

Research Article

A Knowledge, Attitude and Practices Survey and Entomological Situation Analysis in Malaria Endemic Tribal Villages of Surajpur District, Chhattisgarh, India

Raju Ranjha

ICMR, National Institute of Malaria Research, Raipur, Chhattisgarh, India.
DOI: <https://doi.org/10.24321/0019.5138.201901>

I N F O

E-mail Id:

dr.ranjha@outlook.com

Orcid Id:

<https://orcid.org/0000-0002-9389-4626>

How to cite this article:

Ranjha R. A Knowledge, Attitude and Practices Survey and Entomological Situation Analysis in Malaria Endemic Tribal Villages of Surajpur District, Chhattisgarh, India. *J Commun Dis* 2019; 51(1): 1-5.

Date of Submission: 2018-12-04

Date of Acceptance: 2018-12-30

A B S T R A C T

Background and objective: Malaria continues to be a global health concern with 219 million cases in year 2017. Chhattisgarh is a malaria endemic State, which contributes to 13.5% of malaria cases and 18.43% of deaths reported in India. More than 30% of Chhattisgarh's population is tribal. Tribal areas have high malaria prevalence due to prevailing congenial conditions for malaria transmission. This study was carried out with an objective to understand the entomological situation of malaria in the area. An attempt was also made to know the KAP of the population living in the area towards malaria and also towards utilizing the services provided by the government.

Methodology: This study was carried out at Odgi block, District Surajpur, where more than 60% of population is tribal. Entomological survey was carried out to find out the primary vector population present. KAP survey was carried out through of in-depth interviews.

Results: In our entomological survey, we found high MHD for *Anopheles culicifacies*, which was the primary vector in the area. We found that the people have very low knowledge about malaria and prefer to visit local traditional healers instead of using government facilities.

Conclusion: Our study concluded very low knowledge about malaria in the community. There was requirement of changing IRS or distributing more Long-Lasting Insecticidal Nets (LLIN) with malaria awareness campaigns at regularly basis to effectively control malaria in the area.

Keywords: Elimination, Entomology, KAP, LLIN, Malaria, Tribal

Introduction

With 219 million cases and half million deaths worldwide, malaria is an important global health concern.¹ India reported highest number of malaria cases in Southeast

Asian region, which accounted for 75% of total malaria cases in the region.² In 2017, 0.84 million cases and 194 deaths are reported due to malaria in India. Out of total malaria cases in India, nearly 16.67% of cases and 41.76%

Copyright (c) 2019 Journal of Communicable Diseases (P-ISSN: 0019-5138 & E-ISSN: 2581-351X)

<https://www.adrpublications.in>



of deaths were reported from Chhattisgarh alone.³ Out of total 27 districts of Chhattisgarh, 19 are endemic for malaria and have API more than 1. In line with global malaria strategy 2016-2030, India has set goal for malaria elimination by 2030. Chhattisgarh comes under Category 3: Intensified control phase, according to National framework for malaria elimination.⁵

In India tribal population reside mostly in remote and difficult to reach areas. The tribal areas have high malaria transmission and poor utilization of health services due to orthodox health beliefs of tribals.⁴ Understanding the multifaceted determinants for malaria tribal community is necessary for the goal of malaria elimination from the country. Surajpur is one of the malaria endemic district of Chhattisgarh with API=7.11 in 2017. 61% of the population living in Odgi Block, Surajpur belongs to tribal community. The villages under Odgi Block of District Surajpur were reported to have sudden increase in number of Malaria cases on July, 2017. On request from state health department, Chhattisgarh, we undertook the survey of affected area for the situation analysis from August 9-18, 2017. Most

of the villages, included in this study, were having tribal population and comes under Biharpur PHC. The objective of this study was to find out the entomological situation in the area and to know the attitude of people in the areas towards utilization of health services during malaria illness so that future strategies can be made for effective malaria control in the area.

