and surrounding cluster blocks in the country. Artether injections have been made available for treatment

of severe and complicated malaria cases. Now, according to Revised Drug Policy 2010, the first line of treatment for all confirmed Pf cases is ACT in whole of the country. The programme is expecting that the private providers will also follow the recently Revised Drug Policy 2010 for the treatment of malaria cases.

INTEGRATED VECTOR CONTROL MEASURES

For reduction of transmission risk in the high endemic areas the indoor residual spray (IRS) with appropriate insecticides like DDT, malathion and synthetic pyrethroid is being carried out in the identified villages and sub-centres. Around 70 million populations are being protected with IRS annually in the country.[18] The IRS coverage should be more than 80% of quality spray for achieving desirable impact. Many states are not able to achieve that target. Resistance to insecticides is being monitored with the help of field stations. Around 10 million nets have been procured and distributed. From 2009, long lasting insecticidal have been introduced in high risk areas. Larvivorous fishes are used to control mosquitoes in the feasible areas.

HEALTH SYSTEM STRENGTHENING:

To gear up the surveillance and supervision of programme implementation at the ground level the technical manpower like consultants (Monitoring & Evaluation), District Vector Borne control consultants, malaria technical supervisor/technicians and the contractual male multipurpose workers are being provided to the identified needy districts under special projects for identified areas. Involvement of additional MPWs and ASHA to increase the surveillance and thus help in case detection is being carried out.[23] Sentinel sites are also being identified in high-risk districts to improve the severe case management

services. There is a provision of flexible fund for management of severe cases and their timely referral. The data generated on therapeutic entomological monitoring and developments of GIS in identified districts are used in priority areas. Special projects are being implemented with the support of Global Fund and World Bank in the identified high-risk areas.

SPECIAL PROJECTS

(A) GFATM assisted Project:

The GFATM Malaria project was taken up in 2004 for the areas contributing to high disease burden based on malaria data of 2002. Around 100 million population in 94 districts (now 106) in 10 states including 7 North East States, selected high risk areas Orissa, Jharkhand and West Bengal were included. These areas contributed to 0.46 million cases and 464 deaths of malaria out of 1.84 million cases and 973 deaths respectively in the country in 2002, (9.76% population reporting 25% of total cases and 47% of deaths. The project focused on drug resistant areas also, as 75% of the population in drug resistant areas live in the project area. Implementation of the project began on 1st July 2005.[28]

The goal of the proposal was to reduce malaria morbidity and mortality in the project population by 30% within 5 years. The objectives were to increase access to diagnosis and treatment in high endemic areas, with particular focus on remote and inaccessible areas through community participation, up gradation of peripheral health facilities and small hospitals in the diagnosis and treatment of severe malaria, reduction of malaria transmission risk through integrated vector control and enhancing awareness about malaria control and promote community, NGO and private sector participation.

Newer interventions in the project were use of RDT for improving access to early treatment and prompt diagnosis of Pf malaria especially ii difficult / remote inaccessible areas where the laboratorj facilities were

non-existent or scarce. These were to be used by the community volunteers, and ASHA.[5]

ACT was used for improving the manage ment of Pf cases in drug resistant and Pf dominant areas. Arteether injections was used for management of severe and complicated malaria. Capacity building of the medical officers, laboratory technicians and community volunteers was undertaken.

Preventive measures for control of malaria included distribution of ITN to families Below Poverty Line (BPL) in the village. Villages were selected for bed net distribution by epidemiological (SPR >5 and Pf %> 30%) and entomological parameters (difficulty in performing indoor residual spray, areas cut off due to rains, inaccessible and remote areas). The current national guideline is to ensure availability of two bed-nets for each household, each bed net calculated to protect 2.5 persons.

The overall achievement in the cases treated with SP- ACT is 70% of the target. The states of Assam, Manipur and Jharkhand have shown poor performance in the area of treatment of cases with SP- ACT. The target for distribution of bed nets has also shown under-achievement by most states.[27]

The performance of the project in terms of impact and outcome indicators at the end of the project (June 2010) are presented in Table 5. The malariometric indicators reflect the overall trend of decline in malaria disease burden. The current status indicated decline in annual parasite incidence, slide positivity rate and slide falciparum rates. However, the malaria mortality has increased in the project areas, which is a cause of concern. The increase in mortality was due to outbreaks in the states of Assam, Meghalaya during the year 2006. The lack of sufficient manpower for surveillance had been the main reason for the upsurge of malaria cases and deaths during the year 2006.

To sustain the efforts for achieving further reduction in morbidity and mortality in North East areas, GF Round 9 supported Intensified Malaria Control Project -II is going to be implemented in seven North East states during the period of 2010 to 2015, wherein the interventions will be further scaled up both for prevention and control of malaria.

Table 4a: Comparative Status of Epidemiological Indicators of Malaria (2002-09) - Country and Project Areas

Indicator	2002	2003	2004	2005	2006	2007	2008	2009	% change from 2002
Population-country (thousands)	1013942	1027157	1040939	1022552	1084067	1087571	1119624	1150113	13.4
Population-project (thousands)	83838	89619	90807	93533	101887	103925	106004	105645	26.0
ABER-country	9.04	9.65	9.33	10.18	9.83	8.73	8.69	8.99	-5.5
ABER-project	7.76	7.72	7.20	8.87	9.28	8.61	8.47	9.89	27.45
API-country	1.82	1.82	1.84	1.78	1.65	1.39	1.36	1.36	-25.27
API-project	5.25	5.33	4.98	4.88	4.95	4.05	3.43	4.02	- 23.42
SPR-country	2.01	1.89	1.97	1.75	1.67	1.59	1.57	1.51	-24.88
SPR-project	6.77	6.90	6.79	5.51	5.33	4.70	4.05	4.07	-39.88
SfR-country	0.98	0.86	0.92	0.77	0.79	0.78	0.80	0.81	-17.34
SfR-project	3.41	3.33	3.32	2.55	2.79	2 52	2.41	2.63	-22.87
Malaria mortality-Country	973	1006	949	963	1708	1310	1055	1144	+ 17.57
Malaria mortality-Project	478	484	395	426	1124 **	691	389	563	+ 17.78

ABER-Annual Blood Examination Rate; SPR-Slide Positivity Rate; SfR-Slide Falciparum Rate

Table . 4b Indicators of Malaria in Kolar district(2006-2010

Population	B/S Collected &Examined	Total Positives	Total Pf Cases	ABER	API	SPR	Pf%	R.T%	DDT
2762305 *	460705	8157	2078	16.68	2.96	0.45	25.42	98.90	54
1278496	211417	724	247	16.54	0.57	0.12	34.12	99.72	Nil
1337529	212031	508	220	15.85	0.38	0.10	43.31	99.41	Nil
1244012	273339	320	192	20.34	0.24	0.07	60.00	99.06	Nil
1440281	281966	739	239	19.58	0.51	0.08	32.34	99.19	Nil

* Kolar District was bifurcated in the year 2007to two Districts, hence the reduction in population size from 2762305 in 2006 to 1278496 in 2007.

Malaria cases have consistently declined from 8174 to 320 during 2006 to 2009. Similarly Pf cases have declined from 2078 to 0.84 million cases during the same period.But during 2010 the total cases and Pf cases has increased.[29]

(B) World Bank aided NVBDCP Project:

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME (NVBDCP)

The NVBDCP is the programme for prevention and control of vector borne diseases as an integral part of the National Rural Health Mission (NRHM) of India. The NVBDCP envisages a self-sustained and well informed, healthy India free from vector borne diseases with equitable access to quality healthcare services nearest to their residences. The programme activities are directed in a way to meet with the Millennium Development Goal of halting and reversing the incidence of

malaria and other vector borne diseases by the year 2015 towards reduction of poverty.

The programme aims to make the investments sustainable by developing robust systems and supporting the local capacity.[30]

It is planned to ensure that the right diagnostics and treatment are available to all people - especially the poor and disadvantaged, living in tribal and rural areas.[31]

The Government of India has provided cash assistance for engaging Male Multipurpose Health Workers (MPW-Male) on contractual basis in high endemic districts for strengthening surveillance, treatment, prevention and control of malaria and other vector borne diseases. Accredited Social Health Activists (ASHA), Anganwadi Workers and MPWs are trained on the use of Rapid Diagnostic Tests (RDT) and Artimisinin based Combination Therapy (ACT) for malaria diagnosis and treatment at community level. Incentives are given to ASHAs for providing these services.

Monitoring and evaluation are integral to every aspect of the programme and critical to its success. A new cadre of Malaria Technical Supervisors has been inducted in high endemic areas at sub-district level to strengthen supportive supervision and micro-level monitoring of diagnosis, treatment, prevention and control activities.

Overall objectives of the malaria control programme are:

• Prevention of deaths due to malaria.

• Prevention of morbidity due to malaria.

• Maintenance of ongoing socio-economic development.

Specific objectives are:

• API 1.3 or less in the llth Five Year Plan.

• At least 50% reduction in mortality due to malaria by the year 2010, as per National Health Policy (2002).

• To halt and reverse the incidence of malaria by 2015 (as per Millenium Development Goals).[16]

In India presently, screening of fever cases for malaria is done under the NVBDCP covering about 10% of the population annually, of which about 1.5 to 2.0 million are positive for the malarial parasite; around 45%-50% of these cases are due to Plasmodium falciparum. Though the annual parasite incidence (API) has come down in the country, it varies from one state to another. The malaria situation remains a major problem in certain states and geo-graphical pockets. Majority of malaria cases and deaths in India are being reported from Orissa, the seven North Eastern states, Jharkhand, Chattisgarh, Madhya Pradesh and Rajasthan with Orissa alone contributing more than 20% of the cases in the country.

The focus of India's malaria control strategies is not only on technomanagerial aspects but also on the socio-economic-cultural context. Behaviour Change Communication (BCC) activities are aimed at generating awareness that would enable and empower the people to access and utilise available services and actively participate in the decision making processes. Antimalaria Month is observed in the month of June every year with enhanced campaigning prior to the peak malaria transmission season.[32]

Improving health outcomes is a shared responsibility. It is intended to pursue VBD control strategies through actions which involve all sections of society and all sectors.

The Global Fund (GFATM) and the World Bank are the major

partners supporting the NVBDCP for its specific activities in focal areas for malaria control and kala- azar elimination in the most endemic districts affecting the poorest of the poor residing in inadequate and unhygienic housing. WHO is another important partner providing technical support and assistance to the programme in various forms.

Malaria control strategies under NVBDCP[16]:

(1) Surveillance and case management :

• Case detection (passive and active).

• Early diagnosis and complete treatment.

• Sentinel surveillance.

(2) Integrated vector management (IVM):

• Indoor residual spray (TRS).

• Insecticide treated bed nets (ITNs) / long lasting insecticidal nets (LLINs).

• Antilarval measures including source reduction.

(3) Epidemic preparedness and early response.

(4) Supportive interventions:

• Capacity building.

• Behaviour change communication (BCC).

• Intersectoral collaboration.

• Monitoring and evaluation (M & E).

• Operational research and applied field research.

GLOBAL MALARIA ACTION PLAN (GMAP)

The vision of GMAP is of a world free from the burden of malaria. By 2015, the GMAP expects that the malaria-specific Millennium Development Goal (MDG) is achieved, and malaria is no longer a major cause of mortality and no longer a barrier to social and economic development and growth any where in the world. Beyond 2015, all countries and partners will sustain their political and financial commitment to malaria control efforts.[33] It also visualises that the burden of malaria never rises above the 2015 level, ensuring that malaria does not re-emerge as a global threat. In the long term, the GMAP envisages that global malaria eradication is achieved and there is no malaria infection in any country leading to stopping malaria control efforts'.

Targets set by the GMAP, through targeting universal coverage by 2010 are that:

• 80% of people at risk from malaria are using locally appropriate vector control methods such as long-lasting insecticidal nets (LLINs), indoor residual spraying (IRS) and, in some settings, other environmental and biological measures

• 80% of malaria patients are diagnosed and treated with effective antimalarial treatments; in areas of high transmission,

• 100% of pregnant women receive intermittent preventive treatment (IPTp).

• The global malaria burden is reduced by 50% from 2000 levels to less than 175-250 million cases and 500,000 deaths annually from malaria.

And by 2015:

• Universal coverage continues with effective interventions.

• Global and national mortality is near zero for all preventable deaths.

• Global incidence is reduced by 75% from 2000 levels to less than 85-125 million cases per year.
• The malaria-related MDG is achieved halting and beginning to reverse the incidence of malaria by 2015.
• At least 8-10 countries currently in the elimination stage will have achieved zero incidence of locally transmitted infection.

India malaria programme is also committed to achieve these goals and putting in all the efforts with the help of stakeholders such as Global Fund and World Bank.

MALARIA ELIMINATION

Malaria control: Reducing the malaria disease burden to a level at which it is no longer a public health problem.

Malaria elimination: zero incidence of locally acquired malaria infection, through active control measures with continued measures in place to prevent re-establishment of transmission. Elimination refers to a status, where endemic transmissions have been interrupted by interventions and there is limited further transmission from imported infections below a level, at which risk of reestablishment of malaria is minimal. For sustaining this state indefinitely, both capacity and commitment are required.[9]

For elimination of malaria from an endemic area, a prerequisite is to identify parasite carriers harbouring asymptomatic infections that are not noticed and detecting parasites that have persisted after a certain drug treatment, either because the treatment failure due to drug resistance or

because some stages of the parasites are not targeted by treatment.India has chosen the strategy of focusing initially on scaling up malaria control efforts in high burden states and malaria elimination in certain states and regions before launching the nationwide elimination efforts as the disease burden is focused in north eastern and eastern states of the country. Recently the state of Goa has launched the programme of elimination of malaria from the state as most of the cases are in immigrants.

Certification of malaria elimination: The official recognition of malaria-free status granted by WHO after it has been proven beyond reasonable doubt that the chain of local human malaria transmission by Anopheles mosquitoes has been fully interrupted in an entire country for at least 3 consecutive years.[18]

Malaria eradication

Permanent reduction to zero of the worldwide incidence of infection caused by a particular malaria parasite species. Intervention measures are no longer needed once eradication has been achieved.

INDIA MALARIA PROGRAMME

The country API of malaria in year 2009 was 1.36. Out of 35 states/UTs, 20 state/UTs are having API less than 1 per 1000 population. (in preparatory and attack phase). Out of them 6 states are already having API less than 0.1 (already in consolidation phase of elimination). Table 6 shows the status of disease burden in terms of API. The technical feasibility of elimination depends upon the intensity of malaria transmission and frequency of malaria importation.[4]

If presences of both factors are high, then elimination probably may not be feasible for the time being eg, North-East (NE) states.

