

## Malaria Causes, Transmission and Control Practices of People Living in an Endemic Village in KBK District of Odisha: An Anthropological Study

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**ABSTRACT** Odisha is highly endemic for malaria and has a high incidence mostly observed in tribal dominated districts. This study aimed to assess the causes, transmission process and control practices of malaria of people living in a malaria endemic tribal dominated village of Kalahandi-Balangir-Koraput (KBK) district. Qualitative data was collected through Focus Group Discussions (FGDs), interviews of Key Informants (KIs) on daily activities, sleeping habits, knowledge on the cause, transmission and control of the disease. The disease malaria is locally familiar among people as *Palli Jwaroo*. Its treatment practices are being greatly influenced by the decisions of the elder members of the family, poor economic condition, socio-cultural activities, sleeping habits, herbal medicines by traditional healer (*Baidya*) and health services provided by village health workers.

### INTRODUCTION

Malaria is a vector borne disease transmitted through bites of female anopheles mosquito between dusk and dawn. It exists as a major public health problem for human beings since long because its transmission dynamics differs from place to place. It has been reported that South Africa and South East Asian countries are mostly affected due to malaria as compared to other parts of the world. It was estimated that a total of 1.4 billion people are at risk of malaria and out of this, 1.2 billion people reside in malaria endemic countries of Africa, and Southeast Asian countries. Around sixty-five percent of total malaria cases of Southeast Asian countries are from India (Hussain et al. 2013). As per the World Malaria Report 2017, fifteen countries in Sub Saharan Africa and India carry almost eighty percent of the global malaria burden. India alone contributes four percent of total malaria cases, six percent of *Plasmodium falciparum* (*pf*) cases, six percent of *Plasmodium vivax* (*pv*) cases and six percent of deaths (WHO 2017). The state

of Odisha in India, located on the east coast of India constitutes four percent of the total population of India, and contributes to about forty-four percent of *pf* and *pv* category of malaria cases, out of which forty-nine percent malaria cases are found in the *pf* category with 25.5 percent of total malaria deaths (Kumar et al. 2007). In the year 2011 it has been reported Odisha contributed 24.4 percent of the total malaria cases, forty percent of *pf* infections and 17.3 percent of malaria deaths of the country in the year 2009. Tribal settlements are the most malaria endemic areas in the state of Odisha and are also economically underdeveloped, have difficult terrain, poor communication facilities and inadequate health infrastructure (Das and Rabindran 2011). Malaria burden and transmission also vary from region to region in Odisha. It has been reported that the tribal dominated districts of Odisha namely, Koraput, Rayagada, Nowrangpur, Malkangiri Balangir, Sonapur, Kalahandi and Nuapada named as undivided KBK districts have shown high malaria prevalence followed by northern and western districts (Panda et al. 2018).

In contrast, eight coastal districts showed very low incidence of malaria over the years except few pockets in these districts. Malaria incidence is thus multifarious in KBK regions because of its vast territory of forest with only twenty-seven percent of state population and fifty percent tribal population, contributing seventy percent of total malaria positive cases and sixty-four percent of total malarial deaths case of Odisha up to 2018 (Pradhan and Meherda 2019). Hence, the present study was conducted to know the prevention and cure strategies being adopted by people for cure of malaria in a malaria endemic village. This study was concentrated to highlight the indigenous methods of prevention and cure practices adopted by the people before, during and after appearance of a feverish condition of disease malaria popularly known by people as *Palli Jwaroo*.

### Objectives

The study was designed with the objective to understand the cause, transmission and control practices of people in a malaria endemic village in KBK districts of Odisha.

