MALARIA CONTROL AMONGST TROOPS INVOLVED IN COUNTER INSURGENCY OPERATION IN RESISTANT PLASMODIUM FALCIPARUM AREAS

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ABSTRACT

Incidence of malaria in troops carrying out counter-insurgency operation in thick jungles in North East region was compared for the year 1995 and 1996. Since troops were on constant move in thick jungles in hostile environment and they have to sleep and rest outdoor, use of mosquito net was not feasible in both years. Counter-insurgency operation lasted for two and half months in both the years from last week of March - 1st week of June. In spite of troops being on 300mg chloroquine (base) per week as chemoprophylaxis, 40 cases (5%) of malaria were observed in troops in the year 1995. During the year 1996 troops were advised to take 600mg chloroquine (base) per week as chemoprophylaxis. Three cases (0.40%) of malaria were observed during the year 1996. Difference was found to be statistically significant.

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KEYWORDS : Counter-insurgency operation; Malaria control; Resistant plasmodium falciparum areas.

Introduction

The National Malaria Control Strategy (NMCS) is directed to provide freedom from malaria to the people of India as their basic right. NMCS takes cognizance of prevailing malaria situation and new epidemiological paradigms in the country. These paradigms are tribal malaria, irrigation malaria, urban and peri-urban malaria, project malaria, marginal rural malaria, migration malaria and border malaria. Each type of malaria has some common and some specific control approaches [1]. Malaria control in troops involved in counter-insurgency operation (CI ops) in North-East cuts across all the epidemiological types of malaria, since it has overlapping area of mixed epidemiology of tribal, migration, border and marginal rural malaria, thus making malaria control problematical and at times impractical. This study has sought to look into some aspects of malaria control amongst troops involved in CI ops in North-East. Mizoram (North East) is holoendemic (API 20 and above per thousand population) for malaria. *Anopheles dirus*, *Anopheles minimus* and *Anopheles fluviatilis* are major vectors for malaria [2]. Stratification committee for malaria (1987) has included Mizoram as Stratum No VII (Refractory areas with high receptivity for malaria) [3]. Predominance of *P.falciparum* moderately resistant to chloroquine and focally to sulpha

pyrimethamine drugs have been reported in these areas [1]. As per the eighth report on World health situations 79.8 per cent cases are due to *P.falciparum* in Myanmar which is the highest in South-East Asia [4].

Material and Methods

The study has been carried out amongst troops involved in CI ops in North-East. Approximately 800 troops were inducted for CI ops from Manipur, Nagaland and South Assam in the year 1995. Troops were already on chemoprophylaxis (300mg chloroquine every week) before induction. Troops were involved in CI ops in thick jungles from last week of March 95 to 1st week of June 95. Troops had to sleep and rest outdoor in thick jungles during the operation. Troops were advised to observe anti-malaria measures i.e. use of mosquito net, protective clothing, use of DMP as mosquito repellent on skin and clothings, 300mg chloroquine base every week on fixed day after meal at a formal parade under supervision as chemoprophylaxis. All cases of fever with or without chills and rigors were given presumptive treatment 600mg (base) chloroquine and were evacuated by air/road to nearest hospital. Blood slide for malarial parasite was taken and sent along with the patient to hospital where patients were evacuated. Evacuation of cases remained a difficult task due to hilly/hostile terrain, bad weather and bad roads.

Again in the year 1996 approximately 800 troops were inducted from Manipur, Nagaland, South Assam for CI ops. None of the inducted troops belonged to local areas. Troops carried out the CI ops from last week of March 96 to 1st week of June 96 in the same area. But this time apart from other preventive measures which were advised during the year 1995, troops were advised to take 600 mg (base) chloroquine prophylaxis every week on fixed day after meal at a formal parade under supervision. Troops were asked to report side effects due to chloroquine chemoprophylaxis

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to the medical officer. In this study, new case showing clinical features of malaria and responding to antimalarial treatment was considered a case of clinical malaria in absence of slide positivity and confirmed malaria in presence of slide positivity.

Results

Incidence of malaria in troops involved in CI ops in the year 1995 and 1996 is reflected in Table 1. During the year 1995, 40 cases (5%) of malaria were reported. Amongst these, 4 cases were having cerebral malaria, 3 were having *P. falciparum* and 2 were having *P. vivax* infection. In other cases malarial parasite could not be detected possibly due to troops being on chemoprophylaxis. Since the cases were having signs and symptoms suggestive of malaria they were labelled as clinical malaria. Amongst the cerebral malaria cases, 2 died inspite of administration of quinine. All other cases recovered after treatment.

