Socio-economic conditions act as dominant factors for the occurrence of human malaria: A case study from India

Pankaj Saini*, Bishambhar Datt Joshi, Trilochan Sharma[1]

Department of Zoology and Environmental Sciences
Gurukul Kangri Vishwavidyalaya, Hardwar, Uttarakhand (India)
1. National Institute of Malaria Research (Field Station), Hardwar, Uttarakhand (India)
*E-mail : **sainip_1984@yahoo.com**

Abstract: Malaria is one of the foremost public health problems in India. Some times the problem arises up to the extant, which take the shape of epidemic and several lives are lost due to the disease. Entomlogical, parasitological, clinical and environment related issues are looked into to bring down the morbidities and loss to human lives, but socio-economic aspect play a major affecting factor for malaria and needs to study for better understanding and implementation of action plan to control malaria. So, the aim of this study was to asses any link between socio-economic condition with occurrence of human malaria. Epidemiological survey was conducted to collect the information of the malarial patients in Roorkee town of hilly state Uttarakhand (India) during the year 2007. Out of the 430 suspected fever patients, 60 were found positive for MP (malaria parasite) test. 30 % patients were infected by *P. falciparum* while rest 70 % patients were infected by *P. vivax*. It was found that about 85% of malarial patients belonged to Below Poverty Line (BPL) and residents of slum area. It indicates that socio-economic conditions (SEC) play a major role in occurrence of this disease. Community awareness program and solid insanitary infrastructure is a need to control the cause of malarial and other vector borne disease. [Researcher. 2010;2(6):50-53]. (ISSN: 1553-9865).

1. Introduction:

Malaria was called as the king of disease by Charaka and Sushruta, great Indian physicians of Ayurved while it was first recognized as occurrence of intermittent fevers and given the term malaria due to bad odour coming from marshy areas by Romans and Greeks (Sharma et al. 1996). Malaria exists in about 100 countries, but is mainly confined to poorer tropical areas of Africa, Asia and Latin America. More than 90% of cases of malarial deaths occur in tropical Africa. Poorest countries are suffering with a burden of malaria (Panda and Mohapatra, 2004) and other epidemic like tuberculosis (Vissandjee and Pai, 2007). India is a developing country and its 26.1 % population live under Below Poverty Line (BPL), and it has no city without slum areas. About 70 % of malarial cases in India belong to the BPL category of socio-economic status (Sharma, 2003). The Planning Commission, Government of India (2001) has earmarked the poverty line for rural and urban areas for the year 2001-02 at Rs. 331.40 & Rs. 425.76 respectively. On the basis of this the Planning Deptt., Govt. of Uttarakhand has worked out annual income of a family consisting of five members in rural and urban areas as Rs.19884 (Approx $ 398) and Rs. 25546 (approx $ 511), respectively. Although many factors

(Batra et al, 2001; Joshi et al, 2005; Bhattacharya et al, 2006; Saini et al, 2009) are responsible for occurrence of malaria, but poverty and unawareness has been found as one of the predominantly and indirect factor for the occurrence of malaria, in various studies (Worral et al, 2005; Okyere, 1994).

It is also observed in various studies that all parts of India are facing problems related to malaria, except the areas situated at 5000 ft. above sea level. Uttarakhand, the hilly state of India, falls under hypo endemic zone of malaria (Sharma et al. 1996). In case of Uttarakhand, nine anopheles species are reported to cause malaria in Kumaon region (Shukla et al, 2007), while three species are reported dominant to be the vector for malaria in Garhwal region (Pemola and Jauhari, 2008).

2. Materials and Methods:

The present study is based on the survey conducted to find out the instances of malarial cases during the year 2007, reported through local medical practitioners, hospitals, nursing homes, pathologies of Roorkee town. The residential areas of these reported patients were also surveyed to find out the economic condition and sanitation condition in their living areas. Roorkee town is the part of Haridwar district at

29^0 51' North latitude and 77^0 53' East longitude and at the elevation of 274 MSL. As per the Indian census report of 2001, Roorkee has a population of 97,064. The data was examined and correlated to a number of socio-economic and eco-climatological conditions, to ascertain the key factor(s) of malarial infection.

