AN INVESTIGATION ON INSTANCES OF MALARIA IN TWO DIFFERENT ENVIRONMENTAL AMBIENCES OF DISTRICT HARDWAR OF UTTARAKHAND STATE

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A survey was conducted to find out the instances of malaria in selected two different environmental ambiences / zones i.e. (i) Industrial area (IA) of BHEL township (ii) Rural area (RA) of Bahadarabad village of district Haridwar during the year of 2007. During the present study, maximum (70) and minimum (22) instances of malaria were from RA and IA, respectively. Study shows a high positive correlation between rainfall and instances of malaria in the area studied. It was also observed that about 66% of malarial patients in selected environmental zones belonged to BPL category. It was also observed that males of between 21-30 years of age range showed higher infection of malaria as compared to females from the same areas.

Malaria has been a major public health problem in India even though modern medical science has reached its peak. Except for areas situated 5000 ft. above sea level malaria is endemic all over India. The endemity varies from place to place depending on survival condition of malaria vector as well as its longevity. In spite of a century of research and control efforts, malaria is still a major global health problem and an obstacle to social and economic development.

In India, occurrences of epidemics and focal outbreaks have worsened the malaria situation. During the first half of the twentieth century, malaria has affected every walk of life so much that it became one of the major problem for the developing countries. According to an estimate in 1935, out of 100 million malarial cases, one million deaths occurred in Indian subcontinent. Another estimate in 1947 about 75 million cases of malaria (21.8% population) were recorded in India with about 8,00,000 deaths. India had an estimated 10.6 million cases in 2006, which account for approximately 60% of cases in the whole of the South-East Asia Region.

MATERIAL AND METHODS

The area of present study is spread with in district Haridwar, situated between latitudes 29° 45' - 29° 58' N and longitudes 77° 52' - 78° 75' E. The area of the district is about 2360 sq Km. Population and its density is 14,44,213 and 612 per sq Km, respectively (as per 2001 census). To assess the instances of malaria in communities of different environmental ambiences / zones viz., (i) Industrial Area / Zone of BHEL Township and (ii) Rural environmental Area of Bahadarabad village, surveys were conducted during 2007, through house to house interview and consulting local medical practitioners, hospitals, nursing homes and pathologists of the selected areas under study.
RESULTS AND DISCUSSION

In the present study, maximum (70) and minimum (22) instances of malaria were found from RA and IA zones, respectively. Out of 92 malaria patients found from these two different environmental ambiences of district Haridwar, 10 patients (10.9%) were found infected by P. falciparum (Pf), while rest 82 patients (89.1%) were found infected by P. vivax (Pv). It was also observed that about 66% of malarial patients in selected environmental ambiences of Haridwar district belonged to below poverty line (BPL) category. The distribution of malaria patients in correlation to age, sex, socio-economic condition are depicted in Table-1 and Fig.-1. In the present investigation relatively fewer cases were found in winter season and maximum cases of malaria were recorded during monsoon and post-monsoon months of the year.

During the present study, the association between monthly rainfall and instances of malaria was found greater than that for between temperature and malarial instances. This apparently is indicative of that humidity caused due to rainfall play an important role in the growth and transmission of disease than ambient temperature, as has been postulated by few earlier workers from different places\(^4\)\(^-\)\(^6\).

But it was also observed that proper management can fight against this dominant favorable factor of malarial infection. This can be easily explained in case of township of industrial area of BHEL where a well managed plan is in good functional condition rain water harvesting and drainage. The management of BHEL is working in collaboration of National Institute of Malaria Research (NIMR) to control malaria on a large scale since 1986. It is on account of the obvious fact that the township has a human workforce related population of about 10000-15000 (including house hold family members). This necessarily warrants a status of good health for the whole population of the industrial area, otherwise a discared population will hit hard and impact severely to the productivity of the industry and in long term shall prove far costlier to the industrial management. On the other hand, the rural area of higher instances is a low-lying area and many breeding sites of mosquitoes were spread with stagnant water holes in and around this zone. On account of this, the man - mosquitoes contact reaches at higher level, increasing the instances of malarial infection. The present findings are in accordance with the studies\(^7\)\(^-\)\(^8\) in which the climatic condition and socio-economic status were found most important factors in malaria infection. It was observed that about 66% of malarial patients were from Low Income Group (LIG) and most of them were residents of slum localities in different environmental zones of Haridwar district.

Thus it is clear that poor economic conditions and poor habitation conditions provide supportive environment and congenial ambience for malaria. On account of their poverty and slummy area, they can not afford to any variety of 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\(^9\) also emphasized on the economic level for the casual factors of health degradation in East and West countries.

The infection of malaria in males and females revealed that the males were more prone to malaria. There were 96.8% more cases of malarial infection in males as compared to females. Similar finding were also observed.
by Mishra\textsuperscript{10} in Maharashtra. The sex-wise difference in the infection may be due to the reason that comparatively males are more exposed to the risk of acquiring malaria because of the out door life they lead. Secondly, females in India mostly wear more covered clothes than males. Clothing and covering of the body was also found playing an important role in malaria transmission. During present study, instances of malaria differed in different age-groups. Malaria infection was maximum in the 21-30 years age groups and minimum in 0-10 years age groups. The infants had less malaria infection. It is mainly due to the fact that infants are generally kept well protected with cloths and nets. In different age groups which were studied during the present study, the maximum cases of malarial fever were mostly among the poor patients of 21-30 year age. It is clear that economic status, environmental condition and education of people play a key role in the life style and maintenance of their health care approaches to mitigate and control the occurrence and spreading of malarial vectors and disease in particular region.

Table 1: Instances of malaria in selected areas with reference to sex & age groups during the year 2007

<table>
<thead>
<tr>
<th>Age Group (in years)</th>
<th>No. of Malarial Cases</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pf</td>
<td>Pv</td>
<td>Pf</td>
<td>Pv</td>
</tr>
<tr>
<td>0-10</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>11-20</td>
<td>2</td>
<td>7</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>21-30</td>
<td>3</td>
<td>35</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>&gt;30</td>
<td>1</td>
<td>8</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>54</td>
<td>3</td>
<td>28</td>
</tr>
</tbody>
</table>

Fig. 1: Variation of Instances of malaria in relation to economic status of patient’s family in selected environmental zones in Haridwar district during the year 2007
REFERENCES