Materials and Methods

Study Area and Malaria Endemicity

The Surajpur, Chhattisgarh, is located at latitude 23.223047 and longitude 82.870560 with GPS co-ordinates of 23° 13' 22.9692" N and 82° 52' 14.0160" E.⁶ The villages under study were foothill villages (Figure 1). The surveys for the study were carried out in August 2017.

Last seven years (2010-2017) epidemiological data for Odgi Block was collected from state health department (Table 1). The data showed API ranged from 0.58 to 10.56 from 2010 to 2016. API for year 2017 was 66.26. Figure 2, shows trend of API, Odgi Block, from 2010-2017.

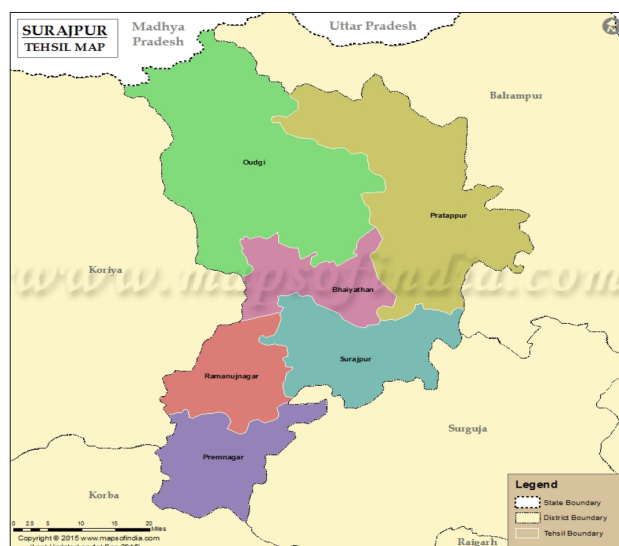


Figure 1. Map of district Surajpur showing the different blocks. Study was carried out at Odgi block

Table 1. Sub-center wise API from 2010 to 2017

	2010	2011	2012	2013	2014	2015	2016	2017
Biharpur	4.4	9.1	8	12	7.5	0.69	1.65	131.97
Nawatola	1.6	7.7	3.5	2.5	3.1	0.16	1.9	151.2
Thadpathar	1.2	7.6	3.8	2	1	0	1.65	11.09
Pasal	2	12.6	3.8	4.2	2.9	0.28	1.65	13.13
Khaira	3.5	11.2	2.3	6.8	2.5	0.27	0.27	70.33
Mahuli	2.6	7.3	3.2	5.4	2.2	1.52	2.59	47.24
Umjhar	3.5	12.5	11.4	10	5.1	0.38	3.82	55.36
Moharsop	15	16.5	13.3	11.5	5.1	1.41	3.53	50.63

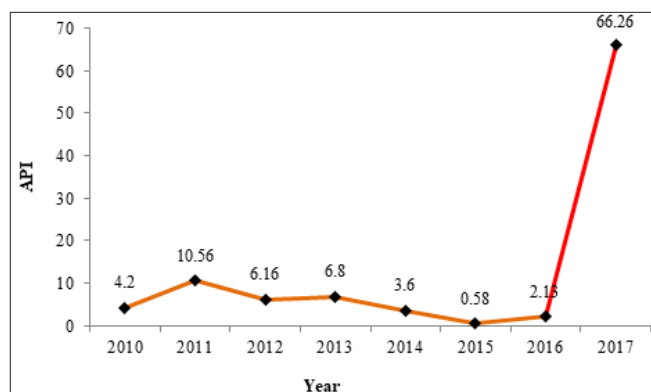


Figure 2. Trend of API from 2010 to 2017. There was an increase in 2011 and then their continuous decrease in API till 2015 with slight increase in 2016 and there was tremendous increase in year 2017

Entomological Survey and Insecticide Resistance Monitoring

For the entomological study mosquito collection was carried out in Human Dwelling (HD) as well as Cattle Shed (CS) using hand-catch method. Primary and secondary vector species present were identified and Man Hour Density (MHD) was calculated. DDT was being sprayed in the area so we also looked at the insecticide susceptibility status by susceptibility test with discriminating concentration and cone bioassay, according to WHO protocol.⁷ *An. culicifacies* collected from unsprayed area were exposed on mud, cemented walls and wooden doors sprayed with DDT in a WHO cone bioassay test. Survey was carried out for the potential breeding sources present in the area.