Table 5: States with API <1

State	API
Andhra Pradesh	0.34
Delhi	0.01
Gujarat	0.79
Puducherry	0.06
Karnataka	0.68
Bihar	0.03
Maharashtra	0.84
Himachal Pradesh	0.04
Manipur	0.36
J& K	0.07
Rajasthan	0.48
Kerala	0.06
Sikkim	0.23
Tamilnadu	0.22
Uttarakhand	0.14
Uttar Pradesh	0.29
Chandigarh	0.41
Daman & Diu	0.52
Lakshdweep	0.13
Punjab	0.11

The National Drug Policy on Malaria was first formulated in 1982 and has subsequently been reviewed and revised periodically.[34] The present National Drug Policy for Malaria (2010) has been drafted

keeping in view the availability of more effective antima-larial drugs and drug resistance status in the country.

Early diagnosis and complete treatment is one of the key strategies of the National Malaria Control Programme. All fever cases clinically suspected of malaria should be investigated for confirmation of malaria by either microscopy or RDT. In high Pf predominant areas where it is not possible to get microscopy results within 24 hours, ASHAs/other community health volunteers/MPWs should be provided with rapid diagnostic kits and antimalarials (including ACT) for early diagnosis and treatment of P falciparum cases. .

Effective treatment of malaria under the National Drug Policy aims at:

- Providing complete cure (clinical and parasitological) of malaria cases.
- Prevention of progression of uncomplicated malaria into severe malaria and thereby reduce malaria mortality.
- Prevention of relapses by administration of radical treatment.
- Interruption of transmission of malaria by use of gametocytocidal drugs
- Preventing development of drug resistance by rational treatment of malaria cases.

Guidelines :

(1) All fever cases suspected to be malaria should be investigated by microscopy or RDT.[35]

(2) P vivax cases should, be treated with chloroquine for three days and primaquine for 14 days. Primaquine is used to prevent relapse but is contra-indicated in pregnant women, infants and individuals with G6PD

deficiency.

Note: Patients should be instructed to report back in case of haematuria or high coloured urine, cyanosis or blue colouration of lips and primaquine should be stopped in such cases. Care should be taken in patients with anaemia.

(3) P falciparum cases should be treated with ACT (artesunate 3 days + sulphadoxine-pyriniethamine 1 day). This is to be accompanied by single dose of primaquine on day two.

(4) Pregnant women with uncomplicated P falciparum should be treated as follows:

- 1st trimester: Quinine
- 2nd and 3rd trimesters: ACT

Note: Primaquine is contra-indicated in pregnant woman In cases where parasitological diagnosis is not possible due to non-availability of either timely microscopy or RDT, suspected malaria cases will be treated with full course of chloroquine, till the results of microscopy are received. Once the parasitological diagnosis is available, appropriate treatment as per the species is to be administered.

(5) Presumptive treatment with chloroquine is no more recon mended.

(6) Resistance should be suspected if in spite of full treatment with no history of vomiting, diarrhoea, patient does not respond within 72 hours, clinically and parasitologically. Such cases not responding to ACT should be treated with oral quinine with tetracycline / doxycycline. These instances should be reported to concerned District Malaria /State Malaria Officer/ROHFW for initiation of therapeutic efficacy studies.

Treatment of uncomplicated P vivax cases (Table)

• Chloroquine: 25 mg/kg body weight divided over three day.

10 mg/kg on day 1, l0 mg/kg on day 2 and 5mg/kg on day 3.

plus Primaquine: 0.25 mg/kg body weight daily for 14 days.

Table 6_Age-wise dosage schedule for treatment of *P.vivax* cases

Age (in years)	Tablet Chloroquine (150 mg base)			Tablet Primaquine* (2.5 mg base)
	Day – 1	Day – 2	Day -3	Day – 1 to Day – 14
< 1	½	½	¼	0
1 – 4	1	1	½	1
5 – 8	2	2	1	2
9 -14	3	3	1½	4
15 & above	4	4	2	6

* Primaquine is contraindicated in infants, pregnant women and individuals with G_6PD deficiency. 14 day regimen of Primaquine should be given under supervision.

Treatment of uncomplicated P falciparum cases:

Artemisinin based combination therapy (ACT) Artesunate 4 mg/kg body weight daily for 3 days plus Sulfadoxine (25 mg/kg body weight) - pyrimethamine (1.2 mg/kg body weight) on first day Primaquine 0.75 mg/kg body weight single dose on day 2.

Treatment of uncomplicated P falclparum cases in pregnancy

First trimester : Quinine salt l0 mg/kg 3 times daily for 7 days.

Quinine may induce hypoglycaemia; pregnant women 3t start taking quinine on an empty stomach and should eat [r], while on quinine treatment.

Third trimester: ACT as per dosage given above.

Treatment of mixed infections (P vivax + P falciparum)

Mixed infections should be treated with full course of ACT plus Primaquine 0.25 mg per kg body weight daily for 14 days.

Treatment of severe malaria cases:

In severe malaria treatment should be given immediately and associated complications managed.

Artesunate: 2.4 mg/kg body weight IV or IM given on admission, then at 12-hour and 24-hour.

Artemether: 3.2 mg/kg body weight IM given on admission, then 1.6 mg/kg body weight per day.

or

Arteether: 150 mg IM daily for 3 days in adults only.

or

Quinin: 20 mg/kg body weight on admission (IV infusion/IM injection) followed by maintenance dose of 10 mg/kg wt 8 hourly. The infusion rate should not exceed 5 mg >dy weight per hour.

Chemoprophylaxis:

Chemoprophylaxis should be administered only in selective groups in high P falciparum endemic areas. Use of personal protec tion measures including Insecticide treated bed nets (ITN) / long lasting insecticidal nets (LLIN) should be encouraged for pregnant women and other vulnerable population including travellers for longer stay. However, for longer stay of military and para-military forces in high Pf endemic areas, the practice of Chemoprophylaxis should be followed wherever appropriate e.g. troops on night patrol duty and decisions of their medical asdministrative authority should be followed.

Short term Chemoprophylaxis (up to 6 weeks):

Doxycycline: 100 mg once daily for adults and 1 .5 mg/kg once daily for children (contra-indicated in children below 8 years). The drug

should be started 2 days before travel and continued for 4 weeks after leaving the malarious area.

Note: It is not recommended for pregnant women and children less than 8 years.

Chemoprophylaxis for longer stay (more than 6 weeks):

Mefloquine : 250 mg weekly for adults and should be administered two weeks before, during and four weeks after exposure.

Note: Mefloquine is contra-indicated in individuals with history of convulsions, neuropsychiatric problems and cardiac conditions. Therefore, necessary precautions should be taken and all should undergo screening before prescription of the drug.

CHALLENGES IN MALARIA CONTROL

Challenges faced by India in their malaria control efforts are varied. India, being a large country, have regions in very different situations, some bearing most of the malaria burden, others almost or partially malaria free. Stratified approaches are required to adapt the strategy to local needs.

1. To ensure access to high-quality-assured and affordable drugs according to updated national drug policies through all types of providers.
2. Involvement of private providers in the treatment of malaria cases as per country; specific drug policies is also a major challenge.
3. Provision of diagnostic services through rapid diagnostic tests or microscopy and pre-packaged ACT through public and private healthcare systems, including in remote rural villages is another important challenge.
4. Prevention of irrational use of artemisinine based compounds

especially among the unqualified private providers is also a major challenge.

5. Drug resistance is another important challenge.
6. Poor ITNs and IRS coverage.
7. Emergence of resistance to insecticides in mosquitoes is also noted in various research onducted by the field stations of MRC. In India,
8. Health care delivery to people residing in forests and migrants.
9. Administering Primaquine for 14 days for radical treatment of Plasmodium vivax malaria.
10. Building managerial capacity is another important challenge.
11. Availability of trained manpower.
12. Ensuring community participation.

SOCIAL AND CULTURAL ASPECTS OF DISEASE

SOCIETY AND CULTURE

People in the community and the health care providers for them generally come from diverse cultural backgrounds. There are certain obvious differences such as language, religion and caste which are easily perceived. But the diversity of attitudes, feelings, reactions are not easy to recognize which are due to cultural variations.[36]

A.L.Kroeber defined culture as a product of human beings in groups: A set of ideas, attitudes and habits evolved by men to help them in the conduct of life. Failure to consider cultural, religious and racial differences may result in failure to account important social and psychological factors which can be very helpful in disease control, prevention and management.

It is well recognized that cultural differences exists between cultural differences exists between different sections of a given community. The health care providers need to be aware of these sub-

cultural differences which might influence people behavior with respect to a disease.

SOCIETY AND SOCIAL CLASS

In addition to cultural and sub-cultural differences between people there exists social stratification among them. The stratification generally is based on “caste system”, educational level, occupation type, income, property owned, housing, power they possess, etc.

Poverty creates preconditions for malaria and ways for its spread, thereby making it difficult to control malaria.[37]

Poor populations are at greatest risk; 58% of the cases occur in the poorest 20% of the world's population and these patients receive the worst care and have catastrophic economic consequences from their illness. This social vulnerability requires better understanding for improving deployment, access, quality, and use of effective interventions.[38]

Jones and Williams point out that epidemiologists and economists have dominated the burden literature. They attest that culture, beliefs, and political context affect perceptions, individual behaviors, social structure, and social action.[39] When people from different social groups or strata interrelate conflicts of interest may arise. It is important for the health care planners and those who deliver the service to perceive these differences. Some of the social stratification differences may be subtle and difficult to perceive.

SOCIETY AND DISEASE

Society considers health and illness in different ways. The value of health and disease and the local health beliefs and practices varies in communities. The health care providers themselves are strongly influenced by their own culture. Exploring the beliefs and practices

regarding health and disease in a community is necessary to plan and deliver heath care. Individual perceptions of illness, in this case malaria, determine people's response to seeking medical care[36]. In Orissa state, the participation of tribal peoples in treatment and control of malaria is limited because they do not consider mosquito bites to be harmful and consider malaria as a mild disease. Untreated people are potential sources of malaria infection. Research from rural areas in other developing countries show the widespread belief that mosquitoes do not transmit malaria. Sleeping habits which contribute to the spread of malaria include not using mosquito nets or any protective device, outdoor sleeping, and children sharing a bed.[37]

Society's perceptions of disease, malaria, and perceived risk influence people's willingness to change their health behaviors, but the political and economic context, social organization, and cultural rules affect their ability to change behavior. Social factors make some groups or individuals more susceptible to infection or more vulnerable to the consequences of infection. For example, women may be limited in their access to cash and ability to take decisions on their own, affecting their ability to seek treatment of a sick child. Understanding the sociocultural dimensions of the burden of malaria is vital to development of interventions to access vulnerable groups.[40]

KNOWLEDGE ATTITUDE AND BEHAVIOUR IN RELATION TO MALARIA AND ITS PREVENTION

BEHAVIOR CHANGE COMMUNICATION IN MALARIA

Behaviour as a factor in health

Human behaviour – much of which is influenced by social, cultural, economic, and political factors, is clearly related to health, including the risk for infectious diseases like malaria[7]. Whether it is

intentional or not, human behavior affects health promoting and disease preventing activities, in some instances increasing risk and in others reducing it. Inhorn & Brown have noted that “human groups have often unwittingly facilitated the spread of infectious diseases through culturally coded patterns of behaviour or through changes in the crucial relationship among infectious disease agents, their human and animal hosts, and the environments in which the host-agent interaction takes place" (Inhorn & Brown, 1990). Beyond human behaviour as such, prevalent sociocultural factors – including political and economic parameters – also contribute to shaping how humans act, and therefore must be seen, in and of themselves, as epidemiological predictors of health and disease patterns. Although people's behaviour may increase malaria risk, to change such behaviour is not easy.[41]

Indeed, there are many reasons why particular behaviours exist and they often are tied to considerable benefits in areas quite distinct from health. MacCormack has written that "the principal reason [for why people do not accept new kinds of health behaviour] is that the behaviour being advocated is inconvenient, produces unwanted side-effects, or does not give visible results" (MacCormack, 1984). Thus, it is not usually the case that "these people don't know any better," but rather that their native logic and rationality make sense within the realities and limitations of their local circumstances.

As Good (1994) has pointed out, we should be careful to avoid thinking that "they" have "false beliefs" (not knowledge), which need to be changed, where-as "we" have knowledge, which needs to be imparted. We should also heed Farmer's (1999) caution in his book, Infections and Inequalities: The Modern Plagues, not to exaggerate people's agency, or power, to effect beneficial changes for their own health and welfare.

The physical environment, and people's proximity and exposure to vectors or parasites, including microbiological and parasitological factors, are clearly essential for transmission of infection and constitute necessary and immediate risk factors. The primary point of this work, however, is to underscore that people's behaviour and how sociocultural factors affect their lives are equally crucial and constitute underlying risks for the spread of infection. These more fundamental risks must be addressed by any effort to control malaria on a worldwide scale. Certain sociocultural factors, such as poverty and social disenfranchisement, may place people at continuous "risk of risks" and may make the affliction from infectious and other diseases inevitable (Link & Phelan, 1995; Farmer, 1999). Inhorn & Brown (1990) talk about proximate cause versus the ultimate etiology of political and economic inequality. They suggest that although the presence of (proximate) microbiological risk factors is essential, it is not sufficient, since the ultimate causation is tied to sociocultural factors, in particular, to inequality. This point is established as well by Farmer (1999). Such an emphasis is nothing new, of course; it goes as far back as Hippocrates, the father of allopathic (Western) medicine, and was renewed by European social theorists and public health practitioners of the nineteenth century, including Rudolph Virchow, John Snow, and Peter Panum, to name but a few. With the advent of social epidemiology and medical anthropology in the 1950s and 1960s, represented by such publications as Benjamin Paul's Health, Culture and Community (1955) and Steven Polgar's Health and Human Behaviour: Areas of Interest Common to the Social and Medical Sciences (1962), there was a shift in twentieth-century thinking about sociocultural factors as being complementary to bacteriological ones. With the increase of such literature (based on innumerable studies) since then, any public health effort would be delinquent and shortsighted if it did not pay significant

attention to how behavioural and social factors contribute to risk for and prevention of malaria infection.[42]

The interrelationship between infectious disease and sociocultural characteristics is by now well established, although not fully accepted within international public health circles. In the current effort to mount an effective malaria control campaign, the connection needs to be re-emphasized and re-substantiated.

As Etkin has put it:

To the extent that contemporary malaria control programs deviate little from their early design, and that too many studies still conclude that sociocultural variables should have been taken into account at the program's onset, the redundancy in recommendations for program design is apparently necessary. Because failure to deal even relatively superficially with the behavioral dimension squanders the technical sophistication and competence of mosquito control technology and the prophylaxis and chemotherapy of plasmodial infections. (Etkin, 1991)

Brown has also noted:

There has been little written about social factors in the modern resurgence of malaria. This is because the focus of public health, and malariology in particular, has been narrowly fixed on the parasite and the mosquito vector.

The bigger picture has been neglected – namely that increased rates of malaria morbidity, although directly influenced by changes in the parasite and vector, are more directly caused by human behaviours. Those behaviours are both related to individual culturally coded patterns and largerscale sociological phenomena including the political-economic level. (Brown, 1997)

Malaria and other infectious diseases can be studied from a biological, ecological, or sociocultural point of view, and, indeed, considerable work has been done in each of these areas, with most weight given to the biological sphere (Inhorn & Brown, 1990). While this volume focuses on the sociocultural factors (and also on how human behaviour affects overall disease ecology), indicating their relevance for malaria control efforts, we agree that it is only with a combined, interdisciplinary approach that the best results may be obtained.