## METHODOLOGY

### Study Area

The study was conducted in the village Chabripalli in Khaparakhol Block in the district of Balangir under KBK district of Odisha and lies between latitude 20°52'41" North and Longitude 82°56'41" East having the unique features of varying topography including hills and rolling uplands covered with forests (Gandhamardan mountain part of Eastern Ghats), watercourses and plain agricultural land. This village is categorised under high malaria endemic category, as the malaria is continuously occurring in the village and four malarial deaths cases were reported in the year 1998, 1999, 2000 and 2001 and ninety percent malaria fever cases in the village in the year 2016 to 2018 were due to *Plasmodium falciparum* (*pf*) category without any death after government intervention. Further, the study village can be a better representative to compare with other parts of KBK district for its backwardness, topography, and highest incidence

of malaria cases and inhabitation of a unique Tribe-Binjhal who can work without sweating.

### Survey Methods

The field survey was undertaken for collection of qualitative primary data in the village of Chabripalli by employing anthropological research methodology with the following steps, that is, identification of community gate keepers according to their role and responsibility in the village from among villagers having social responsibility and knowledge in village affairs as well as their broader understanding on causes, transmission, prevention and control of malaria like their daily habits, economic condition, exposure for the disease, knowledge of government sponsored schemes and treatment process for selection of Key Informants (KIs) for in-depth interview and Focus Group Discussions (FGDs). The KIs in the present study included village *Jati* Panchayat head, traditional healers (*Baidya*), private practitioners (*Kabiraj*), local leaders (Panchayati Raj Institution (PRI) members), medical officers, female health workers, *Anganwadi* Workers (AWW), Auxiliary Nurse Midwives (ANM) and Accredited Social Health Activists (ASHA) working in the village. The FGDs with a group of seven to eight villagers included adult men, adult women (including pregnant and lactating women) and health service providers available in the village. FGDs were organised at the house of the village head (gatekeeper), at village common places such as the village middle point or a school campus as per availability of space in the village.

A total number of five KI interviews and fourteen FGDs were undertaken in the present study for collection of qualitative primary data. The time limit was minimum 40 minutes without any interference in their working hours and cultural norms as well as due care was taken for collection of data according to availability of members in the village. The detail leading questions mentioned as below were asked in each KI and FGD in order to have a broader understanding on causes, transmission, prevention and control of malaria in the malaria endemic village of KBK district.

1. Is the disease malaria known to villagers, and are they aware of it?

2. Do they have any idea about the causes, transmission and control practices of malaria?
3. Do they start malaria treatment practices immediately?
4. Do financial hardships cause delay in treatment?
5. How do they manage the economic issues?
6. What are the different methods adopted for prevention practices?

Due to the remoteness of the village, the voluntarily expression of the members of the FGDs and KIs were recorded manually.

### Ethical Considerations

The community members in the study village were informed well in advance about the study and the aim of the research work seven days before visiting the study area. The key informants such as local *Panchayati Raj* Member (*Sarpanch*/ward member/*Samiti* member) as well as village head, health workers and school teachers were contacted individually. For the Focus Group Discussions, the women and men of the village were interacted with separately after obtaining due consent along with permission from family heads. Further, individual members of different age groups were duly informed and ex-

plained about the study and oral consents were taken before collection of data (Figs. 1 and 2).

### RESULTS

The result of the present study was basically concentrated on the qualitative research data collected from villagers, which is dominated by a Scheduled Tribe (*Binjhal*). All the stakeholders also grouped under KIs and FGDs had a dominance of the Binjhal Tribe.

The malaria disease is familiar as *Pali jwaroo* (intermittent fever) among people having the symptoms of high temperature fever, severe convulsions and periodic shivering along with body ache. The details of one to one interviews and discussions on different aspects of malaria causes, transmission, prevention and control practices as expressed by the KIs and FGDs are given in Tables 1 and 2, respectively. The findings revealed that symptoms and causes of *Palli Jwaroo* (malaria) were not only caused by mosquito bites but also by other agents like flies, forest water and forest fruits. During interviews with the KIs and discussion in the FGDs, it was perceived that the villagers have their own concept to distinguish *Palli Jwaroo* (malaria) from other fever type illnesses.