3. Results:

In the present study, a total of 430 patients were screened for MP test on the suspect of primary symptoms of malaria. Out of which 60 were found positive for MP Test, in which 18 malaria patients (30%) were found infected by *P. falciparum,* while rest 42 malaria patients (70%) were found infected by *P. vivax.* It was also observed that 85 % of malarial patients in Roorkee town belonged to BPL category. The distribution of malaria patients and socio-economic condition is depicted in Table 1-2 and Figure 1.

Table 1: Age and Sex wise distribution of malaria patients

Age (in years)	No. of the patients (malaria + ve)	
	Males	**Females**
0-10	4	2
11-20	6	3
21-30	24	14
>30	4	3
Total	38	22

Table 2: Relation of malaria to the economic status of patients

Age in years	Yearly economic levels of patients family		
	Below poverty line* (< $ 511)	**Middle Income class (> $ 511 But < $ 3000)**	**Upper Income class (>$ 3000)**
0-10	3	3	0
11-20	6	3	0
21-30	38	0	0
>30	4	3	0
Total	51	9	0

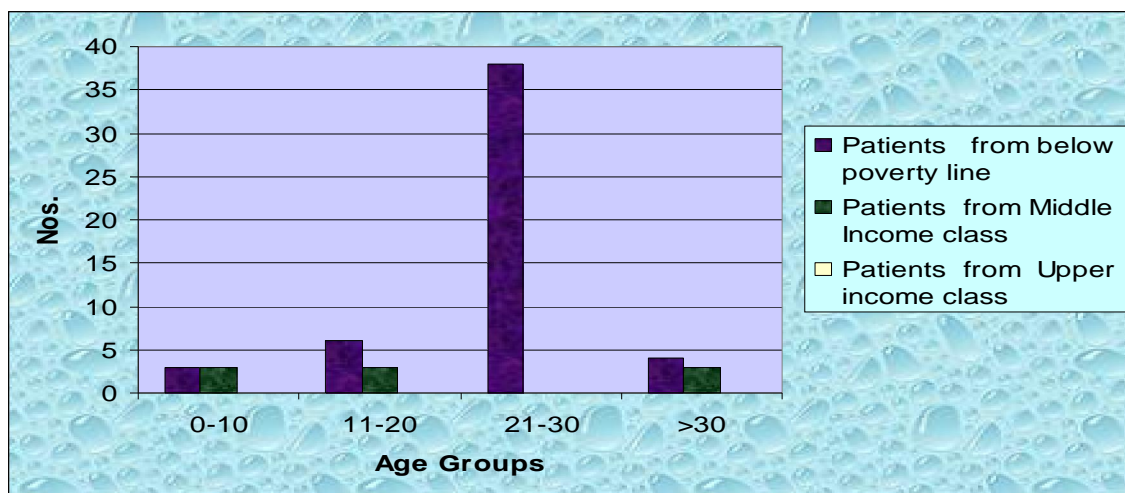- **Vide Planning Commission, Govt. of India (2001).**

Figure: 1. No. of malarial patients in relation to income & age groups

4. Discussion:

Out of a total of 60 patients, about 85% of malarial patients belonged to Below Poverty Line (BPL) category and most of them are residents of slum areas of Maqtool puri , Sati mohalla, New Basti, Laxmi Vihar and