This is reflected in the American Anthropological Association's Working Group on Anthropology and Infectious Disease definition of the anthropological field of infectious disease as "the broad area which emphasises the interaction between sociocultural, biological and ecological variables relating to the etiology and prevalence of infectious disease" (Inhorn & Brown, 1990:90-91). It is clear that social scientists need to continue to work in concert with malariologists.

The limitations of health education in malaria control Health education in malaria control is offered as a means of ameliorating risky behaviour, but as Gramiccia observed more than 20 years ago:

There are four main reasons for the failure of health education in malaria control. The first reason is the type of populations that suffer from endemic malaria in poor countries or in depressed areas with low educational standard and poor housing, hygiene and general environmental conditions.

Accessibility to these populations is often difficult, and the medical facilities available to them are, to say the least, scarce. A second reason is that malaria is part of a socioeconomic depression complex from which people have difficulty singling out malaria for particular concern.

The people cannot understand why malaria should be selected for elimination rather than poverty, hunger, or other diseases or conditions.

The multiplicity of afflictions from which the people suffer takes away a good part of the motivation they might have for self-help in controlling malaria.

A third difficulty is the nature of the disease itself, specifically the complexity of its epidemiology ...The fourth reason for failure of health education in malaria control is the methods currently employed. Generally speaking, they have not been well adapted to local situations. (Gramiccia, 1981).[7]

Gramiccia further stated that, "Any attempt at educating people in self-help in malaria control should take into consideration the many serious scourges affect-ing the particular population and the order of priority given them by the people" (Gramiccia, 1981). Once again, we return to the need not only to single out the problem of malaria, but to attack it as yet another aspect in a much wider effort to intervene in improving people's lives. Messing (1973) noted this some 25 years ago in an article about public health in Ethiopia entitled "*Discounting Health*," in which he suggested that "health" was really far down the list of a community's main concerns. Of greater importance was what he called "subsistence anxiety," that is, concerns over security, employment, availability and productivity of land, and thus the accessibility of food. Considering the fundamental factors for health, these Ethiopians, like people everywhere, did not in fact "discount health," but were profoundly concerned with health and welfare issues, even if not voiced in terms of "health" as such, and perhaps not as it would be expressed by health personnel. How can people be healthy if they have neither security nor food? From next door in Somalia, Abyan & Osman observed, "The reasons we are dwelling on cash earning of the poor farmer [in Somalia] is to highlight the unlikely prospects for these farmers to be able to pay for their basic health needs, including prevention of disease, like malaria,

unless their productivity is enhanced... There is a need to enhance the communities' economics to a degree that they can afford effective malaria control services for themselves" (Abyan & Osman, 1993).

Yet, although there is some recognition of malaria as a disease of poverty, solutions, like those suggested by Abyan and Osman, seldom centre on the reduction of poverty as such.

Public health workers are justifiably concerned about the seriousness of malaria, but for large proportions of the rural and urban poor, malaria may be perceived as a relatively minor malady in the hierarchy of problems with which they have to deal every day, problems such as hunger, unemployment, and security.

Fungladda notes, "People in malarious areas have long regarded malaria as part of their everyday lives; they have been conditioned to live with it and with other scourges such as poverty, hunger, and other diseases. As we have already noted, villagers cannot understand why malaria should be selected for elimination rather than their poor living conditions or any other disease" (Fungladda, 1991). This underscores the need for understanding not only people's perceptions and some of their cultural associations, but also the whole context of lives that give shape to these perceptions and behaviours. Another study from Ethiopia reported that, "The majority of individuals in the study area do not consider that the impact of malaria was serious" (Yeneneh et al, 1993). Moreover, the perceived hierarchy of specific health problems also determines behaviours, as reported in a study among university students in Malawi, which found that the perceived seriousness of and thus the attention given to malaria was minimised in the face of having to deal with people with AIDS (MacLachlan & Namangale, 1997).

While there may be certain similarities between disease perceptions of people from different cultures and countries, the studies

mentioned here make it clear that perceptions, and consequent behaviour, cannot be assumed. Attention must be paid to local realities (including cultural characteristics) that are major influences in shaping ideas. Experiences that influence perceptions range from economic deprivation, to the spread of diseases considered more life-threatening than malaria, to war and social conflict. Moreover, perceptions may vary within a cultural entity, shaped by such factors as educational level, social status, and degree of exposure to an urban or cosmopolitan environment. While awareness of varying views of the disease is essential to the success of any antimalarial programme, care must be taken not to assume that particular notions will always and necessarily lead to specific behaviours. Many other factors may play a role, and individuals may be quite comfortable in behaving in ways which, to an outsider, may seem contrary to commonly held perceptions. No malaria control effort can afford to overlook the multidimensional human contexts that create and support varying notions of malaria and its prevention, treatment, and control.[23]

According to Brown, "the resurgence of malaria represents a significant challenge to social scientists and is associated with a recent call for a scientific paradigm shift in malaria research" (Brown, 1997). This shift "... was away from mosquito control – that required little concern for human behaviour, except permission to spray – to the new approaches in 'control' within PHC [primary health care] which require citizen participation" (Brown, 2000). It calls for an increased attention to the sociocultural environment (behavioural and social factors). Brown, an anthropologist, using a broad definition of culture that incorporates economic, social structure, and cognitive/belief issues, is obviously concerned with how cultural (in a more limited sense of that word) factors relate to malaria. But like an increasing number of

anthropologists, he casts his net much wider, and in a truly ecological fashion, states that "the continuation of brutal poverty and hunger in much of the world is undoubtedly linked to large numbers of unnecessary deaths from malaria" (Brown, 1997).

Farmer, another anthropologist (and physician), who does define culture in a more limited way, similarly makes this wider point when he warns against seeing structural violence and mistaking it for cultural difference (Farmer, 1999).

Yuji Ataka1, Tsukasa Inaoka and Ryutaro Ohtsuka conducted a community based cross-sectional survey of 262 participants in four island communities of Manus, Papua New Guinea using a structured questionnaire to examine possible factors of malaria prevalence, including education experiences, knowledge, attitudes, and preventive behaviors, in relation to antimalarial antibody titers. Bivariate and multivariate analyses revealed that micro-environmental conditions caused intercommunity differences in malaria prevalence. Ninety-nine percent of the subject villagers recognized mosquito bites as a cause of malaria transmission, which explained the high possession rate of bednets. There was a significant correlation between malaria education experience at schools and knowledge ($p < 0.01$) and between knowledge and bednet use ($p < 0.05$). However, regular bednet users were only 35% of the total, due primarily to feelings of discomfort, heat, and stuffiness inside the bednet. Villagers' behavior of consulting an aid post orderly (APO) in case of high fever significantly lowered the titer level ($p < 0.05$), while their bednet use did not. This unexpected result was attributable to inappropriate bednet use and to daily living patterns, including both subsistence and social activities. The authors conclude that information regarding lifestyles and attitudes toward bednet use as well as

malaria education experience at schools are particularly important for practical malaria prevention.[43]

Syed Masud Ahmed, Rashidul Haque, Ubydul Haque and Awlad Hossain conducted a population-based prevalence survey in 2007, on the sociological and behavioural aspects of malaria, which is essential for an evidence-based design of prevention and control programmes, and is lacking in Bangladesh. A two-stage cluster sampling technique was used to select study respondents randomly from 30 mauzas (lowest administrative unit) in each district for the socio-behavioural inquiry (n = 9,750). A pre-tested, semi-structured questionnaire was used to collect data in face-to-face interview by trained interviewers, after obtaining informed consent. The overall malaria prevalence rate in the 13 endemic districts was found to be 3.1% by the Rapid Diagnostic Test. Findings revealed superficial knowledge on malaria transmission, prevention and treatment by the respondents. Poverty and level of schooling were found as important determinants of malaria knowledge and practices. Allopathic treatment was uniformly advocated, but the 'knowdo' gap became especially evident when in practice majority of the ill persons either did not seek any treatment (31%) or practiced self-treatment (12%). Of those who sought treatment, the majority went to the village doctors and drugstore sales people (around 40%). Also, there was a delay beyond twenty-four hours in beginning treatment of malaria-like fever in more than half of the instances. In the survey, gender divide in knowledge and health-seeking behaviour was observed disfavouring women. There was also a geographical divide between the high endemic south-eastern area and the low-endemic north-eastern area, the former being disadvantaged with respect to different aspects of malaria studied.

The authors concluded that the respondents in this study lacked comprehensive knowledge on different aspects of malaria, which was

influenced by level of poverty and education. A gender and geographical divide in knowledge was observed disfavouring women and south-eastern area respectively. They preferred allopathic treatment for malaria, although a substantial proportion did not seek any treatment or sought self-treatment for malaria-like fever. Delay in seeking care was common.[44]

Dambhare DG, Nimgade SD, Dudhe JY, studied the knowledge, attitude and practices of malaria transmission and its prevention in a cross-sectional study among the school going adolescents in rural Wardha, Maharashtra. About 84.7% of the respondents heard about the malaria disease and 8.6% were aware about the causative agent. Transmission of malaria by mosquito bite was known to 69.8% of the adolescents. Some of the adolescents had misconception regarding the mode of transmission of malaria like houseflies (32.8%). Nearly half (51.1%) of the adolescents had knowledge of symptoms of malaria as fever. None of the adolescents were aware about the new strategy of insecticide treated bed nets. Majority of the adolescents (57.7%) knew commonest breeding habits of mosquitoes as dirty stagnant water. The main source of information about malaria to most of the adolescents was television and radio (51.7%). About 47.4% of the adolescents practiced the prevention of breeding places of the mosquitoes by cleaning the surrounding. Nearly one fifth (20.7%) of the adolescents were using mosquito net. During the study, 66 (6.02%) adolescents were suffering from fever out of that 12.1% adolescents had taken self medication. The authors concluded with a need to involve the health workers to provide active support and empower teachers with information about malaria causation and prevention strategies so that such knowledge could be passed on to students.[45]

Joshi AB, Banjara MR, undertook a cross-sectional study of 1330

households in rural areas of three districts in Nepal in 2005. The objective was to assess knowledge, practices and behaviour of the people living in malaria endemic districts and relate with malaria control policy in Nepal. Around 40% of the respondents were illiterates. Eighty-six percent respondents had heard about malaria and 50% responded with fever with chills as the sign and symptom of malaria. Seventy-three percent said that mosquito bites causes malaria transmission and 74% respondents considered that malaria is the fatal disease but very few have knowledge that the treatment of malaria in time can save life. More than 50% did not have information on availability of free treatment of malaria in Nepal. Around 16% were consulting traditional healers for the treatment. The outside sleeping habit was found in almost one fourth of the population mainly in summer season indicating no knowledge about prevention of malaria. Although bednet use practice was higher, only 4% had knowledge on insecticide impregnated bednets and 23% of them practicing it. The authors conclude that health education to the malaria affected communities on the proper and regular use of bednets, availability of free treatment provided by the government is necessary to control malaria.[46]

Vijaykumar KN et al, conducted a study in two districts of Orissa to know people's knowledge, attitude and practice on malaria and its prevention. One district had an ongoing insecticide treated mosquito nets (ITNs) programme and another without such programme. Both qualitative and quantitative methods were used for data collection. The local concepts used for malaria describe only the biomedical symptoms of the disease although a few by meaning in local language reflect people's misconceptions about the cause of malaria. About 63% of the respondents mentioned mosquito bite as the cause for this disease and 65% considered

malaria as a serious problem. People from remote villages seek treatment from traditional healers. About 64% of the respondents stated that avoiding mosquito bites could prevent malaria. Majority (99%) of the people reported using personal protection measures to avoid mosquito bites. Although, majority of the people were aware of the cause and prevention of malaria (about 70% stated sleeping under mosquito net prevents malaria), a sizable proportion still had misconceptions. The authors recommend that appropriate communication strategies should be developed and imparted alongside ITNs/LLINs distribution for a behaviour change to adopt such preventive measures. The tribes generally seek treatment from traditional healers; hence they should be involved in motivating people to use ITNs/LLINs to protect from mosquito bites and malaria.Also, local knowledge and practice related to malaria is important for the implementation of culturally appropriate, sustainable and effective interventions.[47]

The aim of this qualitative study was to investigate local residents' of the Pacific coast of Guatemala beliefs about the symptoms, causes, treatment, prevention, and control of malaria, and how such concerns might affect the success of control measures. Open-ended interviews, as well as true-false questionnaires, were used. The only potential drawback is the small sample size of the study, but the authors remedy this by using "consensus analysis," people living in the study area belonged mainly to the same cultural group. 75% of people interviewed believe that the mosquitoes can also acquire infections from contaminated water or by biting snakes and frogs. Furthermore, most residents believe that malaria can be acquired in other ways, such as by bathing too frequently or by drinking unboiled water. Although self-treatment of malaria with oral and injectable drugs purchased at stores and pharmacies is very common. The authors found that poor knowledge and many misconceptions about

malaria treatment and transmission existed in the community. They also found that even though National Malaria Service workers and village malaria workers had been previously found to have a higher level of knowledge than lay persons, the malaria workers still had many misconceptions about malaria transmission. The authors conclude by suggesting that an educational campaign could help improve malaria knowledge and acceptance of control efforts in the community.[48]

HEALTH CARE SEKING BEHAVIOUR FOR FEVER

Ashis Das, TK Sundari Ravindran, conducted a cross-sectional community-based survey during the high malaria transmission season of 2006 in Boudh district. Respondents (n = 300) who had fever with chills within two weeks prior to the day of data collection were selected through a multi-stage sampling and interviewed with a pre-tested and structured interview schedule. Malaria treatment providers (n = 23) were interviewed in the district to gather their insights on factors associated with prompt and effective treatment through a semi-structured and open-ended interview guideline. Majority of respondents (n = 281) sought some sort of treatment e.g. government health facility (35.7%), less qualified providers (31.3%), and community level health workers and volunteers (24.3%). The single most common reason (66.9%) for choosing a provider was proximity. Over a half (55.7%) sought treatment from appropriate providers within 48 hours of onset of symptoms. Respondents under five years (OR 2.00, 95% CI 0.84-4.80, P = 0.012), belonging to scheduled tribe community (OR 2.13, 95% CI 1.11-4.07, P = 0.022) and visiting a provider more than five kilometers (OR 2.04, 95% CI 1.09-3.83, P = 0.026) were more likely to have delayed or inappropriate treatment. Interviews with the providers indicated that patients' lack of trust in community volunteers providing treatment led to

inappropriate treatment-seeking from the less qualified providers. The reasons for the lack of trust included drug side effects, suspicions about drug quality, stock-outs of drugs and inappropriate attitude of the provider.