During one to one interactions as part of the Key Informant interviews (KIs), it was observed



Fig. 1. Male FGD discussion with leading questions



Fig. 2. Female FGD discussion with leading questions

**Table 1: Views of Key Informants (KIs) on the issues like causes, transmission, prevention and control of malaria in the study area**

<i>KII</i>	<i>Issues</i>	<i>Observations</i>
Key Informant I (Village head)	Transmission of malaria/awareness of malaria	“People of our village were earlier not aware of the disease malaria but with the establishment of the Anganwadi Centre and periodical joint visits of Anganwadi Workers and ANMs to the doors of villagers, nowadays people, specially the women, are believing that malaria is a dangerous disease but a sizable portion still believe that malaria is not caused only by mosquito bite but also due to other reasons”.
Key Informant II [Village traditional healer (Baidya)]	Malaria treatment practices	“Allow the sick person to consume local herbal mix, which is a paste made from plant leaves of Gangaseuli ( <i>Nyctanthes arbor-tristis</i> , that is, Night-flowering Jasmine (10gm) + ginger (5gm) + black pepper (1.0gm) + water (100ml) + honey (10gm) and equivalent amount of country liquor (Mahuli) for immediate cure and prevention.” “Further in the study area it was seen that people who are well versed with the village health staff or hospital staffs are seeking allopathic malaria treatment immediately compared to others”. Lack of awareness for the proper use of mosquito net is also expressed as one of the causes for malaria transmission, as many a times a mosquito enters inside the nets and bites the members who sleep inside the mosquito net.
Key Informant III (Malaria experienced villager)	Malaria leads to brain malaria	“From the experience of the people suffering from malaria, it was opined that if there is delay in treatment it will affect brain ( <i>Mumnd</i> ), which may cause death of the patient or suffering from a lunatic condition”. It has also been observed that due to ignorance and economic hardship, the people who are working in the jungle area for plucking <i>kendu leaf</i> or collecting firewood or similar activities hardly take care of their health. It has also been suggested to take prompt action for treatment of the disease. Further, it has been expressed that too much exposure to outside village areas in bare body and over work/fatigue and sleeping outside the house are the causes of malaria.”
Key Informant IV [Caste Council (Village <i>jati panchayat</i> ) member]	Prevention of mosquito bites	“In order to prevent mosquito bites, women and young children are preferring to sleep inside the house having a country fowl present. It is seen that due to presence of country fowls inside the sleeping room the flies, mosquitoes or other small insects do not enter it”. Mostly the country fowls are reared for the fulfilment of cultural practices (using eggs and live birds in different rituals) and economic sustenance of the family. Regarding the use of a mosquito net, participants opined that they are unable to use it because of unavailability of adequate number of nets for all adult family members. Only the women and elderly members have preference to use the same. It has also been reported by the participant that the small sleeping room size, difficulties in hanging mosquito net, inappropriate mosquito net size and discomfort with breathing inside the mosquito net desist them from using a mosquito net.
Key Informant V (Forest going villager)	Prevention practices	“It has been observed that people who are going to the forest area for collection of firewood and forest produce including collection of leaves, fruits, plums, sleeping or staying more time in the forest area or taking bath in or drinking from forest rivulets water are considered as major cause of occurrence of the disease”. The participants also opined that non-consumption of forest spring water, avoiding contact with small forest flies, non-consumption of forest fruits/plum unwashed and avoiding bathing in spring water reduces the malaria cases.

**Table 2: Views of Focus Group Discussions (FGDs) on the issues like causes, transmission, prevention and control of malaria in the study area**

