Prevalence of Malaria and Sickle cell anemia in Nanded District (MS) INDIA

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ABSTRACT

Study establishes mainly focus the relationship between malaria and sickle cell anemia, climatic conditions, mosquito ecology. This study indicated the possibility of predicting potential impacts on decrease in density of parasite by using past information and life cycle of parasite. The malarial parasite resides in the liver. Where as Sickle cell disease is a genetic disorder commonly found among people of tropical countries and transmitted as autosomal recessive character. If a person receives only one gene responsible for sickle haemoglobin from either of the parent, the condition is called carrier or trait. Mainly the disease is found in belt of central and South India.

Key words: Malaria, Sickle cell anemia, emigration, Change in climate.

INTRODUCTION

It is an infectious disease carried by mosquitoes. It is common in the tropics, although it has also been seen in the Americas and Africa and Asia. The disease is caused by a eukaryotic protest (*P. falciparum, P. vivax, P. ovale*, and *P. malariae*)) of Plasmodium genus and it affects about 250 million people every year. In Africa the disease causes death of one to three million people in a year, most of whom are children. The disease in fact considered a primary contributor to poverty in many countries. From thousands of years malaria is curse to humankind. The female anopheles mosquito transmits Falciparum malaria (*P. falciparum*). It is deadliest amoung the four types.

Common symptoms of malaria are fever, vomiting, joint pain, chills, anemia, and convulsions. In some patients, retina can be damaged upto some extent. In Malaria, following symptoms are observed in a series, starting with a period of sudden coldness followed by fever and sweating that may last for 4 to 6 hours. Depending on the particular strain the same cycle may repeat itself every two or three days.

Sickle cell disease is also commonly found among people of tropical countries and genetically transmitted as autosomal recessive character. When a person receives only one gene responsible for sickle haemoglobin from either of the parent, the condition is called carrier or trait. Where as when two defective genes are inherited (one from each parent), the condition is called sickle cell disease. It is observed that, the carrier state is stated to provide protection against mortality against malaria, it has attained high frequency in many parts of the tropical world. Person with trait leads a normal life but the diseased person suffers from various complications throughout the life. Symptoms of Sickle cell disease particularly recurrent infection, anaemia, osteomyelitis, splenic sequestration crises, bone & joint pain, joint swelling, necrosis of bone, aplastic crises, abdominal pain, hepato-splenomegaly etc. (Serjeant & Serjeant, 2001).

MATERIALS AND METHODS

Researcher has considered following parameters for the study, 1) Malaria disease 2) Sickle cell anemia 3) communities and their distribution in Maharashtra 4) Humidity 5) Climate 6) Temperature 7) Literacy 8) Poverty. The present study is launched to understand all above factors in relation to the Nanded district (Marathwada) and Maharashtra state.

The *Anopheles species* breed in clean water where as *Culex species breeds in* both clean and dirty polluted water. The *Aedes species* prefer artificial collections of water and *Mansonia species* breed in water containing certain type of aquatic plants. Generally, mosquitoe prefers particular habitats.

They can breed in spoonful of water to an extensive marshy area. Mosquitoes can hibernate (Severe winters can be hibernated) in the adult stage when the environmental conditions are not favorable.

RESULTS AND DISCUSSION

In Maharashtra (Source: Gazette of Maharashtra) only six districts are endemic to Malaria. The districts prone to malaria in Maharashtra are Thane, Raigad, Nasik, Gondia, Chandrapur, Gadchiroli and Gr. Mumbai. In these districts emigration, industrial development, deforestation, climate, increase in slum area is playing important role, which is mainly responsible to increase in breeding sites of vectors. In Nanded district malaria rate is (API 0.1 to 1), and mainly it is observed in Kinwat and Maur (API 0.57) taluka.

The relative humidity is high not only in district of Nanded but of entire Marathwada (Districts- Aurangabad, Jalna, Parbhani, Beed, Osmanabad, Solapur, Latur, Nanded) during the south-west monsoon season when they are between about 60% and 80%. With the withdrawal of the south-west monsoon, humidity gradually decreases and in the cold and summer seasons the air is generally dry. The summer season is the driest part of the year when the relative humidity in the afternoons is generally less than 30 %. In sickle cell anemia disease about 50% cases found in India and most of them are from Central and South India.

Table 1: showing distribution of sickle cell anemia in Maharashtra & Nanded District

Sr.	Particulars	%	Number of Population
1	Total Population of Nanded District (Census 2011)		33,69,900
	Total S.C., S.T. and O.B.C. population (Nanded District)	25	8,42,475
2	Expected Carriers Nanded District	10	84,248
	Expected Sufferers in Nanded District	0.5	421

In present study the sickle cell population amoung the selected area population is less. so the malaria resistant might be because of eco factors responsible for malaria resistant in the population. It was stated earlier by Willcox *et al*., 1983 , Modiano *et al.,* 2001 (might be another strong cause which in present study need further detail genetical study in said population)

As per Willcox, *et al.,* 1983, Hemoglobin C is also believed to protect against malaria, although data on this point were not conclusive until recently. Hemoglobin C lacks the in vitro anti-malarial activity of hemoglobin S. Some epidemiological studies found no evidence for protection against malaria in people with either homozygous or heterozygous hemoglobin C . The relatively small number of patients with hemoglobin C in these studies left the conclusions opens to question, however. The issue was finally settled in an investigation that included more than 4,000 subjects (Modiano *et al.,* 2001). Hemoglobin C heterozygotes had significantly fewer episodes of *P. falciparum* malaria than did controls with only hemoglobin A. The risk of malaria was lower still in subjects who were homozygous for hemoglobin C. Homozygous hemoglobin C produces a mild hemolytic anemia and splenomegaly. The much milder phenotype of the condition relative to homozygous hemoglobin S led the investigators to speculate that without medical intervention for malaria, hemoglobin C would replace hemoglobin S the over the next few thousand years as the dominant "antimalarial" hemoglobin in West Africa.

Table 2: Comparison of Vector born diseases with sickle cell patients in Nanded District

Sr. No.	Name of District and Year	Malaria	Dengue	Chikungunya	Filaria (New cases)	Sickle cell anemia (Expected)
1	Nanded **2010-11**	974	5	11	64	Carriers 84,248, Sufferer 421.
2	Nanded **2011-12**	532	4	7	46	
3	Nanded **2012-13** (Upto Dec.12)	274	1	0	83	

The population which lies in central and South India is resistant to the malaria and that's why less cases of malaria are found in this belt. If compared with other districts of Maharashtra, Nanded district has very few cases of vector born diseases (Malaria, filarial, Chikungunya and Dengue) see table No. 1.4. The mf rate of Nanded District was 1.27% in 2005. The main reasons are Relative less humidity is in Marathwada as compare to other part of Maharashtra, which is unfavorable for mosquito breeding. The impact of dry climatic conditions is more in this region compared to sickle cell anemia. Change in mean temperature and rainfall is mostly responsible for vector borne diseases in this region. Mostly the malaria patients are found in Kinwat Taluka (API 0.71), Mahur Taluka (API 0.57) of Nanded district. About $1/10^{th}$ population of Nanded District is in this area. The distribuition of population in this area is 1:3 (Mahur and Kinwat Taluka repectively).Probably the reasons are i) Forest coverage ii) It is on border of Karnataka and A.P. Gulbarga (API 2-5), Bidar (API 0.1-1) Districts of Karnataka state, Adilabad (API 0.1-1) of Andhra Pradesh. The mosquitoes can cover the area of two Km.

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