Epidemiological Survey

Active blood slide collection was performed from four villages, namely, Pasal, Avantikapur, Khohir and Mahuli which were reported to be highly affected by malaria. During blood slide collection, blood slides were collected of the persons living in the houses where either malaria cases or deaths (suspected due to malaria) were reported and also from the people living in the surrounding houses. Details of the participants were recorded in the performa. 31-45 slides per village were collected and examined for the presence of parasite.

Knowledge Attitude and Practices Survey (KAP Survey)

Survey was carried out in the form of in-depth interviews to know the people's knowledge about malaria, attitude toward health and utilization of health services. Kolhua and Khohir, highly affected villages were selected for the survey. Consent was taken from all the participants in the study. Total number of participants in the study was 90. Demographic features of participants are given in table 2. Mock interviews were carried out and training was given to the persons for carrying interviews. Systematic random sampling method was used for the survey. Data was

analyzed using statistical software Stata 15.0 (Stat Corp.) and number were expressed in Mean±SD, N (%) and range.

Table 2. Demographic features of the respondents in household survey for health awareness

Demographic feature	Number
Age (Yrs.)	
Mean ± SD	39.91±15.48
(Range)	(15-86)
Gender	
Male	58 (64.4)
Female	32 (35.6)
Number of house hold surveyed	
Kolhua	60 (67.7)
Kohir	30 (33.3)
Cast	
Pando	32 (35.5)
Gaund	31 (34.4)
Kelar	8 (8.8)
Kumhar	2 (2.2)
Bhramin	3 (3.3)
Sahu	5 (5.6)
Kewat	5 (5.6)
Teli	2 (2.2)
Panika	1 (1.1)

Results

In our entomological survey we found *An. culicifacies* and *An. annularis* to be the primary and secondary vector respectively, present in the area. Mean MHD for *An. culicifacies* was 26.8 (11-49) and 64 (38-99) in HD and CS respectively (Table 3). Vector density was highest in the village Kolhua, PHC Biharpur, which was reported to be highly affected by Malaria in July 2017 (Table 1). *An. culicifacies* collected from unsprayed area were exposed on mud, cemented walls and wooden doors sprayed with DDT in a WHO cone bioassay test. There was no knockdown and corrected mortality was 6.66%, 0% and 0% for mud, cemented and wooden surface respectively. Adult susceptibility test with discriminating dose of DDT showed almost no mortality (1% mortality), showing very high level of resistance.

Survey was carried out for the potential breeding sites present in the area. Four villages were surveyed (Kolhua, Khohir, Mahuli and Avantikapur). Water canals running from the surrounding hills were the main potential vector breeding sites in all the villages.

Table 3. MHD of *An. culicifacies*

Date	Village	MHD in HD	MHD in CS
10/8/2017	Pasal	11	38
11/8/2017	Avantikapur	19	45
12/8/2017	Khohir	29	41
13/8/2018	Mahuli	26	97
14/8/2018	Kolhua	49	99

During our active survey, out of total 145 blood slides, only 2 were Pv positive and non was Pf positive. The probable reason for the low positivity was mass drug administration due to sudden increase in numbers. In our households survey, in 87.78% of houses all the members of the family had taken medicine for malaria (Data not shown).