<i>FGD</i>	<i>Issues</i>	<i>Observations</i>
FGD participant (Men Group Members-1)	Causes of malaria	“It has been expressed by members in FGD that if someone works in the dirty/dark place and comes in contact with any stagnant water in the working place, it has the possibility of causing malaria. Further, it has also been opined by members of the group that consumption of any forest fruits or plum, roots or even drinking of stream water from forest area have chances of suffering from <i>Palli Jwaroo</i> ”.
FGD participant (Men Group Members-2)	Food habits and causes of malaria	The participants opined that in the locality majority of male members, who are working and have a habit of consuming fermented watered rice, raw onion, curry/dry fish along with country liquor ( <i>Mahuli</i> ) for relaxation of their body after long hours of day long hard labour suffer from different diseases including <i>Palli Jwaroo</i> . Further, this also causes economic hardship as well as depletes the earning capacity for their sustenance, as they are unable to perform in terms of hard physical labour in their agricultural and allied field activities of their own and wage-earning work inside and outside the village, which are the sources of their income. This also leads to loss of man-day labour of self as well as family members who are engaged for treatment of the sick member, which causes economic distress condition of the family. Participants also stressed that those who are engaged in wage-earning work outside the village are more vulnerable to <i>Palli Jwaroo</i> than those who are working in the village.
FGD participant (Men Group Members-3)	Availability of malarial medicine	The participants opined that the medicines available for malaria treatment such as Chloquine (white tablets) and Quinine (brown tablets) are being supplied by the Anganwadi workers/ASHA workers/ANM workers to cure malaria ( <i>Palli Jwaroo</i> ) in the ANM/AWW Centres. Previously, this facility was not available and people had to travel a long distance to get medicines for treatment, and by sacrificing a part of the daily earning.”
FGD participant (Men Group Members-4)	Malaria cure and prevention practices	“The participants expressed that previously the village did not have health personnel except Anganwadi Workers and that too without any medicine. For seeking any treatment, one has to walk kilometres, as there was no transport or pucca road in the area. Further, if someone in the family fell sick, they would try to get him/her cured in the village itself, and if he/she is not cured and fell sick for a longer time then they would the sick person to PHC Khaprakhol or to a private practitioner ( <i>Kabiraj</i> ) at Paikamal town (Bargarh district) and waited two to three days for the treatment and the treatment could continue for a week or more. Because of above types of difficulties people preferred to seek treatment from the traditional healer (local herbal men called <i>Baidya</i> ) first who is a respected person of the village, and provides herbal medicines not for immediate cure but also for future prevention of the disease. Participant also informed that the mobile private practitioner is locally familiarly known as <i>Village Kabiraj</i> , and is also available while visiting this area.”
FGD participant (Men Group Members-5)		Cure and prevention experience The old participants in FGD elaborated the reason for their choice in the local herbal man’s ( <i>Baidya</i> ) treatment as that “malaria fever was cured by consumption of tablets, but it re-occurred. With herbal medicines being consumed for

Table 2: Contd...