The authors conclude that involvement of less qualified providers is suggested in the malaria control programme as volunteers after appropriate capacity development since the community has more trust in them. This should be supported by uninterrupted supply of drugs to the community volunteers, and involvement of the community based organizations and volunteers in the planning, implementation, and monitoring of malaria control services. There is also a need for continuous and rigorous impact evaluations of the program to make necessary modifications, scale up and to prevent drug resistance.[49]

Himanshu et al conducted a similar study. In this study an area served by two districts of Upper Assam representing people living in malaria endemic area was selected for household survey. A sample of 1,989 households, in which at leastone member of household suffered from febrile illness during last three months and received treatment from health service providers, were selected randomly and interviewed by using the structured questionnaire. The individual characteristics of patients including social indicators, area of residence and distance of health service centers has been used to discriminate or group the patients with respect to their initial and final choice of service providers.

Of 1,989 surveyed households, initial choice of treatment-seeking for febrile illness was self-medication (17.8%), traditional healer *(Vaidya)*(39.2%), government (29.3%) and private (13.7%) health services. Multinomial logistic regression (MLR) analysis exhibits the influence of occupation, area of residence and ethnicity on choice of health service providers. The traditional system of medicine was

commonly used by the people living in remote areas compared with towns. As all the febrile cases finally received treatment either from government or private health service providers, the odds (Multivariate Rate Ratio) was almost three-times higher in favour of government services for lower households income people compared to private.

The researchers concluded that their study indicates the popular use of self-medication and traditional systemespecially in remote areas, which may be the main cause of delay in diagnosis of malaria. The malaria training given to the paramedical staff to assist the health care delivery needs to be intensified and expanded in north-east India. The people who are economically poor and living in remote areas mainly visit the government health service providers for seeking treatment. So, the improvement of quality health services in government health sector and provision of health education to people would increase the utilization of government health services and thereby improve the health quality of the people.[50]

AlemayehuGetahun et al[51], conducted a case control study to assess determinants of malaria treatment delay in under-five children in three districts of south-west Ethiopia. One hundred and fifty five under-five children who had clinical malaria and sought treatment after 24 hours of developing sign and symptom were considered as csase and controls were 155 under-five children who had clinical malaria and sought treatment within 24 hours of developing sign and symptom of malaria. Mothers of children who were in a monogamous marriage (OR = 3.41, 95% CI: 1.39, 8.34), who complained about the side effects of anti-malarial drugs (OR = 4.96, 95% CI: 1.21, 20.36), who had no history of child death (OR = 3.50, 95% CI: 1.82, 6.42) and who complained about the higher cost of transportation to reach the health institutions (OR = 2.01, 95% CI: 1.17, 3.45) were more likely to be late for the treatment of malaria in under-

five children. The authors conclude that effective malaria control programmes should address reducing delayed presentation of children for treatment. Efforts to reduce delay should address transport cost, decentralization of services and increasing awareness of the community on early diagnosis and treatment.

Elfatih M Malik et al, interviewed 96 mothers who had brought their febrile children to selected health facilities and conducted 10 focus group discussions with mothers at village level as well as by observation in the west of Sudan. The aim of the study is to identify the basis on which fever was recognized by mothers with children less than 5 years and classified and exploring factors involved in selection of different treatment options. Mothers' had a high score of knowledge and recognition of fever/malaria. Mothers usually started care at home and within an average of three days, they shift to health workers if there was no response. The main health-seeking behaviour is to consult the nearest health facility or health personnel together with using traditional medicine or herbs. There are also health workers who visit patients at home. The majority of mothers with febrile children reported taking drugs before visiting a health facility. The choice between the available options determined by the availability of health facilities, user fees, satisfaction with services, difficulty to reach the facilities and believe in traditional medicine. The authors concluded that mothers usually go through different treatment option before consulting health facilities ending with obvious delay in seeking care. The authors recommend implementation of malaria home management strategy urgently needed to improve the ongoing practice.[52]

Table 7 showing similar studies on knowledge and treatment seeking pattern for fever with respect to malaria.

	Ashish Das et al	Himanshuk et al	Adedotun et al	Unnikrishnan et al	Joshy et al	Budhathoki CB et al
Self medication		**17.8%**		**32.6%**		
Govt		**29.3%**		**23.4%**		
Private		**13.7%**		**9%**		
Govt/ private		**78.5% patients utilized govt compared to private-52.5%**				
Person to person transmission						**only 33.1 percent of the study subjects**
Common symptom of malaria	**90%- fever as common symptom for malaria**				**54% fever and chills as common symptom**	
Cause for malaria	**72.3%- mosquito bites**		**93.2% mosquito bites**	**80.5% mosquito bites**	**73.7% Mosquitoes bites**	
Mosquito control/ personal protection	**70.3%- method of malaria prevention**		**79.7%- using insecticides/ 44.3% herbs**		**41.9% -personal protection**	
Source of knowledge regarding malaria					**health workers (21.7%), relatives/friends (13.5%), malaria patients (10.2%)**	
ITN			**16.7% of H.H used.**		**13.2% of H.H used**	

MATERIAL AND METHODS

STUDY AREA AND SUBJECTS

The study was undertaken in Mulbagal taluk area, which is one of the five taluks in Kolar, located 25 kms from the district head quarters. Kolar district (lat. 13° 2' - 13° 20' N and long. 77° 56' – 78° 17' E) is a semiarid and a drought prone district. Less than 14% of the land is under forest cover. More than 90% of the drinking water requirements are met by ground water resources. Also, around 16% of the villages in Kolar district are affected by excess fluoride concentration in groundwater ranging from 1.5 to 4.05 mg/L, leading to endemic fluorosis. The main occupations in these communities are agricultural activities. There is intense cultivation of mulberry for silk worms, floriculture and horticulture farming. Quarrying, stone crushing and bricks and roof tiles manufacturing are major unorganized sectors in Kolar.

There are 343 villages in Mulbagal taluk covered by 17 PHC's for health care delivery. For the study purpose the PHC area was divided into two groups. One group of PHCs with API >2 and another with API <1, consistently in the last five years.

STUDY DESIGN

This analytical cross-sectional study examines the associations that exists in the two groups at the given time. The study is based on prolective data collection. This survey combines both purposes. First, to describe the population in the two groups in relation to socio-demographic, socio-economic and socio-environmental characteristics. This is the descriptive cross-sectional study component where the data was collected at one time. Second, to analyse (find explanations) why people are not utilizing the preventive measures and the health services for malaria control. Here the fever survey is repeated in the same selected

communities (cohort) three times (longitudinal study) to find the various health care seeking behaviours and consistency in health care utilization and delivery practices.[53]

SAMPLING

The sampling was done at two stages. First, two PHC areas were selected randomly one each from the two groups. Devarayasamudra from the group of PHCs with API>2 and Nangli PHC from API<1 group . Second, two villages each were selected randomly from each of these PHC areas namely Bellamballi and Hoskere from Devarayasamudra PHC and Patrahalli and Seegehalli villages from Nangli PHC. Among the four villages selected, accessibility to the nearest sub centre was within 15 minitues on foot and to PHC within 20 minutes using a public transport. The subcentres are run by the multipurpose health workers who carry out active malaria surveillance fortnightly in each village. The PHC provides passive malaria surveillance for fever cases. The Mulbagal town was excluded from this survey carried out.

The participation rate to the interview survey was above 80% in these four villages.

DATA COLLECTION

The interview survey, based on a 74-item structured questionnaire focusing on socio economic status, environment, education experiences and knowledge, attitudes and practices against malaria, was conducted in the local vernacular(Kannada and Telugu). The villagers answers about bednets and dwelling houses including window screening were confirmed during the investigators visit to each household. The survey was conducted by household visits between 8 am and 11 am and 6 pm and 8 pm.

The survey consisted of two parts. First, visits were made to enumerate information on all the households in the selected villages, including demographic, social, educational, occupational, economic, environmental and knowledge, attitude and behavior regarding malaria and its prevention. The head of the household if present at the time of the visit or an adult member of the household answered the structured questionnaire. Second, in the subsequent three visits to the households in the selected villages, information on cases with fever in the last fortnight was collected. Here the information on health care services utilized by the persons with fever including self treatment and the visits made by the multipurpose workers and ASHA was collected. Rapid diagnostic test (RDT) (Bio care) for malaria was performed on those who reported fever in the last 15 days of the investigators visit. Patients diagnosed as having malaria at the time of survey were referred to the PHC for treatment as per national guidelines.

ITEMS INCLUDED IN THE QUESTIONNAIRE:

Individual characteristics

1.Age, sex, religion and caste

2.Occupation

3.Educational level

4.Educational experience regarding malaria

5.Knowledge of malaria causes and symptoms

6.Possession, type and frequency of bednet use

7.Reason(s) for no/irregular use of bednets

8.Other individual preventive behavior for malaria

9.Details of fever treatment-seeking behavior.

10.Household characteristics

11.Structure of the house: wall, roof, floor, doors and windows

12. Details of multipurpose worker(MPW) visit to the households.

DATA COLLECTION

Primary information was collected from the respondents with the help of a pre-tested, structured and closed-ended interview schedule, translated in kannada. The respondents were asked about their health care-seeking behavior with respect to the recent episode of the disease and the actions they took for their recent episode of fever, pathways of treatment seeking, reasons for such actions, distance and mode of transport to the provider. Reasons for not going to a provider appointed by the government health system were explored.

The variables

Household: When individuals living together took meal from a common cooking facility, the entity is defined as a Household (HH).[54]

The head of Household: is defined as the person who was perceived by household members to be the primary decision-maker in the family and who may or may not have been the main income-earner.

Education: was measured by completed years of formal schooling.

Occupation: Engagement in a particular income-earning activity for the major part of the day was categorized as 'main occupation'.

HIGH RISK AREAS:

Primary health centre areas with an API above 2 cases per 1000 population per year have been classified as high risk.[55]

1. Areas of high transmission, where the reported annual incidence of malaria due to all species was ≥1 per 1000 population in 2010.

2. Areas of low transmission, where the reported annual malaria case incidence from all species was < 1 per 1000 population in 2010 but greater than 0. Transmission in these areas is generally highly seasonal, with or without epidemic peaks.

3. The malaria-free areas are where there is no continuing local mosquito borne malaria transmission, and all reported malaria cases are imported. An area is designated malaria-free when no cases have occurred for several years. Areas may become malaria free due to environmental factors or as a result of effective control efforts. In practice, malaria-free areas can be accurately designated by national programmes only after taking into account the local epidemiological situation and the results of entomological and biomarker investigations. These areas where malaria were not reported in Mulbagal were also included under areas of low transmission.

The population at risk considered is the total population living in the selected areas of low and high transmission. The population at risk is used as the denominator in calculating operational coverage of malaria preventive interventions and case incidence.

COVERAGE

Coverage of ITN bed nets and IRS. The percentage of households that own at least one ITN bed net, and the percentage of persons who slept under an ITN bed net, are taken from the household survey in these communities.

ETHICAL CONSIDERATIONS

The study received approval by the research review board and the ethical review board of Sri Devaraj Urs Medical College, Kolar. Verbal informed consent was obtained from the participants or their guardians before proceeding with the survey activities. Anonymity of the respondents at all stages of data analysis was maintained.

STATISTICAL ANALYSIS

The information from questionnaire survey was entered in Microsoft Excel and later analyzed with open epi . Chi-square ‘p’ value of < 0.05 was considered statistically significant.

Comparisons between the malaria endemic areas and low endemic area groups were made by chi-square test for bivariate analysis. Crude odds ratios (OR) and their 95% confidence intervals (95% CI) were calculated.

All statistical analyses were conducted using the Open epi (Open Source Epidemiologic Statistics for Public Health, Version 2.3).

RESULTS

SOCIO DEMOGRAPHIC INFORMATION

Table 1. Demographic information of the communities studied in Mulbagal taluk

Variable	Devarayasamudra PHC*	Nangli PHC**	Total
	N (%)	N (%)	N (%)
No. of Households	104 (50.2)	103 (49.8)	207 (100)
No. Males	275 (51)	286 (51.3)	561 (51.15)
No. Females	265 (49)	271 (48.7)	536 (48.85)

*API>2 – Devarayasamudra PHC **API<1- Nangli PHC.

Table1 shows the demographic information of the communities surveyed in Mulbagal rural area. All the households in the two villages each in the sampled PHC areas of Devarayasamudra and Nangli were surveyed .The number of households enumerated as per 2011 census in the two villages of surveyed Devarayasamudra PHC area was 129. Similarly in the two village of Nangli PHC area was 124 households were enumerated. Around 104 and 103 households could be surveyed giving a percentage of 80.6 and 83 per cent in Devarayasamudra PHC and Nangli PHC area respectively. The households which could not be surveyed were locked. Attempts were made two more times to contact them and socioeconomic status of the locked households were collected from the neighbours. There was no significant difference in the age, sex, socioeconomic and occupational aspects of these households when compared with the surveyed households.

Table 2. Age and gender distribution of study population in Mulbagal

Age (yrs)	Devarayasamudra PHC			Nangli PHC		
	Males N(%)	**Females N (%)**	**Total N (%)**	**Males N (%)**	**Females N (%)**	**Total N (%)**
< 5	12 (4.36)	13 (4.9)	25 (4.62)	13 (4.5)	14 (5.1)	27 (4.8)
6-18	54 (19.63)	61 (23)	115 (21.2)	66 (23)	68 (59)	134 (24)
19-40	110 (40)	109 (41.1)	25(46.4)	116 (40.5)	96 (35.4)	212 (38)
41-60	55 (20)	52 (19.6)	107 (19.8)	52 (18.1)	52 (19.1)	104 (18.6)
>60	44 (16)	30 (11.3)	73 (13.5)	39 (13.6)	41 (15.1)	80 (14.3)
Total	**275 (100)**	**265 (100)**	**540 (100)**	**286 (100)**	**271 (100)**	**557 (100)**

There is no significant difference in the composition of the population in terms of age and sex, in the two PHC areas. Majority of the households members belong to 19-40 years category.

Table 3. Distribution of the studied population based on Education level in Mulbagal rural

Education	Devarayasamudra PHC	Nangli PHC	Total
	N (%)	**N (%)**	**N (%)**
Illiterates	43 (41.3)	56 (54.4)	99 (47.9)
Primary and Middle	20 (19.2)	11 (10.7)	31 (15)
High school	19 (18.3)	14 (13.6)	33 (16)
College and above	22 (21.2)	22 (21.4)	29 (21.3)

Table 3. shows the distribution of the studied population based on education level in Mulbagal rural. Around 48 per cent of the head of the households in the studied communities were illiterate. The proportion of illiterates in Nangli PHC area was 54.4 per cent and in Devarayasamudra PHC was 41 per cent.

Table 4. Distribution of the studied population based on Occupational status

Occupation	Devarayasamudra PHC	Nangli PHC	Total
	N (%)	N (%)	N (%)
Agriculture land owner	15 (14.4)	33 (32)	48 (23.2)
Manual labour	39 (37.5)	47 (45.6)	86 (41.5)
Service/employed	24 (23.1)	9 (8.7)	33 (15.8)
Self employed	15 (14.4)	nil	nil
House wives	11 (10.6)	14 (13.6)	25 (12)

Table 4 Shows distribution of the studied population based on occupation. Around 41% in the households were working as labourers in agricultural fields, construction sites and in other manual work sector.