67.7% of respondents in our health awareness survey belonged to tribal community. Table 2, shows the demographic features of respondents involved in the survey. People prefer quacks over government doctors and Mitanin's. More than 50% of people go to untrained practitioners and quacks compared to government doctors (34.44%) and Mitanin's (13.33%). Most of the people (76.66%) visit doctor/quacks after waiting for 2-3 days. Most of them (81.11%) were not aware for malaria transmission by mosquito. 92.22% did not know about the mosquito breeding sources. There was very low knowledge about the role of mosquito in malaria transmission, 73% responded by saying that dirt is the reason for spread of malaria. Results of in-depth interviews about malaria knowledge and health awareness are given in Table 4. Mosquito net distribution was being done by the state govt. 96.67% of houses had at least one mosquito net. In 43.33% of houses mosquito net was being used by ladies and children only. In our survey we found that only in 35.56% of houses all the members slept under net on previous night of survey. Only 1% of the participants in our survey had knowledge about LLIN and its benefits. Table 5, shows the results of questionnaire about mosquito net knowledge and usage.

Table 4. Knowledge of malaria and health attitude of people

Variable	N (%)
Attitude toward fever	
Go to Doctor	16 (17.8)
Self-medication and Home remedies	51 (61.1)
Superstitious remedies (Jhad funk)	22 (24.4)
Do nothing	1 (1.1)
Doctor Visited	
Quacks	46 (51.1)

Mitanin	12 (13.3)
Government hospital doctor	31 (34.4)
None	1 (1.1)
Number of days before going to doctor	
Same day	1 (1.1)
2 nd day	4 (4.4)
3 rd day	47 (52.2)
4 th day	22 (24.4)
5 th day	11 (12.2)
6 th day	3 (3.3)
Only in severe condition	1 (1.1)
Don't go to doctor	1 (1.1)
How do Malaria spread?	
Mosquito	17 (18.9)
Don't know or dirt	73 (81.1)
Mosquito breeding source	
Stagnant water	7 (7.8)
Don't know or dirt	83 (92.2)

Table 5. Mosquito usage and LLIN knowledge

Variable	N (%)
Slept under Net Last night	
All members	32 (35.6)
Only children or Ladies and children	39 (43.3)
Ladies only	4 (4.4)
Old age People only	13 (14.4)
No one	2 (2.2)
No. of people going to field at night/ carry Net in field	4/0
Knowledge about LLIN	1 (1.1)

Discussion

An. culicifacies has been described as primary vector for malaria transmission in Chhattisgarh.⁸ *An. fluviatilis* and *An. annularis* were reported to be the secondary vector species present in Chhattisgarh.^{8,9} In our study we found *An. culicifacies* and *An. annularis* as primary and secondary vector species, respectively, present in the area. Bhagel P et al. reported density of *An. Culicifacies* in Raipur, Chhattisgarh as 2.10 and 4.55 in July and August 2003 respectively.⁹ High density (11.3-125.1) of *An Culicifacies* was observed by Sharma and Parsad, 1991, in rural areas of Shahanjapur, Uttar Pradesh.⁶ The vector density observed in our survey (Table 2) was very high compared to earlier studies by Bhagel P et al. and Sharma RK.^{6,9}

An. clulificaies was reported to be resistant to DDT in different districts of Chhattisgarh by Bhatt RM et al.⁸ Our finding further support the earlier study and show very high level of resistance to DDT. Water canals running from the hills were the potential vector breeding source present and might be the factor for high vector density. High humidity with intermittent rain may create favorable environment for mosquito breeding. Resistance to IRS being used may be one of the important factor for high vector density observed in the area.

Assessment of KAP is needed for planning malaria control activities being essential component. Panda R et al., 2000 reported very low knowledge of malaria transmission and need of health education in South Bastar region of Chhattisgarh.¹⁰ Survey carried out by Kadam S et al. average knowledge of malaria in tribal communities at Maharashtra.¹¹ Vijayakumar KN et al., 2009 reported good knowledge of cause and prevention of malaria in tribal belt of Orisa.¹² In the study, it was found that the people preferred self-medication and Jhad-funk (going to ojhas) over doctor. Most of the respondents told during fever they wait for 2-3 days before going to doctor. Not timely visiting health facility and preferring untrained professionals may lead to increase in the severity of disease due to delayed treatment. This may further lead to increased number of deaths due to disease. Our results match with the results of Panda R et al.¹⁰ that there is high need of health education campaigns in Bastar region for effective control and elimination of malaria. In survey, we observed that mosquito nets available were not adequate for universal coverage as reported with Raghavendra K et al.¹³ There was very low knowledge about LLIN in the community which may lead to low usage rate. After this survey LLINs were distributed by state health department in the area in January 2018.