Ambartalab localities of Roorkee town. People of these areas have been dwelling under poor sanitary conditions all around (Danik Jagran Beuro, 2006). The malarial parasites were found mostly among the poor patients of 21-30 year age group, out which 24 patients were male and 14 were female. Almost all of these patients earn their livelihood as a daily wage labors or on daily contract basis and they have to spent most of their time in construction related works, where these work as unskilled laborers. Their habitations are poorly built mud house or simple brick houses, without inbuilt toilet facilities. More than often their hutments are surrounded with pools of waters. Their streets are full of drainages and provide ample pockets for the breeding of mosquitoes. There are no proper drains to carry the house hold waters. As a result even the kitchen water flow between narrow lanes of the streets. On account of this the man – mosquitoes contact reaches at higher level because of these areas are very supportive for breeding of mosquitoes. Rests 15 % of malarial patients were of middle income class and there was no patient from higher income group. Thus it is clear that poor economic conditions and poor habitation conditions provide supportive ground for malaria. On account of their poverty and slummy area, they can not afford the Mosquito coils, Liquid machines and a Variety of other mosquito repellants and other preventive measures to control mosquitoes. On the other hand the people of upper economic class live in well maintained housing colonies and can spend an adequate amount of money to repeal the mosquitoes. Razum et al. (2008) also emphasized on the economic level for the casual factors of health degradation in East or West countries. From the above discussion it is clear that economic status still play an important role to provide a suitable environment for the occurrence and survival of these vectors. It is well known that it is almost impossible task to resolved the economic problems, but Govt. can do much to enhance the improved sanitary facilities to control the root cause of diseases like malaria, besides through compulsory mass education of the relatively illiterates population living in these areas. High literacy would go a long way in controlling these diseases.

Correspondence to:
Pankaj Saini.
Sr. Research Scholar,
Department of Zoology & Environmental Science,
Gurukula Kangri University,
Haridwar-249404 (Uttarakhand), India.
E.mail: sainip_1984@yahoo.com
Mobile No. 91-9837878385

References
[1] Sharma RS, Sharma GK, Dhillon GPS. Epidemiology and Control of Malaria in India. Government of India Ministry of Health & Family welfare NMEP (Directorate General of Health Service). 1996
[2] Panda M, Mohapatra A. Malaria control- An over view in India. J. Hum. Ecol., 2004;15(2):101-4.
[3] Vissandjee B, Pai M. The socio-cultural challenge in public health interventions: the case of tuberculosis in India. Int j public Health. 2007; 52: 199-201.
[4] Sharma VP. Malaria and poverty in India. Cur Sci., 2003; 84(4): 513-515.
[5] The Planning Commission, Govt. of India (2001): http://planning.up.nic.in/annualplan0450/part1/chapter-02.htm
[6] Batra CP, Adak T, Sharma VP, Mittal PK. Impact of Urbanization on Bionomics of *A. culicifacies* and *A. stephensi* in Delhi. Indian J Malariol, 2001; 38: 61-75.
[7] Joshi V, Sharma RC, Singhi M, Singh H, Sharma K, Sharma Y, Adha S. Entomological studies on malaria in irrigated and non-irrigated areas of Thar desert, Rajastan, India. J.Vect Borne Dis, 2005; 42: 25-29.
[8] Bhattacharya S, Sharma C, Dhiman RC, Mitra AP. Climate change and malaria in India. Cur Sci, 2006; 90(3): 369-75.
[9] Saini P, Joshi BD, Sharma T. Climatic variables and Malaria Incidence in Haridwar district of Uttarakhand State. In: Trivedi A, Jaiswal K, Trivedi S P, Pandey BN (ed) Environment and Society, 1st edn. APH Publishing Corporation- New Delhi, 2009; pp 181-86.
[10] Worrall E, Basu S, Hansoon K. Is malaria a disease of poverty? A review of literature. Trop medi & Int Health, 2005;10 (10):1047-59.
[11] Okyere WKA. Socio-economic factors in malaria control. World Health Forum, 1994; 15: 265.
[12] Shukla RP, Sharma SN, Dhiman RC. Seasonal prevalence of malaria vectors and its relationship with malaria transmission in three physiographic zones in Uttrakhand

state, India. J.Vect Borne Dis, 2007; 44: 75-77

[13] Pemola N, Jauhari RK. Reappraisal on anopheline mosquitoes of Garhwal region, Uttarakhand, India. J.Vect Borne Dis., 2008; 45: 112-23.

[14] Danik Jagran Beuro. Daily News Paper: Danik Jagran – Roorkee Jagran., 2006; Jan 31st pp 6.

[15] Razum O, Altenhoner T, Breckenkamp J, Voigtlander S. Social epidemiology after the German reunification: East vs. West or poor vs. rich? Int J. public Health, 2008; 53: 13-22.

Date: 04-06-2010