Table 5. Distribution of study population according to socioeconomic status

Grades*	Devarayasamudra PHC	Nangli PHC	Total
	N (%)	N (%)	N (%)
lll	7(6.5)	11(9)	18(7.7)
IV	76(71)	75(74)	151(72.5)
V	21(22.5)	16(17)	37(19.7)

The socioeconomic status of the households surveyed in the two PHC areas was graded as per Pareek's socioeconomic classification. The variables studied which included nine components namely Caste, Occupation, Education , Land owning , Social participation, Family members, House, Farm power and Material possession.

None of the households came under the upper and upper middle class(Grade I and II). Majority(72.5%) of the households would be classified under lower middle class. Around 20 per cent belong to lower class and there is no significant difference in the distribution of households according to socioeconomic classification in the two PHC areas.

Table 6. Distribution of study population according to Caste

Caste	Devarayasamudra PHC	Nangli PHC	Total
	N (%)	N (%)	N (%)
Scheduled Caste	34 (32.7)	18 (17.3)	52 (25)
Scheduled Tribe	12 (11.5)	24 (23)	3(17.2)
OBC*	58 (55.8)	62 (59.6)	120 (58.9)
BPL family**			
	92 (88.5)	81 (78)	173 (83.25)

*OBC- Other back ward community, **BPL- Below poverty line

The studied villages had only Hindus. All the households surveyed belong to either scheduled caste, scheduled tribes or other back ward community. There were none belonging to upper caste group.

Table 7. Socio environmental information of the Households in the communities studied in Mulbagal taluk

Variable	Devarayasamudra PHC	Nangli PHC	Total
	N(%)	N(%)	N(%)
Type of House			
Pucca Semi pucca Katcha Sanitary latrine present	78(75) 4(3.8) 22(21) 30(28.8)	48(46.6) 7(6.8) 48(46.6) 18(17.5)	126(60.8) 11(5.3) 70(33.8) 48(23.1)
Presence of livestock			
Draft animals Milch animals Goat/sheep) Poultry	27(26) 53(51) 14(13.5) 20(19.2)	13(12.6) 78(75) 17(16.5) 5(5)	40(19.3) 131(65.5) 31(15) 25(12)
Water collection point			
Community hand pump Community taps Individual H.H water supply	5(4.8) 64(61.5) 17(16.3)	20(19.4) 73(70.2) 8(7.7)	12.5 68.5 12.5

Table7 shows the Socio environmental information of the house holds in the communities studied in Mulbagal taluk. Majority of the houses(75%) in the studied villages of Devarayasamudra PHC area were of pucca type. Around 61% of the studied households in these two communities were pucca houses. Around 47% of the houses were katcha in nature in the villages studied in Nangli PHC area. Only 25% of the households in the studied communities had sanitary latrines. Around 45%

of the households and around 75% of the households in the Nangli PHC and 51% in Devarayasamudra area were having cows or buffaloes. The milk is sold to co-operative dairies. Majority of the households(68.5%) procured water for domestic purpose from community taps and only around 12% had independent household water supply.

BEHAVIOUR/KNOWLEDGE, ATTITUDE AND PRACTICES OF THE POPULATION IN RELATION TO MALARIA IN MULBAGAL RURAL

Table 8. Reported knowledge on Malaria transmission in the study population in Mulbagal

Variable	Devaraysamudra PHC	Nangli PHC	Total	χ^2 test	p-value
	N(%)	N(%)	N(%)		
Person to person transmission	72(69.2)	28(26.9)	100(48)	38.28	<0.001
Knowledge/Information providers					
Health care providers*	91(87.5)	13(10.5)	104(49)	119.1	<0.001
Students**	35(33.7)	8(7.7)	43(20.7)	21.73	<0.001
ASHA workers	Nil	18(17.3)	18(17.3)	NA	NA

*Health care providers- Doctors and ANM's, **Students- Medical and Nursing students.

Appropriate knowledge regarding malaria transmission from person to person is more in Devarayasamudra PHC area(69.2%) compared to Nangli area(26.2). This difference in the knowledge regarding malaria transmission from person to transmission is statistically significant (p <0.001).

In Devarayasamudra PHC area has received much higher information or knowledge regarding malaria by health care providers (87%) where as in Nangli PHC area very few (10.5%) of the house holds

recollected about the health care providers providing information on malaria.

ASHA workers are involved in delivery of information regarding malaria in Nangli area where as in Devarayasamudra area they are not involved.

Table 9. Distribution of Households in relation to awareness on causes, transmission, and symptoms of malaria

Variable	Devarayasamudra PHC	Nangli PHC	Total	χ^2 test	P-value
	N(%)	N(%)	N(%)		
Awareness on causes of malaria					
Mosquito	85(81.7)	35(34)	120	48.43	<0.001
House fly	2(1.9)	6(5.8)	8		
Dirty water	1(1)	1(1)	2		
Do not know	16(15.4)	61(59)	77	47.40	<0.001
Awareness on transmission of malaria					
	72(69.2)	28(26.9)	100(48)	36.64	<0.001
Awareness on symptoms of malaria					
Fever	84(34.2)	29(27.8)	113(32.3)	57.79	<0.001
Headache	41(16.7)	NilF	41(11.7)		
Body ache	53(21.6)	6(5.7)	59(16.9)	51.73	<0.001
Chills	57(24.2)	4(3.8)	61(17.4)	64.54	<0.001
Do not know	10(4)	65(62.5)	75(21.4)	64.09	<0.001
Total	245	104	349(100)		

The knowledge on the causes and symptoms of malaria is better in Devarayasamudra PHC area compared to Nangli PHC area. Appropriate knowledge regarding causes of malaria is more in Devarayasamudra PHC area(81.7%) compared to Nangli area(34%). This difference in the knowledge regarding causes of malaria by mosquito bite is statistically significant (p <0.001). Around 62% of the respondents in Nangli PHC area could not mention any symptom of malaria.

Table 10. Distribution of households according to availability and usage of mosquito bed nets

	Devarayasamudra PHC	**Nangli PHC**	**Total**
	N(%)	**N(%)**	**N(%)**
Availability of bed nets			
Nil	42(40.2)	77(74)	119(59.5)
1	37(35.6)	15(14.4)	52(25)
2	20(19.2)	11(10.6)	31(14.9)
More than 2	5(4.8)	Nil	5(4.8)
No. of members using bed nets			
Nil	44(42.3)	77(74)	121
1	42(40.4)	15(14.4)	57(27.2)
2	14(13.5)	10(9.6)	24(11.5)
More than 2	4(3.9)	1(1)	5(2.4)
Usage of bed nets according to no. of months in the last year			
Nil	42(37.5)	80(82)	122(58.9)
Less than 6 months	40(40)	22(17)	62(30)
More than 6 months	22(22.5)	1(1)	23(11)
	104(100)	103(100)	207(100)

Around 59.5% of the households visited in these communities did not possess bed nets. More number of households (59.6%) in Devarayasamudra PHC area had one or more bed nets compared to 25% in Nangli PHC area. Also 82% of the households in Nangli had never

used a bed net whereas only 37.5% in Devarayasamudra PHC area. In Nangli PHC area both the possession and usage of bed nets is very low.

HEALTH CARE UTILIZATION AND DELIVERY IN RELATION TO MALARIA AND FEVER

Health care seeking behavior among the community members with fever in the last fortnight

Table 11. Age and sex distribution of community members with fever in the last fortnight of the survey

Age(yrs)	Devarayasamudra PHC		Nangli PHC	
	Male	Female	Male	Female
	N (%)	N (%)	N (%)	N (%)
<5	1 (8.3)	3 (12.5)	3 (23)	1 (6.2)
6-18	6 (50)	8 (33.3)	6 (46)	3 (18.7)
19-40	5 (41.6)	9 (37.5)	2 (15.3)	7 (43.7)
>40	nil	4 (16.6)	2 (15.3)	5 (31.2)
Total	12 (100)	24 (100)	13 (100)	16 (100)

In the four identified study villages of Devarayasamudra and Nangli PHC areas three visits were made over a period of 6 months to enumerate those who had fever in the last fortnight from the day of investigators visit. Also the treatment seeking behavior and the health care delivery services provided by the PHC workers was obtained. A total of 65 fever cases were identified in these four communities. All these fever cases were those who had fever in the last fortnight from the day of the investigators visit.

Table 12. Distribution of fever cases according to treatment seeking pattern in the last fortnight.

Treatment seeking pattern	Devarayasamudra PHC		Nangli PHC	
	Male	Female	Male	Female
	N (%)	N (%)	N (%)	N (%)
Self treatment	3 (33.3)	5 (11.1)	6 (25)	4 (14.8)
PHC	8 (44.4)	15 (55.5)	12 (50)	14 (51)
Private Hospital	4 (22.2)	7 (25.9)	6 (25)	8 (2.6)
Compounder Quack	Nil	2 (7.4)	nil	1 (3.7)
Total	15 (100)	29 (100)	24 (100)	27 (100)

Thirty six fever cases were enumerated from Devarayasamudra PHC and 29 from Nangli PHC area. Out of the 65 fever cases 49 of them had seeked the services of primary health centers. Only 17 of them had utilized the services of the private health care providers. Also 18 of them had tried to take treatment on their own. The difference in the treatment seeking pattern for fever among the communities studied in these two PHC areas is not statistically significant.

Table 13. Treatment seeking pattern according to age

Age (yrs)	Devarayasamudra PHC				Nangli PHC			
	Self treatment	**Private clinic**	**PHC**	**Compounder/ Quack**	**Self treatment**	**Private clinic**	**PHC**	**Compounder /Quack**
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
<5	nil	2 (14.2)	3 (12)	Nil	nil	3 (21.4)	4 (16)	nil
6-18	1(11.1)	8(57.1)	9(36)	Nil	3(30)	4(28.5)	9(36)	nil
19-40	7(77.7)	4(28.5)	9(36)	1(100)	1(10)	4(28.5)	8(32)	nil
>40	1(11.1)	nil	4(16)	nil	6(60)	3(21.4)	4(16)	1(100)
Total	9 (100)	14 (100)	25 (100)	1 (100)	10 (100)	14 (100)	25 (100)	1 (100)

It is interesting to note according to table 13 that none of the children below 5 years were given self treatment. Both the sex groups preferred using public health service provider compared to private health service provider. None of the people above 40 years belonging to Devarayasamudra PHC area had been to a private health care provider.

Table 14. Health care service utilization for fever according to age

Age(yrs)	Self treatment	Devarayasamudra PHC	Nangli PHC	Odds ratio	P value	CI
		N	N			
Less than18	Yes	1	4	0.218	0.21	0.196-2.44
	No	8	7			
More than18	Yes	8	7	4.5	0.21	0.408-51.14
	No	1	4			
	Private treatment					
Less than 18	Yes	10	7	2.5	0.25	0.52-11.92
	No	4	7			
More than 18	Yes	4	7	0.4	0.25	0.08-1.90
	No	10	7			
	PHC					
Less than 18	Yes	12	13	0.85	0.77	0.28-2.58
	No	13	12			
More than 18	Yes	13	12	1.17	0.77	0.38-3.55
	No	12	13			

Among individuals more than 18 years in the Devarayasamudra PHC area, there was 4.5 times greater chances of administering self treatment. Similarly among individuals less than 18 years belonging to Devarayasamudra PHC there was 2.5 times higher chances of going to a private health care provider.

Table 15. Pattern of self treatment for fever among community members in Mulbagal rural

	Devarayasamudra PHC	Nangli PHC
	N (%)	N (%)
Modes of self treatment		
Tablets purchased from medical shops by telling symptoms	2 (22.2)	4 (36.3)
Some specific drugs are taken from shop	6 (66.6)	6 (54.5)
Consuming drugs present in home	1 (11.1)	1 (9)
Total	9 (100)	11 (100)
Reported reason for seeking health care for fever from private service provider		
Lack of trust in PHC	6 (16.6)	4 (13.7)
Trust in private	6 (16.6)	4 (13.7)
Poor services in PHC	5 (13.8)	6 (20.6)
No specific reason	19 (52.7)	15 (51.7)
Total	36 (100)	29 (100)
Reason for delay (about two days) in not seeking treatment for fever		
Negligence	24 (66.6)	21 (72.4)
Lack of money	1 (2.7)	3 (10.3)
Old age	1 (2.7)	Nil
Not necessary	10 (27.7)	5 (17.2)
Total	36 (100)	29 (100)

Table 15 shows the pattern of self treatment among the fever cases. Around 60% of people have asked for specific drugs from pharmacy and petty shops. Around 29% of them purchased the drugs after telling the symptoms to the chemist. During the three visits made in these identified 4 villages, 25 of them had seeked treatment from private health service provider. The reasons for seeking service from the private sector commonly was because of perceived poor services provided in the PHC and lack of trust in PHC services.

Sixty five persons who have identified to have fever sought treatment only after two days. The commonest reason attributed is negligence(22%). Around 15 of them felt that treatment was not necessary.

DELIVERY OF HEALTH CARE SERVICES FOR MALARIA PREVENTION AND CONTROL

Table 16. Distribution of frequency of visit according to the households with fever in the last fort night

	Devarayasamudra PHC	**Nangli PHC**
	N (%)	**N(%)**
Frequency of MPW* visit		
Once in fortnight	17 (48.5)	8 (27.5)
Once in a month	13 (36.1)	16 (55.1)
Once in more than one month	6 (16.6)	5 (17.2)
Total	36 (100)	29 (100)
Distribution of fever cases in the studied villages of Mulbagal according to blood smear collection		
Smear	Devarayasamudra PHC	Nangli PHC
Done	17 (47.2)	4 (13.7)
Not done	19 (52.7)	25 (86.2)
Total	36 (100)	29 (100)
Distribution of fever patients according to receipt of tablets for fever after blood smear collection		
	Devarayasamudra PHC	Nangli PHC
Received tablets	13 (36.1)	3 (10.4)
Did not received tablets	23 (63.9)	26 (89.6)
Total	36 (100)	29 (100)

MPW*- Multi purpose worker

Visit by the health care workers to the households in the last fortnight of fever was more in Devarasamudra area(48.5%) compared to Nangli area (27.5%). Blood smear collection in in the last fortnight for

fever cases was more in Devarasamudra area(47.2%) compared to Nangli area(13.7%). Receipt of tablets for fever after blood smear collection was more in Devarayasamudra area(36.1%) compared to Nangli area(10.4%).

Table 17. Distribution of studied population according to receipt of health education and health care providers who gave health education regarding malaria in the last 6 months

	Devarayasamudra PHC	**Nangli PHC**
	N(%)	**N(%)**
Health education		
Yes	63 (60.5)	3 (3)
No	41 (39.5)	100 (97)
Total	104 (100)	103 (100)
Distribution of H.H according to health care providers who gave health education regarding malaria		
Health care providers	API>2	API<2

Health care providers*	91(87.5)	13 (10.5)
Students**	8(7.7)	35(33.7)
ASHA workers	Nil	18(17.3)
Distribution of H.H according to distribution of Insecticide treated bed nets(ITN)		
ITN bed nets		
Yes	38(36.5)	Nil
No	66(63.4)	103(100)
Total	104(100)	103(100)

*Health care providers- Doctors, ANM. ** Students- Medical and nursing students.