FGD	Issues	Observations
FGD participant (Men Group Members-6)	Transmission of malaria	seven days continuously, it resulted in positive result and there is no reoccurrence, and they praised the <i>Baidya</i> and the herbal medicines and their effectiveness for curing <i>Palli Jwaroo</i> ." Allow the sick person to consume a local herbal mix, a paste made from plant leaves Gangaseuli ( <i>Nyctanthes arbor-tristis</i> , that is, night-flowering jasmine) (10gm) + Ginger (5gm) + black pepper (1.0gm) + + Water (100ml) + Honey (10gm) and an equivalent amount of country liquor ( <i>Mahuli</i> ) for immediate cure and prevention. Participants opined that "biting of small flies" is the main cause and is responsible for occurrence of the disease. <i>Palli Jwaroo</i> is occurring in the area because of small flies locally called ( <i>Gunddi pookk</i> ) and forest based big mosquitoes only. On the issue of non-biting of mosquito in the night, all respondents agreed to inform that "country fowls are rejecting files to enter into their living room" and because of this their family members are sleeping comfortably inside the house and one could not hear flies croon because of the country fowl present inside the living room".
FGD participant (Men Group Members-7)	Preventive practices	Those elders who are sleeping outside sleeping rooms are falling sick with <i>Palli Jwaroo</i> frequently and the ladies and children sleeping inside the house are not falling sick of any fever. The aspect of a dirty and unhygienic environment because of keeping a fowl inside the living room was also discussed among villagers. Participants mentioned that country fowls are being treated as a sacred bird in the area, as their egg and meat are being used in all important rituals (birth, marriage ceremony and as a useful as gift for others) and ceremonial occasions and festivals where the sacrifice offering is being done before the local goddess.
FGD participant (Women Group Binjhal Tribe-1)	Causes of malaria	"The female members of this group opined that <i>Palli Jwaroo</i> occurs due to biting of small flies during day time and they do not experience any night bites of flies/mosquito and hardly suffer from <i>Palli Jwaroo</i> (malaria), as they sleep inside the houses at night along with country fowls inside the living room at their coop."
FGD participant (Women Group -2)	Treatment of malaria	The participants opined that they are more concerned for the sick family members as ' <i>Palli Jwaroo</i> ' takes away most of their earnings for its treatment. They also viewed that "in a family if someone falls sick due to ' <i>Palli Jwaroo</i> ' for two weeks or more, then that family members run for curing of the disease, as there is some apprehension that if the treatment is not proper it may be fatal and will lead to loss of life. This also leads to loss of man-day labour of self as well as family members who are engaged for attending treatment of the sick member, which causes economic distress condition of the family. Some participants of the group also viewed that " <i>Palli Jwaroo</i> " is not a serious problem, as there are effective medicines available in the village. ANM/AWW centres and affected persons should take the course of the medicine as per the advice of ANM/AWW or ASHA worker available in the village".
FGD participant (Women Group -3)		Presence of fowl inside their living rooms "The participants opined that most of us prefer sleeping inside our house regularly and always drink tube-well water

Table 2: Contd...

FGD	Issues	Observations
FGD participant (Women Group -4)	On the re-occurring of <i>Palli Jwaroo</i>	and avoid stale food, and so we have never experienced any <i>Palli Jwaroo</i> (malaria) but our male members are often suffering because they are working outside and sometimes consume stale food and drinking forest stream water". "The participants opined that if family members will sleep inside the house and avoid consuming stream water, fruits, etc. inside jungle/ bush and consume herbal medicines as given by our local medicine men then one will never fall with <i>Palli Jwaroo</i> . On the issue of practices to prevent mosquito bites the respondents stated that they were sleeping inside the house where country fowl is being kept at night.
FGD participant (Women Group -5)	Prevailing diseases in the area	The participants opined that in the village small flies, pigs and even cockroaches are responsible for disease in the locality. One will be surprised to know that drinking forest stream water is the main cause of <i>Palli Jwaroo</i> in this area. "Our country chicken (fowl) are not allowing any flies to croon inside our living room, and as such we are keeping country chicken inside our living room without any harm to us since our forefathers' times". People's habits in terms of their culturally appropriate daily action, locally suitable activities, etc. are emerging as important factors, which save them from falling sick due to diseases.
FGD participant (Women Group -6)	Preventive practices	The participants opined that in order to prevent ' <i>Palli Jwaroo</i> ', all dirty clothes producing bad odour should be cleaned, body should be covered fully, and drinking water container must be covered with a lid. One should not go to outside especially to forest bushy areas with little clothing or bare body. All should sleep inside the house at least at night".
FGD participant (Women Group -7) (Pregnant/ Lactating Women)	Preventive practices	The participants opined that if they sleep inside the house, drink boiled water and consume warm food then they would not suffer from ' <i>Palli Jwaroo</i> '. An old female FGD participant had mentioned, "In order to drive away odd smell in and around houses, we used to burn turmeric, Neem leaves, Saal tree bark, dried leaves smoke to drive away flies in the evening when they are too much in and around our house site area. However, since we used to keep our country fowls inside our living room, we do not allow any smokes inside the house, which may harm our country fowls. Because of the smell of fowls, no flies/mosquito are being able to enter to our living room, and you know they are very useful for us in all occasions". "...We do not experience any croon sound inside our living room at night where our fowls are residing and inside the house we are not feeling any dicomfort".

that a sizable population in the study village was aware of the occurrence about malaria (*Palli Jwaroo*) but lacked the basic knowledge on real causes of malaria and its transmission, prevention and control, as they have different per-

ceptions levels of malaria. Further, the findings reveal that villagers almost lack the knowledge on malaria, as most of the villagers believe that bathing in or drinking forest stream water will cause malaria. It was also been opined that ex-

posure to too much outside village areas in bare body, over work/fatigue and sleeping outside houses are attributed towards the causes of occurrence of malaria (*Palli Jwaroo*). The detail observations of KIs in the study area are mentioned in Table 1.