TABLE 1

Incidence of malaria in troops involved in counter insurgency operation at Mizoram Myanmar border with two different chemoprophylactic regimen

Chemoprophylactic regimen	Attacked (malaria case)	Non attacked	Total
Tab Chloroquine 300 mg base every week (1995)	40 (5.00)	760 (95.00)	800 (100.00)
Tab Chloroquine 600 mg base every week (1996)	3 (0.40)	797 (99.60)	800 (100.00)
Total	43 (2.70)	1557 (97.30)	1600 (100.00)

Figures in parenthesis are percentages
 $\chi^2 = 30.97$, df = 1, $p < 0.001$

In spite of the fact that same number of troops carried out CI ops in same area, for same duration and same part of year only 3 clinical malaria cases (0.40%) were reported during the year 1996. Difference in incidence of malaria in the year 1995 and 1996 was found to be statistically significant. Malariagenic conditions like rain fall, temperature, humidity were compared for the study period during the year 1995 and 1996 for Mizoram but no significant difference was observed. Incidence of malaria amongst troops involved in operation in the year 1995 was on higher side in comparison to incidence of malaria amongst nearby civil population and it was on lower side during the year 1996. However, this comparison may not be valid in view of army being nonimmune population to local strain as well as difference in preventive measures in both. However, incidence of malaria in nearby civil population in 1995 was not on higher side in comparison to 1996 during the study period.

Discussion

Army remains a special risk group for malaria being nonimmune population to local strain, variable state of herd premunity and frequent movement of troops due to annual and casual leave, temporary duty or permanent posting. Migration of troops from endemic to holoendemic areas and vice versa often brings in localized epidemics and dissemination of new parasite strains. Problem is further aggravated when troops have to move out frequently in thick jun-

gles for CI ops and they are not able to use mosquito net. Mosquito repellent for skin application or impregnation of clothing can be useful but its efficacy is reduced due to short duration of repellent effects which can be further compromised due to intolerable heat and humidity. Chemoprophylaxis in this situation seems to be sheet anchor and practicable for control of malaria since it has to be given once a week only. However, success of chemoprophylaxis for prevention of malaria depends upon chemoprophylactic regimen used (in view of resistant *P. falciparum* strain in North-East) and regularity of drug consumption.

At present we do not have a drug which is casual prophylactic against all species of malaria parasite i.e. it should not allow the sporozoites to develop further. Neither we have antimalarial vaccine. WHO has recommended chloroquine 300 mg base weekly with 200 mg proguanil daily or chloroquine 300 mg base weekly with 100 mg dapsone/125 mg pyrimethamine weekly as chemoprophylactic regimen for chloroquine resistant *P. falciparum* areas. But persons taking chloroquine in combination with proguanil, dapsone or pyrimethamine should have their blood examination at monthly interval and upon completion of prophylaxis [5]. Army authorities have recommended 600 mg chloroquine base as chemoprophylaxis in chloroquine resistant areas [6].

The present study is an example of nonrandomized trial but differences in incidence of malaria in the year 1995 and 1996 were statistically significant. It proves efficacy of 600 mg chloroquine base as chemoprophylactic drug for control of malaria in *P. falciparum* resistant areas when other malaria control measures are not feasible or practicable and diagnostic and therapeutic facilities are not easily available.

REFERENCES

1. Sharma VP, Kalra NL, Pattanayak S, Sharma RS, Orlev VS. National Malaria Control Strategy: Malaria Research Centre, Delhi: Akashdeep Printers: 1994; 3-19.
2. Rahman SJ, Sharma SK, Rajagopal R. Manual of Entomological Surveillance of Vector borne diseases: Division of Medical Entomology and Vector Control, National Institute of Communicable diseases, Delhi: 1989: 2-14.
3. National Institute of Health and Family Welfare (1988). National Malaria Eradication Programme. National Health Programme Series-4, NIHFV, Delhi 39-41.
4. Eighth report on the world health situation, Implementation of Global Strategy for Health for all by the year 2000, second evaluation, Vol 4, South East Asia Region 1993.
5. Park K, Park's textbook of preventive and social medicine. 14th ed., Jabalpur: Banarsidas Bhanot Publishers, 1994; 184.
6. DGAFMS Medical Memorandum No 116. Malaria, Govt of India, Department of Publication, Civil Lines Delhi: 2-5.