In Devarayasamudra PHC area about 60.5% of population had received health education compared to Nangli area where only 2% of population had received health education regarding malaria prevention and control.About 36% of the population in Devayayasamudra area has received insecticide treated (ITN) bed nets where as no ITN treated bed nets are received in Nangli area. Four house holds in Hoskere village which is in Devarayasamudra area for malaria has received Insecticide residual spray(IRS) and none of the households in other three villages had received insecticide residual spray(IRS).

Table 18. Distribution of the fever cases in the PHC areas according to Socio demographic variables.

Variable	**Devaeayasamudra PHC**	**Nangli PHC**
	N(%)	**N(%)**
Males	13	12
Females	16	24
Less than 18 years	13	18
More than 18 years	16	18
Upper caste	6	10

Lower caste	23	25
Grade lll SES	7	11
Grade IV SES*	76	75
Grade V SES	21	16

*SES - Socio Economic Status

Table 18 shows the distribution of the fever cases in the PHC areas according to Socio demographic variables. There is no significant difference in the socioeconomic variables and the fever cases in the two PHC center areas.

Table 19.Treatment seeking pattern with respect to Education and Caste in the study population in Mulbagal rural

	Devarayasamudra PHC	**Nangli PHC**	**Odds ratio**	**P value**	**CI**
Self Treatment					
Illiterates	5	6	1.66	0.627	0.21-13.22
Literates	2	4			
Private Treatment					
Illiterates	5	5	1	1	0.19-5.06
Literates	7	7			
PHC					
Illiterates	13	12	2.02	0.083	0.74-5.5
Literates	15	28			
Self Treatment					
Upper caste	3	7	0.862	0.86	0.13-5.08
Lower caste	5	10			
Private Treatment					

Upper caste	9	6	3	0.168	0.61-14.6
Lower caste	4	8			
PHC					

Variable	**Devarayasamudra PHC**	**Nangli PHC**	**Odds ratio**	**P value**	**CI**
Upper caste	13	17	0.52	0.26	0.17-1.61
Lower caste	13	9			

Table 19 shows the distribution of treatment seeking pattern with respect to education and caste in the study population in Mulbagal rural.

The odds of illiterates administering self treatment in Devarayasamudra PHC area is 1.66 times compared to Nangli PHC area. Similarly the odds of illiterates seeking treatment from a public health sector in Devarayasamudra area is 1.66 times compared to Nangli PHC area. But none of these findings were statistically significant.

Table20.Treatment seeking pattern with respect to gender in the study population

Self Treatment					
Males	3	6	0.42	0.34	0.05-2.94
Females	5	4			
Private Treatment					
Males	4	6	0.76	0.74	0.05-3.85
Females	7	8			
PHC					
Males	8	12	0.62	0.41	0.19-2.01
Females	15	14			

Table 20 shows the treatment seeking pattern with respect to gender in the study population according to PHC areas. No significant association was found between gender and residence in the two PHC areas with respect to treatment seeking behaviour.

DISCUSSION

This study demonstrates that people's health care seeking behavior and health service delivery in rural areas of Kolar differs with varying endemicity of Malaria. There is a lack of information on treatment seeking practices and health care delivery for fever and malaria in Kolar. Hence, this baseline survey was carried out.

Around 48% of the head of the households in the studied communities were illiterates. Around 21.3% had an education at college and above level. Majority of the head of the households are male members.

As per 2011 census, The overall literacy rate in the country is 74%. The literacy rate of males in the country is 82.14 and the literacy rate of males in Karnataka is 82.85% .The rural literacy rate of males in Karnataka is 77.92%.The literacy rate of males in Kolar is 81.94%. The literacy rate of women in the country is 65.5%.The literacy rate of females in Karnataka is 68.13 and the literacy rate of females in Kolar is 66.56%. [56]

Around 65% of the studied population in these areas undertook agricultural activities. Around 23.2% of the household were engaged in agricultural activities in their own lands and 45.5% of them did agricultural labour work. This is the common scenario in Indian agrarian societies. Majority of them depended on agricultural activities for their livelihood. This information on occupation is very much essential to understand the epidemiology of malaria. Agriculture and agriculture related activities favour transmission of malaria. Some of the well known factors favoring malaria in agricultural societies are presence of open wells, ponds, irrigation canals, water lodged fields which facilitate mosquito breeding. Malaria consequent on such human undertakings is called man-made malaria.[57]

Certain human behaviors which favour mosquito bites are working in agricultural fields with minimal clothing. Sleeping in agricultural fields in the night and sleeping outdoors during summer and a peak in biting activity was recorded outdoors and early in the evening.[58]

All the households in the studied communities of Mulbagal belong to either scheduled caste (SC=25%), scheduled tribes (ST=17.2%) and

other backward communities (OBC=58.9%). Around 83.2% of these households were considered as below poverty line (BPL) by the government. Such a distribution of communities is typical of agricultural dominant societies. The social and economical conditions and behavior related to health care utilization are likely to be different when compared to societies or communities, where the upper castes are prominent. Also in those communities where other occupations were practiced namely industries, trade, education etc the epidemiology of malaria is likely to be different.

Around 60.8% of the houses in the studied villages were of pucca type and 33.8% were of katcha type.

As per the National Sample Survey conducted during July, 2008 to Jun, 2009 out of total rural households, 55.4% of them were residing in pucca houses, and 17.0% were residing in katcha houses. whereas, 91.7% households were residing in pucca, 6.2% in semi-pucca and 2.1% were residing in katcha houses in urban areas.[59]

Only 23.1% of the households had a sanitary latrine. As per 2011 census, the total rural households in India possess 33.6% of sanitary latrines. [56]

A significant percentage (65.5%) of households in the selected communities had milch animals like cows and buffaloes. Cooperative dairying is a predominant development in rural Kolar apart from rearing of silk worm, horticulture and floriculture.

In our study we reported on knowledge of person to person transmission in the communities and we found that around 48% of the interviewed persons were aware that malaria is transmitted by mosquito bites. This knowledge was better in Devarayasamudra PHC area community (69.2%) compared to Nangli PHC area (26.9%). This difference was statistically significant ($p<0.001$). Budhathoki et al in the

year 2008 did a study on perceptions of malaria pattern of treatment seeking behavior among Tharu and Pahari communities of Jhalari and it was observed that 33.1% of the subjects had knowledge regarding person to person transmission. [60]

The knowledge on transmission of malaria was acquired from either health care providers namely ANMs, ASHA workers and, medical and nursing students. Around 33.7% of the interviewed household members in Devarayasamudra PHC area mentioned that they acquired information on malaria transmission from medical and nursing students and, interns of the medical college in Kolar. Devarayasamudra PHC area is the field practice area for this medical college. Hence, the knowledge on malaria and it's transmission is better (69.2%) in Devarayasamudra PHC area compared to Nangli PHC area (26.9%). In a study conducted by Joshi AB et al, the source of knowledge regarding malaria was health workers (21.7%), relatives and friends (13.5%), and malaria patients (10.2%).[61]

We also found that awareness on causes of malaria by mosquito bites was 81.7% in Devarayasamudra PHC compared to 34% in Nangli PHC area. This difference was statistically significant ($p<0.001$). Similar findings were observed in a study conducted by Joshi AB et al where 73.7% of the subjects had awareness on causes of malaria by mosquito bite. [61]

The awareness on the symptoms of malaria namely fever, headache and body ache was better in Devarayasamudra PHC area compared to Nangli area. The difference in the knowledge on transmission of malaria and symptoms of malaria could be due to one, Devarayasamudra PHC area was hyperendemic for malaria in the last one and half decade. Intense malaria control efforts like health education, insecticide spraying,

biological control measures, environmental and surveillance were carried out since past one and half decade whereas in Nangli PHC area did not have such a problem. Secondly, the service provided by the medical college in Kolar in Devarayasamudra PHC area in the prevention and control of malaria could have promoted acquiring of knowledge by community members in the Devarayasamudra PHC area.

It is interesting to note around 59.5% of the households visited in these communities did not possess bed nets. More number of households (59.6%) in Devarayasamudra PHC area had one or more bed nets compared to 25% in Nangli PHC area. Also 82% of the households in Nangli had never used a bed net whereas only 37.5% in Devarayasamudra PHC area. This observation on bed net usage is significant from the point of view of malaria appearance and it's control. The fact that malaria is a well recognized public health problem in Devarayasamudra PHC area, more households possess bed nets and use it. Whereas in Nangli PHC area both the possession and usage of bed nets is very low. However, it must be noted that environment, social and occupation characteristics of these communities are the same. Hence, it could be concluded that mosquito nets are used in Devarayasamudra PHC area to prevent malaria.

Regarding the utilization of health care services for fever and its management it is observed that there is no significant difference in the pattern in these two PHC areas. However, it is interesting to note that young children were never given self treatment by the care providers at home. Among the adults who utilized the services of a health care provider it was observed that majority of them utilized the services of the nearby primary health center. The children were usually taken to a private practitioner. The middle aged and the elderly usually visited the government health centers. Himanshu et al observed in their study that

29.3% of the subjects who had fever in the last three months utilized health care services of public health provider and 13% utilized services of private practitioners. This is conflicting with the observation that 60% of the people in the country use private sector for common ailments.

It is interesting to know the reason why the private health care services are used in preference to public health services. The most common reason was no specific reason (52.2%) as it was a trend in these communities. Some other reasons are more trust in private practitioners (15.15%) and perceived poor quality of services in the primary health care centers (17.2%) . In a study conducted by Ozawa S et al, the reasons to visit private providers tended to be the more personal and practical manner in which they provide treatment.

Cambodians in the study said that most private providers as friendly, gentle and sympathetic. Villagers often mentioned the location or names of specific private providers they trust.[62]

Interestingly, the reasons for not seeking health care for management of fever within 48 hours were found out which included that majority (69%) of them who had fever in the last fortnight neglected to seek treatment and a few of them felt that seeking treatment for fever was not needed (22.45%).

Delivery of Health Care Services for malaria prevention and control

Sixty five persons were identified to have fever in the last fortnight from the day of the visit in the four rural communities of Mulbagal. These fever cases were identified during the three consecutive visits made to all the households over a period of six months. Only 38%% of these fever cases were visited by the Multipurpose health

worker(MPW). The strategy in Malaria prevention and control in the rural areas is that the MPW has to actively identify cases of fever suggestive of Malaria in the communities by making fortnightly households visits. A Blood smear has to be done on the fever cases and sent to the laboratory in the PHC. Malaria positive cases has to receive radical therapy at household level. Only around 48.5% of the cases were visited by MPW's in Devarayasamudra PHC area compared to 27.5% in Nangli PHC area. This difference was statistically significant. Malaria is frequent in the communities served by Devarayasamudra PHC area. Malaria is not perceived as a public health problem in Nangli PHC area. Hence the frequency of visit by the MPW may be more in Devarayasamudra PHC area compared to Nangli. It is very important for the health care providers at the community level to maintain active surveillance every fortnightly on Malaria. This is the most important strategy for Malaria prevention and control. It is observed that in around 54% of those households which reported fever cases in Devarayasamudra and in 72.5% in Nangli PHC area the MPWs visited once in a month or less frequently for fever surveillance (Table 16).

It is observed that in all the fever cases that were identified by the MPW within a fortnight in Devarayasamudra PHC area a blood smear was taken. Whereas in the Nangli PHC area only in 50% of the cases was a blood smear taken within a fortnight of occurrence of fever. Only three fourth of the fever cases identified within a fortnight received treatment for presumptive Malaria in Devarayasamudra PHC area and less than half in Nangli (Table 17).

In Devarayasamudra area about 60.5% of population has got health education compared to Nangli area where only 2% of population has got health education regarding malaria prevention and control.

Around 36.5% of the population in Devayayasamudra area has

received insecticide treated (ITN) bed nets whereas no ITN treated bed nets were received in Nangli area. Four house holds in Hoskere village which is in Devarayasamudra area were sprayed Insecticide residual spray(IRS) and none of the other three villages had insecticide residual spray(IRS) of the households..

LIMITATION OF THE STUDY

This study attempts to find only some of the factors that influences the epidemiology of malaria in a rural agricultural society, namely behavioural aspects linked to utilization of available health care services, knowledge about malaria and it's transmission and socio economic aspects of the studied communities. Also, the malaria prevention and control services as per the Anti-Malaria program provided by the public health care system established by the government was studied. No attempt is made to study the environmental aspects of malaria including vectors behavior.

The findings of this study could be applicable only to those communities which have socio cultural similarities with the communities studied as malaria is local and focal disease.

SUMMARY AND CONCLUSION

This study on the health care seeking behavior for fever and community based health care delivery for malaria was undertaken in the malaria problematic and non-problematic communities in Mulbagal taluk of Kolar district in Karnataka.

The community knowledge on malaria, it's transmission and it's prevalence and control clearly depends on the endemicity of malaria. The communities studied under Devarayasamudra PHC area which is problematic for malaria had a better knowledge on malaria transmission and it's prevention. Similarly the health care delivery services for fever cases provided by the staff of the primary health centers in Devarayasamudra PHC area was directed towards malaria prevention and control. The knowledge on malaria transmission, it's prevention and control was relatively poor in Nangli PHC area. Similarly he community based health care services for cases of fever directed towards malaria prevention and control was also relatively poor in Nangli PHC area where malaria is not perceived as a public health problem.

Health is one of the thrust areas under the National Common Minimum Programme (NCMP). NRHM under NCMP has the mission of improving the availability and accessibility to quality health care services to people in the rural areas. The findings from this survey on knowledge and practices in malaria prevention, health seeking behavior and health service delivery have important implications for implementing the malaria prevention and control programme. The results of the study show that there is a felt need for providing credible information on malaria and its prevention under the anti malaria programme. This may improve the health care seeking practices for fever. It has been found that knowledge

of malaria influences the use of preventive measures such as use of insecticidal nets. [63] Intensive campaign for practicing early diagnosis and treatment is necessary so that the community is convinced about its need for reducing malaria morbidity. The poor health care services delivery problem in the rural areas of Kolar is highlighted in this study. No attempt is made to study the reasons for the lacunae in health care delivery. Priority should be given to improve the health service delivery through better training of the multipurpose workers, continuing education of all levels of health workers, better management of the primary health centres and an effective behavioural change communication programme. The socio-cultural factors namely education, beliefs, knowledge, use of local medicines, gender inequality favouring the utilization of health care services provided by the government and private sector is demonstrated in this study.

The results of the present study highlights the need to do local research on Malaria in terms of one: as a disease of National priority in terms of local health seeking behavior, local quality control in health care service, local case management of malaria and on local vector control, two: service delivery problems namely, local health facilities coverage, evaluation of health education strategies, coverage and efficiency of existing malaria surveillance services locally and, three: socio-cultural determinants to health namely study of various malaria preventive practices, use of self treatment in fever, and impact of socio-economic status on health locally.