It was observed that for medication of any illness including malaria (*Palli Jwaroo*), most of the villagers prefer home remedies for the first two to three days for its easy availability and accessibility in the village. Then in the next phase they prefer to go for traditional healers (*Baidya*) and at last the government health facility or primary health centre (PHC) is preferred if it lingers for more than seven days. At times the villagers do not prefer to go to PHCs as the village lacks immediate transport facility and the villagers have to cover almost 30 kilometres to reach the PHC and also there is no guarantee on getting urgent medical attention in the PHC. The importance of country fowls among villagers emerged as one of the most important aspects in prevention of mosquito bites in the study area, as the smell of country fowls acts as a repellent against the mosquito bite. During the summer season majority of male members sleep in open space, outside the houses or at the portico of the houses, and are more affected by malaria as compared to women and children who sleep inside the living rooms by opening all door and windows.

## DISCUSSION

The behaviour of the people in the study area as observed could be the result of their strong cultural belief. It has become clear that more respondents attributed bite of flies of small size responsible for *Palli Jwaroo* and they attributed it to be the cause of malaria. Perceptions of people regarding use of mosquito nets alone do not help much in controlling the incidence of malaria, as they believe mosquitoes alone are not responsible for occurrence of malaria. This perception may be attributed towards their irregular use of the mosquito nets and adoption of other methods including consumption of herbal juice from local traditional healers (*Baidya*). As an immediate measure, the traditional healer provides a local herbal mix, a paste made from (plant leaves Gangaseuli (*Nyctanthes arbor-tristis*, that is, night-flowering jasmine)

(10gm) + ginger (5gm) + black pepper (1.0gm) + water (100ml) + honey (10gm) and equivalent amount of country liquor (*Mahuli*) to the patient for immediate cure and prevention. This medication has become very easily available and accessible from an economic point of view.

Villagers do have their perception that keeping country fowls inside their living room reduces the occurrence of *Palli Jwaroo*. This was further observed from the observations of the respondents that sleeping inside the house where country fowls are kept reduces the occurrence of malaria. This perception among the villagers is associated with their socio-cultural habits and age-old habitual practices. Further, it is suggested that adequate supply of bed-net to households for regular use of bed-nets by all family members, and focusing awareness campaign with clear message in local language/local dialect should be done as personal protection measures to prevent *Palli Jwaroo* (malaria).

The local knowledge of people and the biomedical knowledge if synchronised properly could lead to adoption of appropriate health practices. Vijayakumar et al. (2009) in their study in a tribal belt of Odisha highlighted that tribal people have their own way of treatment of diseases and it embedded mostly with their socio-cultural and belief systems. In this connection the participatory role as played by the traditional healer in treating malaria was highlighted in their study. So involving the traditional healer in promoting different preventive measures, namely, the use of bed-net, use of mosquito repellent and herbal medication practices for malaria prevention and control measures in endemic areas may be considered as very useful strategies.

Comoro et al.'s study (2003) of a Tanzanian village highlighted that villagers did not consider malaria as a serious health problem besides sufferings, unless they incurred huge expenses towards treatment. The observations of their study indicated that majority of people are well aware that a mosquito net prevents mosquito bites, but few believe that it will prevent malaria. In the present study, participants reported the culturally appropriate habits of keeping country fowls inside their sleeping room to prevent croon sound and night bite of mosquitoes since long. Hence, though the cause of malaria among the respondents in the study area was not only due



to mosquito bite but also for other reasons as believed by the people.