Conclusion

The parasitic load was found to low at the time of survey due to prior mass drug administration by the local staff, though presumptive treatment is not recommended by the programme. Due to transmission potential of the area, there is urgent need to change IRS for effective vector control in the area. The current study has highlighted that the people living in the area are not aware about malaria and they don't prefer using government facility and taking medicines for malaria. LLIN distribution with regular health education campaigns for promoting locals to use LLIN and visit government facility for treatment are required in the area for controlling malaria in the area.

Acknowledgement

Author would like to acknowledge SPO, State health department Chhattisgarh for the support provided. I also want to thanks Dr. GDP Dutta for the help and guidance during the work.

Conflict of Interest: None

References

1. World malaria report 2017. World Health Organization, Geneva. 2017. CC BY-NC-SA 3.0 IGO.
2. Wangdi K, Gatton ML, Kelly GC et al. A clements, malaria elimination in India and regional implications. *Lancet Infect Dis* 2016; 16(10): e214-24.
3. Directorate of National Vector Borne Disease Control Programme (NVBDCP), Ministry of Health & Family Welfare, Government of India. Accessed 1 Feb 2018. Available from: <http://www.nvbdc.gov.in/>.
4. Sharma RK, Thakor HG, Saha KB et al. Malaria situation in India with special reference to tribal areas. *Indian J Med Res* 2015; 141(5): 537-545.
5. National framework for malaria elimination in India (2016-2030). Directorate of National Vector Borne Disease Control Programme (NVBDCP) Directorate General of Health Services (DGHS) Ministry of Health & Family Welfare Government of India.
6. Latitude and Longitude of Surajpur, Chhattisgarh. Available from: https://www.mapsofindia.com/lat_long/chhattisgarh/surajpur.html. Accessed on Jan 15, 2018.
7. Test procedures for insecticide resistance monitoring in malaria vector mosquitoes. 2nd ed. Global Malaria Programme World Health Organization, Geneva, Switzerland.
8. Bhatt RM, Sharma SN, Barik TK et al. Status of insecticide resistance in malaria vector, *Anopheles culicifacies* in Chhattisgarh state, India. *J Vector Borne Dis* 2012; 49(1): 36-38.
9. Baghel P, Naik K, Dixit V et al. Indoor resting density pattern of mosquito species in Fingeswar block of Raipur district in Chhattisgarh, central India. *Journal of Parasitic Diseases: Official Organ of the Indian Society for Parasitology* 2009; 33(1-2): 84-91.
10. Panda R, Kanhekar LJ, Jain DC. Knowledge, attitude and practice towards malaria in rural tribal communities of south Bastar district of Madhya Pradesh. *J Commun Dis* 2000; 32(3): 222-227.
11. Kadam S, Adhav A, Mote B et al. Knowledge, attitude and practices of people towards malaria in tribal communities of Jawahar, Maharashtra, India. *IJCRR* 2015; 7(18): 25-30.
12. Vijayakumar KN, Gunasekaran K, Sahu SS et al. Knowledge, attitude and practice on malaria: A study in a tribal belt of Orissa state, India with reference to use of long-lasting treated mosquito nets. *Acta Tropica* 2009; 112: 137-142.
13. Raghavendra K, Chourasia MK, Swain DK et al. Monitoring of long lasting insecticidal nets (LLINs) coverage versus utilization: a community-based survey in malaria endemic villages of Central India. *Malaria Journal* 2017; 16: 467.