This study highlights the importance to consider the behavioural and social aspects of malaria control and to acknowledge that the sociocultural environment is significant in the epidemiology of malaria. Indeed, the success of the worldwide malaria control initiative depends on serious attention to these factors. [7]

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ANNEXURES

ANNEXURE - I

CONSENT FORM

PROCEDURES

In this study, all patients of any age complaining of fever for less than 15 days duration and having no other diagnosis will be registered and screened for malaria. For diagnosis of disease (malaria), about 3 drops for peripheral blood smear and about 2 drops for RDT will be taken for examination.

CONFIDENTIALITY

The information provided by you will remain confidential. Nobody except principal investigator will have an access to it. Your name and identity will also not be disclosed at any time.

AUTHORIZATION

I have read and understand this consent form, and I volunteer to participate in this research study. I further understand that nothing in this consent form is intended to replace any applicable laws.

Participant's Name : Participant's Signature or thumb impression:

Date:

Principal Investigator's Signature: Signature of Person Obtaining Consent

Date :

ANNEXURE – II

DEMOGRAPHIC INFORMATION

Identification No: **Date of Interview:**

House Hold No: **Respondent Name:**

1. ನಿಮ್ಮ ಮನೆಯ ಮುಖ್ಯಸ್ಥರು ಯಾರು:
2. ವಿಳಾಸ:
3. ನಿಮ್ಮ ಧರ್ಮ ಏನು : ಎ. ಹಿಂದೂ ಬಿ. ಮುಸ್ಲಿಮ್ ಸಿ. ಕ್ರೈಸ್ಟ್ ಡಿ. ಇತರೆ
4. ನಿಮ್ಮಜಾತಿ ಏನು:
5. ನೀವು ಯಾವ ಕೆಲಸ ಮಾಡುತ್ತೀರಿ: ಅ. ಏನೂ ಇಲ್ಲ, ಆ. ಕೂಲಿ ಇ. ಜಾತಿ ಕೆಲಸ
   ಈ. ವ್ಯಾಪಾರ. ಉ.ಸ್ವಯಂ ಕೃಷಿ ಊ. ಸೇವೆ.
6. ಅನಕ್ಷರಸ್ತರೆ:
7. ನಿಮ್ಮ ಭೂಮಿ ಎಷ್ಟಿದೆ?
8. ಸಾಮಾಜಿಕ ಭಾಗವಹಿಸುವಿಕೆ:
9. ಕೃಷಿ ಶಕ್ತಿಯನ್ನು

Sr No	Name of HH member	Relation to Head of HH	Age	Sex	Education	Marital Status	Occupation	Monthly income
01								
02								
03								
04								
05								
06								
07								
08								
09								
10								

10. ಕುಟುಂಬ ಕೌಟುಂಬಿಕತೆ– :

1.Nuclear 2. Joint 3. Extended 4.Others

11. ನಿಮ್ಮ ಮುಖ್ಯ ಆರ್ಥಿಕ ಆದಾಯ ಯಾವುದು?

1.Cultivation	2.Live stock	3.Sericulture	4.Agriculture Wage Labourer	5.Non – Agriculture Wage Labourer
6.Independent Work	7.Petty Shop	8. Salary	9.Artisan	10.Other (Specify)

12. ಕೃಷಿ ಚಟುವಟಿಕೆಯ ಮಾಹಿತಿ (ಒಂದು ವರ್ಷದಿಂದ)

13. ವಸತಿ

14. ಯಾವರೀತಿಯ ವಸತಿ?

15. ಆಸ್ತಿಗಳು.

16. ದನಕರುಗಳು:

17. ಯಾವ ರೀತಿ ಮನೆ

18. ಮನೆಯ ಕೋಣೆಗಳು ಎಷ್ಟು?

19. ನಿಮ್ಮ ಮನೆಯ ವಿಸ್ತೀರ್ಣ ಎಷ್ಟು?

20. ನಿಮ್ಮ ನೀರು ಸಂಗ್ರಣೆ ಹೇಗೆ ಮಾಡುತ್ತೀರಿ?

21. ಶೌಚಾಲಯ

22. ಕುಡಿಯ ನೀರಿನ ಮೂಲಗಳು:

23. ಬೆಳಕು

24. ಗಾಳಿ ಬೆಳಕನ್ನು ಹಾಯಿಸುವುದು?

25. ನಿಮ್ಮ ಅಡುಗೆ ಮೆನೆಯ ನೀರು ಎಲ್ಲಿ ಹೋಗುತ್ತವೆ?

26. ಕಲುಷಿತ ವಿಲೇವಾರಿ ಎಲ್ಲಿ ಹಾಕುತ್ತಿರ?

27. ಸಾಕು ಪ್ರಾಣಿಗಳನ್ನು ಎಲ್ಲಿ ಕಟ್ಟಿಹಾಕುತ್ತೀರ?

28. ನಿಮ್ಮ ಮನೆಯ ಸುತ್ತಮುತ್ತಲು

29. ನೀವು ಬಿ.ಪಿ.ಎಲ್. ಕಾರ್ಡ್ ಬಳಸುತ್ತೀರ?

30. ನಿಮ್ಮ ಕೃಷಿ ಭೂಮಿ ಎಷ್ಟು?

ವಿಭಾಗ –ಬಿ

ಆರೋಗ್ಯ ಬಳಕೆ

1. ನಿಮ್ಮ ಮನೆಯಲ್ಲಿ ಕಳೆದ 15 ದಿನಗಳಿಂದ ಯಾರಿಗಾದರೂ ಜ್ವರ ಬಂದಿತ್ತೆ?

   ಅ.ಹೌದು.ಆ. ಇಲ್ಲ.

2. ನಿಮ್ಮ ಮನೆಯಲ್ಲಿ ಕಳೆದ 15 ದಿನಗಳಲ್ಲಿ ಎಷ್ಟು ಜನ ಜ್ವರಕ್ಕೆ ಒಳಗಾಗಿರುತ್ತಾರೆ?

3. ಯಾರು ಅವರು? ಅವರ ಹೆಸರು / ಲಿಂಗ / ವಯಸ್ಸು

4. ಪ್ರಸ್ತುತ ಯಾರಿಗಾದರೂ ನಿಮ್ಮ ಮನೆಯಲ್ಲಿ ಜ್ವರದಿಂದ ಬಳಲುತ್ತಿದ್ದಾರ?

5. ಅ.ಹೌದು.ಆ. ಇಲ್ಲ.

6. ಹೌದು ಎಂದಲ್ಲಿ ಯಾರು? ಅವರ ಹೆಸರು / ಲಿಂಗ / ವಯಸ್ಸು

7. ಕಳೆದ 15 ದಿನಗಳಲ್ಲಿ ನೀವು ಅಥವಾ ನಿಮ್ಮ ಮನೆಯಿಂದ ಯಾರಾದರು ಬೇರೆ ಪ್ರದೇಶದಿಂದ ಹೋಗಿದ್ದರ?

8. ಹೌದು ಎಂದಲ್ಲಿ ಪ್ರದೇಶದ ಹೆಸರು ಹೇಳಿ?

9. ನಿಮ್ಮ ಮನೆಯಲ್ಲಿ ಯಾರಾದರು ಹೊರಗಿನವರು ಕಳೆದ ರಾತ್ರಿ ಉಳಿದುಕೊಂಡಿದ್ದರ?

10. ಹೌದು ಎಂದಲ್ಲಿ ಅವರು ಯಾವ ಪ್ರದೇಶದಿಂದ ಬಂದಿದ್ದರು?

11. ನಿಮ್ಮ ಮನೆಯಲ್ಲಿ ಯಾರಿಗಾದರು ಜ್ವರ ಬಂದಾಗ ಎಲ್ಲಿ ಚಿಕಿತ್ಸೆ ಪಡೆಯುತ್ತೀರಿ?

    ಅ. ಸ್ವಯಂ ಚಿಕಿತ್ಸೆ ಆ.ಖಾಸಗಿ ಆಸ್ಪತ್ರೆ ಇ.ಪ್ರಾಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರ

12. ಸ್ವಯಂ ಚಿಕಿತ್ಸೆ ಪಡೆದಲ್ಲಿ ಪ್ರಥಮ ಚಿಕಿತ್ಸೆ ಏನು ಪಡೆದುಕೊಂಡಿರಿ.

13. ಹೌದು ಇಲ್ಲ. ಹೌದು ಎಂದಲ್ಲಿ ವಿವರಿಸಿ:

    1. ನಮ್ಮ ರೋಗ ಲಕ್ಷಣಗಳನ್ನು ಹೇಳಿ ಗುಳಿಗೆಗಳನ್ನು ಔಷಧಿ ಅಂಗಡಿಯಿಂದ ಪಡೆದುಕೊಂಡಿವಿ.

    2. ನಿಶ್ಚಿತ ಔಷಧಿಯನ್ನು ಕೇಳುವುದು.

    3. ಮನೆಯಲ್ಲೇ ಇರುವ ಔಷಧಿಯನ್ನು ಪಡೆದುಕೊಳ್ಳುವಿರ?

    4. ಇತರೆ ವಿವರಿಸಿ

14. ನಿಮಗೆ ಜ್ವರ ಬಂದಲ್ಲಿ ವೈದ್ಯರನ್ನು ಬೇಟಿಯಾಗಿದ್ದರ? ಬೇಟಿಯಾಗಿದ್ದಲ್ಲಿ ಜ್ವರ ಬಂದ ಎಷ್ಟನೇ ದಿನ ಬೇಟಿಯಾಗಿದ್ದಿರಿ?

15. ನಿಮಗೆ ಜ್ವರ ಬಂದಾಗ ಎಷ್ಟು ಜನ ವೈದ್ಯರನ್ನು ಬೇಟಿಯಾಗಿದ್ದಿರಿ?

    ವಿವರಿಸಿ.

16. ವೈದ್ಯರನ್ನು ಬೇಟಿ ಮಾಡಲು ಎಷ್ಟು ಸಮಯ ತೆಗೆದುಕೊಂಡಿರಿ?

    ವಿವರಿಸಿ.

17. ವೈದ್ಯರನ್ನು ಬೇಟಿಮಾಡಲು ತಡೆ ಮಾಡಿದ್ದಲ್ಲಿ ಕಾರಣ ವಿವಿರಿಸಿ

1. ನಿರ್ಲಕ್ಷ್ಯತೆ

2. ಹಣದ ಕೊರತೆ

3. ವೃದ್ಧಾಪ್ಯ

4. ಪ್ರತಿಕ್ರಿಯೆ ಇಲ್ಲ.

5. ಬೇರೆ ಕಾರಣವಿದ್ದಲ್ಲಿ ವಿವರಿಸಿ.

18. ಜ್ವರದ ಚಿಕಿತ್ಸೆ ಪಡೆಯಲು ಎಲ್ಲಿ ಬೇಟಿ ನೀಡುವಿರಿ?

1. ಖಾಸಗಿ ಆಸ್ಪತ್ರೆ,

2. ಪ್ರಾಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರ

3. ಆರ್ಯುವೇದ / ವೈದ್ಯ

4. ಸರ್ಕಾರಿ ಆಸ್ಪತ್ರೆ.

19. ನಿಮ್ಮ ಹಳ್ಳಿಯಿಂದ ಖಾಸಗಿ ಆಸ್ಪತ್ರೆಗೆ ಬೇಟಿ ನೀಡಿದಲ್ಲಿ ಎಷ್ಟು ಕಿ.ಮೀ ದೂರ ಕ್ರಮಿಸುವಿರಿ?

ವಿವರಿಸಿ:

20. ನೀವು ಚಿಕಿತ್ಸೆ ಪಡೆಯುವುದಕ್ಕೆ ಎಷ್ಟುಬಾರಿ ಖಾಸಗೀ ಆಸ್ಪತ್ರೆಗೆ ಬೇಟಿ ನೀಡುತ್ತಿರಿ?

1. ಒಂದುಬಾರಿ 2. ಎರಡು ಬಾರಿ

3. ಮೂರು ಬಾರಿ 4. ನಾಲ್ಕು ಬಾರಿ.

21. ನಿಮಗೆ ಬಂದ ಜ್ವರದ ಚಿಕಿತ್ಸೆಗಾಗಿ ಆದ ವೆಚ್ಚ?

1. ವೈದ್ಯರ ವೆಚ್ಚ_____ 2. ಔಷಧಿಗಳು_____

3. ಪ್ರಯೋಗಾಲಯದ ವೆಚ್ಚ_____ 4. ಇತರೆ

5. ಕಾರ್ಮಿಕ ನಷ್ಟ.

22. ಸರ್ಕಾರಿ ಆಸ್ಪತ್ರೆಯಲ್ಲಿ ಚಿಕಿತ್ಸೆ ಪಡೆದುಕೊಂಡಲ್ಲಿ ಎಲ್ಲಿ ನೀವು ಚಿಕಿತ್ಸೆ ಪಡೆದಿರಿ?

1. ಹಳ್ಳಿಯ ಪ್ರಾಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರ

2. ಮುಳಬಾಗಿಲಿನ ಸಮುದಾಯ ಆರೋಗ್ಯ ಕೇಂದ್ರ 3. ಆರೋಗ್ಯ ಕಾರ್ಯಕರ್ತರು

4. ಆಶಾ ಕಾರ್ಯಕರ್ತರು 5. ಅಂಗನವಾಡಿ ಕಾರ್ಯಕರ್ತರು.

6. ಇತರೆ ವಿವರಿಸಿ:

23. ನೀವು ಖಾಸಗಿ ವೈದ್ಯರನ್ನು ಬೇಟಿ ಮಾಡಿದ್ದಲ್ಲಿ ಯಾವ ಕಾರಣದಿಂದ ಪ್ರಾಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರಕ್ಕೆ ಬೇಟಿ ನೀಡಲಿಲ್ಲ?

1. ಪ್ರಾಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರದ ಮೇಲೆ ನಂಬಿಕೆ ಇಲ್ಲ.

2. ಖಾಸಗಿ ವೈದ್ಯರ ಮೇಲಿರುವ ನಂಬಿಕೆಯಿಂದ

3. ಪ್ರಾಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರದಲ್ಲಿ ಕಳಪೆ ಸೇವೆ

4. ಪ್ರಾಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರ ತುಂಬ ದೂರವಿದ್ದಲ್ಲಿ

5. ಅನುಕೂಲಕರವಾದ ಸಾರಿಗೆ ಸೌಲಭ್ಯ ವಿಲ್ಲದಿರುವುದು.

6. ಪ್ರಾಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರದಲ್ಲಿ ಚಿಕಿತ್ಸೆ ದುಬಾರಿಯಾಗಿರುವುದು.

7. ಇತರೆ.