In the study area it was found that women were more aware of the symptoms of *Palli Jwaroo* than the males because of their role as caretakers in the house and their personal rapport with the village level health worker or their interaction with ASHA or *Anganwadi* worker of ANM in the village. Further it was found that Binjhal tribal families, irrespective of their economic condition, keep country fowls inside their living room. This practice of people may be termed as a unique habit, as almost all participants in FGDs reported that due presents of country fowls in living room may be helping as mosquito repellent to drive out the mosquitoes and flies during night as the croon sounds are not being heard and they are less affected by palli jwaroo (malaria). The present study revealed all activities of people living in malaria endemic village and how they should manage disease prevention and cure aspect at the village level. Singh et al. (1999) in their study had reported that the people's habitual activities play an important role towards the interventions. Dowler et al. (2006) in their study highlighted utilisation of health intervention strategies and easy availability of services are influenced by perception of people towards the same and perception of people from the basis of their use and non-use of available health services in the area. Similarly, in the present study, wearing full body covered clothes and sleeping inside the room by women and children are perceived as safe. Although inside their sleeping room they have a country fowl not because of scarcity of space but it is a habit of the people and their perception that croons of flies/mosquitoes are not noticed inside sleeping room! This type of observation shows how people perceived prevention of disease. A study by Njama et al. (2003) in Kampala city in Nigeria, Africa showed that ninety percent of caregivers in the study area knew that mosquito causes malaria but they also indicated that drinking un-boiled water and respiratory illness as also the reasons of the cause.

Since people in the study village are in habit of keeping a country fowl inside their living room and believe that fowls do not allow mosquitos to bite them inside the living room at night, so use of a mosquito net inside the living room is not popular among people. Further people are not in favour of the use of any insecticide spray

inside the living room or use of insecticide treated bed-nets. So, the use of insecticide treated bed-nets in the study village was found not popular among people.

## CONCLUSION

The observations of the present study revealed that the sleeping habits of people and practices prescribed by elders in the village emerged as an important preventive measure of malaria. The practice of sleeping inside rooms and allowing fowls to stay inside their living rooms without any complains of the hygienic aspect in the study area plays a significant role of fowls as a mosquito repellent inside living rooms. This is because of the zoophilic nature of mosquitoes. As per the villagers' opinion, those who are sleeping outside are more prone to malaria fever than those who are sleeping inside living rooms. By seeing this age-old practice of people, one can conclude that malaria preventive measures are being adopted by people, which for years together might have prevented them from sufferings of malaria. Further, the role of traditional healers in treatment decision is crucial, as elder members of the family have always preferred to recommend advice from healers in the beginning. The roles of traditional healers are crucial in remote villages for their easy access and cheap treatment of malaria. Further, they are respected by villagers and play a very important role in the socio-cultural belief of people. Further, the community may be sensitised regarding availability of malaria diagnosis and treatment facility services with the ASHA and Anganwadi workers at the village level. Similarly, the village level health worker should ensure availability of diagnostics kits and medicines at their disposal each moment so that the community members do not lose their faith in them. These important practices may be disseminated as a knowledge bank for repelling the malaria vector in an epidemiological prospective to protect public health, explore a range of habitual behaviour and perceptions of people that would form a sound healthy environment for malaria disease prevention and control strategies.

## RECOMMENDATIONS

Malaria is a poor man's disease. This should be countered with foremost importance by im-

proving the socio-economic conditions of the people of the area to sustain the healthcare practices involving all the stakeholders with a time based new strategy as well as traditional knowledge integration for treatment of malaria.

### LIMITATIONS

This study was undertaken in a tribal dominated village in Balangir in KBK district of Odisha keeping in view malaria cases, deaths, backwardness, varying topography and other unique socio-cultural practices of people. It cannot be a final representative of the areas having high dominance of tribal population, higher education level, daily hygiene and unique socio-cultural behaviour and practices of other tribes.

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