<u>ಆರೋಗ್ಯ ಸೇವೆಗಳ ವಿತರಣೆ</u>

24. ಕಳೆದ 15 ದಿನಗಳಲ್ಲಿ ಆರೋಗ್ಯ ಕಾರ್ಯಕರ್ತರು (ಂಓಒ/ ಒಊಘ/ ಂಖಊಂ) ನಿಮ್ಮ ಮನೆಗೆ ಬೇಟಿ ನೀಡಿದ್ದರ?

1. ಹೌದು 2. ಇಲ್ಲ.

ಹೌದು ಎಂದಲ್ಲಿ ಯಾವದಿನದಂದು ಬೇಟಿ ನೀಡಿದ್ದರು –

25. ಹೌದು ಎಂದಲ್ಲಿ ಕಳೆದ 15 ದಿನದಿಂದ ಎಷ್ಟು ಬಾರಿ ಆರೋಗ್ಯ ಕಾರ್ಯಕರ್ತರು ನಿಮ್ಮ ಮನೆಗೆ ಬೇಟಿ ನೀಡಿದ್ದರು?

26. ಸಾಮಾನ್ಯವಾಗಿ ಆರೋಗ್ಯ ಕಾರ್ಯಕರ್ತರು ಎಷ್ಟು ಬಾರಿ ನಿಮ್ಮ ಮನೆಗೆ ಬೇಟಿ ನೀಡುತ್ತಾರೆ.

1. 15 ದಿನಕ್ಕೊಮ್ಮೆ 2. ತಿಂಗಳಿಗೊಮ್ಮೆ 3. ಎರಡು ತಿಂಗಳಿಗೊಮ್ಮೆ

4. ಮೂರು ತಿಂಗಳಿಗೊಮ್ಮೆ. 5. 6 ತಿಂಗಳಿಗೊಮ್ಮೆ 6. ಬೇಟಿ ನೀಡುವುದಿಲ್ಲ.

27. ಕಳೆದ 15 ದಿನಗಳಲ್ಲಿ ನಿಮ್ಮ ಮನೆಯಲ್ಲಿ ಯಾರಿಗಾದರೂ ಜ್ವರವಿದ್ದಲ್ಲಿ ಆರೋಗ್ಯ ಕಾರ್ಯಕರ್ತರು ರಕ್ತ ಲೇಪನೆ ಪಡೆದಿದ್ದರ?

1. ಹೌದು 2. ಇಲ್ಲ.

ಹೌದು ಎಂದಲ್ಲಿ ಅವರ ಹೆಸರು: ಲಿಂಗ: ವಯಸ್ಸು:

ಹೆಸರು: ಲಿಂಗ: ವಯಸ್ಸು:

28. ನಿಮಗೆ ಆರೋಗ್ಯ ಕಾರ್ಯಕರ್ತರು ಗುಳಿಗೆಗಳನ್ನು ಕೊಟ್ಟರ?

1. ಹೌದು 2. ಇಲ್ಲ.

ಹೌದು ಎಂದಲ್ಲಿ ಎಷ್ಟು ಗುಳಿಗೆಗಳನ್ನು ಆರೋಗ್ಯ ಕಾರ್ಯಕರ್ತರು ನಿಮಗೆ ಕೊಟ್ಟರು?

ಅ. 3. ಆ. 5 ಇ. 10. ಈ. 15

29. ಎಷ್ಟು ಗುಳಿಗೆಗಳನ್ನು ನೀವು ತೆಗೆದುಕೊಂಡಿರಿ?

ಅ. 3. ಆ. 5 ಇ. 10. ಈ. 15

30. ಸಂಪೂರ್ಣವಾಗಿ ನೀವು ಗುಳಿಗೆಗಳನ್ನು ಸೇವಿಸಿದರ?

1. ಹೌದು 2.ಇಲ್ಲ.

31. ಆರೋಗ್ಯ ಕಾರ್ಯಕರ್ತರು ಕೊಟ್ಟ ಗುಳಿಗೆಗಳನ್ನು ತೆಗೆದುಕೊಳ್ಳದಿರಲು ಕಾರವಣವೇನು?

ಅ. ಅಡ್ಡ ಪರಿಣಾಮಗಳು ಆ.ಗುಳಿಗೆಗಳ ಮೇಲೆ ನಂಬಿಕೆಇಲ್ಲದಿರುವುದು. ಇ. ಮರೆವು.

32. ರಕ್ತ ಲೇಪನೆ ತೆಗೆದುಕೊಳ್ಳಲು ಕಾರಣವೇನೆಂಬುದು ನಿಮಗೆ ತಿಳಿದಿದೆಯೆ?

1.ಹೌದು 2.ಇಲ್ಲ.

ಹೌದು ಎಂದಲ್ಲಿ ವಿವರಿಸಿ.

33. ಆರೋಗ್ಯ ಕಾರ್ಯಕರ್ತರು ಚಳಿ ಜ್ವರ ಬಂದಲ್ಲಿ ರಕ್ತ ಪರೀಕ್ಷೆಯನ್ನು ಯಾವ ವಿಧಾನದಿಂದ ತೆಗೆದುಕೊಂಡರು?

ಅ. ರಕ್ತ ಲೇಪನೆ ಆ. ರಕ್ತ ನಾಳದಿಂದ ಇ. ಇತರೆ------

34. ಆರೋಗ್ಯ ಕಾರ್ಯಕರ್ತರು ಪುನಃ ನಿಮ್ಮ ಬಳಿ ಬಂದು ನಿಮಗೆ ಮಲೇರಿಯ ಜ್ವರ ಎಂದು ತಿಳಿಸಿದರ? ಹೌದು ಎಂದಲ್ಲಿ ಎಷ್ಟು ದಿನದ ಬಳಿಕ ತಿಳಿಸಿದರು?

35. ಮಲೇರಿಯಾ ಜ್ವರಕ್ಕೆ ಆರೋಗ್ಯ ಕಾರ್ಯಕರ್ತರು ನಿಮಗೆ ಚಿಕಿತ್ಸೆ ಕೊಟ್ಟರ?

ಹೌದು? ಇಲ್ಲ?

ಹೌದು ಎಂದಲ್ಲಿ ಎಷ್ಟು ಸಮಯದ ನಂತರ ನಿಮಗೆ ಚಿಕಿತ್ಸೆ ಕೊಟ್ಟರು?

36. ಮಲೇರಿಯ ಜ್ವರಕ್ಕೆ ಗುಳಿಗೆಗಳನ್ನು ನಿಮಗೆ ಕೊಟ್ಟರ?

1. ಹೌದು 2.ಇಲ್ಲ.

ಹೌದು ಎಂದಲ್ಲಿ ಎಷ್ಟು ದಿನದ ನಂತರ ತಿಳಿಸಿ:

37. ನೀವು ಆರೋಗ್ಯ ಕಾರ್ಯಕರ್ತರ ಎದುರು ಗುಳಿಗೆಗಳನ್ನು ಸ್ವೀಕರಿಸಿದರ?

1. ಹೌದು 2.ಇಲ್ಲ.

38. ಎಲ್ಲಾ ಗುಳಿಗೆಗಳನ್ನು ನೀವು ಸ್ವೀಕರಿಸಿದರ?

1. ಹೌದು 2.ಇಲ್ಲ.

39. ನೀವು ಯಾವುದಾದರೂ ಗುಳಿಗೆಗಳನ್ನು ಸ್ವೀಕರಿಸುವುದು ಬಿಟ್ಟಿರ?

1. ಹೌದು 2.ಇಲ್ಲ.

ಹೌದು ಎಂದಲ್ಲಿ ಎಷ್ಟು?

ಜ್ಞಾನ ವರ್ಧನೆ ಅಭ್ಯಾಸಗಳು (ಐ.ಂ.ಕ)

39. ನಿಮ್ಮ ಸಮುದಾಯದಲ್ಲಿ ಕಾಣಿಸುವ ಯಾವುದಾದರೂ ಸಾಮಾನ್ಯ ಕಾಯಿಲೆಗಳನ್ನು ಹೆಸರಿಸಿ:

ಅ. ಆ. ಇ. ಈ

40. ಇದರಲ್ಲಿ ಯಾವ ಕಾಯಿಲೆ ನಿಮಗೆ ಬಹಳ ಪ್ರಮುಖ ಎನ್ನಿಸುತ್ತದೆ? ಮತ್ತು ಏಕೆ?

41. ಮಲೇರಿಯ ಎಂದರೇನು?

ಅ. ಜ್ವರ ಆ.ಚಳಿ ಜ್ವರ ಇ.ತಲೆನೋವು ಈ. ಸೋಂಕು.

ಉ. ತಿಳಿದಿಲ್ಲ. ಊ.ಇತರೆ ವಿವರಿಸಿ:

42. ಮಲೇರಿಯಾ ಜ್ವರಕ್ಕೆ ಸ್ಥಳೀಯ ಹೆಸರು ಏನಿದೆ?

_____

43. ಮಲೇರಿಯ ರೋಗ ಲಕ್ಷಣಗಳೇನು?

ಅ. ಜ್ವರ ಆ. ಮೈ ಕೈ ನೋವು ಇ. ಚಳಿ ಈ. ತಲೆನೋವು

ಉ. ತಿಳಿದಿಲ್ಲ ಇತರೆ ವಿವರಿಸಿ.

44. ಮಲೇರಿಯ ಜ್ವರ ಹೇಗೆ ಹರಡುತ್ತದೆ?

ಅ.ಸೊಳ್ಳೆ ಕಡಿತ ಆ. ನೊಣಗಳು ಇ. ಕೊಳಕು ನೀರಿನ ಸೇವನೆ

ಈ. ಪಾಪಗಳು ಉ. ತಿಳಿದಿಲ್ಲ.

45. ಮಲೇರಿಯ ಜ್ವರ ಒಬ್ಬರಿಂದ ಒಬ್ಬರಿಗೆ ಹರಡುತ್ತದ?

1. ಹೌದು 2. ಇಲ್ಲ ಹೌದು ಎಂದಲ್ಲಿ ವಿವರಿಸಿ:

46. ನಿಮ್ಮ ಮನೆಯಲ್ಲಿ ಸೊಳ್ಳಗಳ ಕಡಿತವನ್ನು ನಿಯಂತ್ರಿಸಲು ಯಾವ ರೀತಿಯ ಕ್ರಮಗಳನ್ನು ಕೈಗೊಳ್ಳುವಿರಿ?

ಅ. ಸೊಳ್ಳೆ ಪರದೆ ಆ.ಸೊಳ್ಳೆ ಬತ್ತಿ ಇ. ಕೀಟನಾಶಕಗಳು ಈ. ಫ್ಯಾನ್.

ಉ. ಹೊದ್ದಿಕೆ

47. ಮಲೇರಿಯ ಜ್ವರದ ಬಗ್ಗೆ ಎಲ್ಲಿ ಮಾಹಿತಿ ಪಡೆಯುವಿರಿ?

ಅ. ವೈದ್ಯರು ಆ.ಎ.ಎನ್.ಎಂ. ಇ. ಟಿ.ವಿ / ರೇಡಿಯೊ

ಈ.ಆಶಾ ಕಾರ್ಯಕರ್ತರು ಉ.ಇತರೆ ವಿವರಿಸಿ.

48. ಯಾವಾಗದರಯ ಆರೋಗ್ಯ ಕಾರ್ಯಕರ್ತರು ಮಲೇರಿಯ ಬಗ್ಗೆ ತಿಳುವಳಿಕೆ ನೀಡಿದ್ದರ?

1. ಹೌದು 2.ಇಲ್ಲ.

49. ಹೌದು ಎಂದಲ್ಲಿ ಏನು ತಿಳಿಸಿದರು?

50. ನಿಮ್ಮ ಮನೆಯಲ್ಲಿ ಎಷ್ಟು ಸೊಳ್ಳೆ ಪರದೆಗಳಿವೆ?

ಅ. 1 ಆ.2 ಇ. 3. ಈ. ಮೂರಕ್ಕಿಂತ ಹೆಚ್ಚು.

51. ಎಷ್ಟು ಸೊಳ್ಳೆ ಪರದೆಗಳನ್ನು ನೀವು ನಿಮ್ಮ ಮನೆಯಲ್ಲಿ ಈಗ ಬಳಕೆ ಮಾಡುತ್ತಿರುವಿರಿ?

ಅ. 1 ಆ.2 ಇ. 3. ಈ. ಮೂರಕ್ಕಿಂತ ಹೆಚ್ಚು.

52. ಕಳೆದ ರಾತ್ರಿ ನಿಮ್ಮ ಮನೆಯಲ್ಲಿ ಎಷ್ಟು ಮಂದಿ ಸೊಳ್ಳೆ ಪರದೆಯ ಒಳಗೆ ಮಲಗಿದ್ದಿರಿ?

53. ಕಳೆದ ಒಂದು ವಾರದಿಂದ ಎಷ್ಟು ಮಂದಿ ಸೊಳ್ಳೆ ಪರದೆಯ ಒಳಗೆ ಮಲಗಿದ್ದಿರಿ?

54. ಒಂದು ವರ್ಷದಲ್ಲಿ ಎಷ್ಟು ತಿಂಗಳು ಸೊಳ್ಳೆಪರದೆಯನ್ನು ನೀವು ಉಪಯೋಗಿಸುತ್ತೀರಿ?

55. ಯಾವ ಋತುವಿನಲ್ಲಿ ನೀವು ಸೊಳ್ಳೆ ಪರದೆಗಳನ್ನು ಉಪಯೋಗಿಸುತ್ತೀರಿ?

56. ಸರ್ಕಾರದಿಂದ (ಆರೋಗ್ಯ ಕಾರ್ಯಕರ್ತರು) ನಿಮಗೆ ಸೊಳ್ಳೆ ಪರದೆಗಳ ವಿತರಣೆಯಾಗಿದೆಯ?

ಅ.ಹೌದು ಆ.ಇಲ್ಲ.

57. ಹೌದು ಎಂದಲ್ಲಿ ಎಂದು ವಿತರಿಸಿದರು?

58. ಎಷ್ಟು ಸೊಳ್ಳೆ ಪರದೆಗಳನ್ನು ವಿತರಿಸಿದ್ದರು?

59. ಪ್ರಸ್ತುತ ನೀವು ಸೊಳ್ಳೆ ಪರದೆಗಳನ್ನು ಉಪಯೋಗಿಸುತ್ತಿರುವಿರ?

60. ಕಳೆದ ವರ್ಷ ನಿಮ್ಮ ಮನೆಯಲ್ಲಿ ಕೀಟ ನಾಶಕಗಳನ್ನು ಸಿಂಪಡಿಸಿದ್ದರ?

ಅ.ಹೌದು ಆ.ಇಲ್ಲ.

ಹೌದು ಎಂದಲ್ಲಿ ಎಷ್ಟು ಕೋಣೆಗಳಲ್ಲಿ ಸಿಂಪಡಿಸಿದ್ದರು?

61. ಕೀಟನಾಶಕಗಳನ್ನು ಸಿಂಪಡಿಸಿದ ನಂತರ ನಿಮ್ಮ ಮನೆಗೆ ಬಣ್ಣವನ್ನು ಹಚ್ಚಿದರ?

ಅ.ಹೌದು ಆ.ಇಲ್ಲ.