Educational

HISTORY OF ERADICATION OF MALARIA IN BAHRAIN

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Malaria was endemic in Bahrain from the time when records were available and was one of the main causes of morbidity and mortality.

The factors that were mainly responsible for the high prevalence of malaria in Bahrain from 1936 till 1976 were the following:

A human carrier (parasite positive individuals), insect vector (female Anopheles mosquito), susceptible human host accessible to the bite of infective anopheles and a favourable climatic condition.

In 1937, Major Afridi of Malaria Institute, Delhi, India, carried out a malaria survey and found out that the main vector in Bahrain was Anopheles Stephensi[1]. The records of the year 1938 spoke of 20% incidence and spleen rate among the population. The larvicidal measures began at that year[2]. Drainage and filling schemes started to reduce the breeding places.

D.D.T. spraying was introduced in 1946 and the malaria incidence dramatically fell in 1947. The authorities recognized the imported cases in 1948 and discovered breeding places in water tanks of dhows. The residual spraying of houses in towns and villages were established on a regular basis in 1953[3].

Another entomological study was done in 1955 and revealed that A. stephensi was still the predominant vector. A. fluviatilis was on the decline. A. pulcherrimus was also identified[4].

From 1960 onwards, the incidence of malaria dropped year by year especially in the indigenous cases. The imported cases accounted for the increasing proportion of the annual malaria figures. It was not until 1975 that the indigenous cases rose again[5]. This was mainly due to the stagnation of water that resulted from the indiscriminate landfills and blockage of drains and natural seepage and thus causing an increase in the mosquito breeding sites. In addition to this, the frantic building activities that took place during the rapid development in Bahrain brought in an influx of expatriates from malarious areas. The parasite formula between 1973-1976 was 95% P. vivax and 5% P. falciparum.

At the beginning of 1977, the Ministry of Health asked World Health Organization to send the Regional Malaria Advisor (Dr. Delfini) to assess the situation in Bahrain and to draw up some recommendations for the control of malaria cases. The consultant recommended the increase of surveillance and active case detection, the presumptive treatment of all expatriate labourers coming from malarious areas and the radical treatment of all parasite positive people[6].

After 1977 the number of indigenous cases decreased and attained a zero level from 1979 onwards. To the contrary the number of imported cases increased to a peak of almost 600 cases in 1977 and since then has fluctuated to around 250 cases per year. Of these, the vast majority were diagnosed as P. vivax (Table 1).

On the request of the Ministry, the WHO sent a consultant entomologist (Mr. Shidrawi) to Bahrain in 1978. He found out six Anopheles species in the

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TABLE 1
Malaria Cases 1955 – 1990 by five year period and source of infection

Year	Cases by Species[1]		Total No. of clinical cases[2]	Source	
	P. vivax	P. falcip.		Indigenous	Imported
1955	186	57	2508	—	—
1960	53	4	1041	—	—
1965	6	11	453	—	—
1970	32	6	220	—	—
1975[3]	169	8	178	3	175
1980[4]	253	3	256	—	256
1985	313	12	325	—	325
1990	181	28	209	—	209

1 One P. malaria species was detected in 1973 and one in 1979
2 Reporting was based on clinical diagnosis
3 From 1972, reporting was based on the presence of malaria parasites in blood smears
4 No indigenous transmission since 1979

country, namely, A. stephensi, A. pulcherrimus, A. culicifacies, A. sergenti, A. superpicturs and A. hyremus[7]. He recommended the establishment of an entomological laboratory to go hand in hand with the anti malarial measures and to monitor the susceptibility of Anopheline larvae and adults to the insecticides commonly used. He also recommended the selection of indicator villages and fixed capture stations to study the vector density prevalence and behaviour.

Since 1980, there was a progressive decrease in the number of breeding places positive for Anophelines (Table 2). The probable reason for that appear to be the urbanization of the cultivated areas, the drop in the water table and the intensified anti-mosquitoes and anti-larval measures.

As there was no indigenous transmission of malaria since 1979 (Table 1), the Ministry again requested WHO to send a team to assess the situation and to declare Bahrain free from malaria transmission. The team arrived in 1982 and submitted their recommendations to WHO and to the Ministry. Their conclusions were that *"if the appropriate steps are taken to ensure that the reintroduction of malaria by migrants and travellers is effectively curtailed and the possibility of the introduction of resistant P. falciparum neutralized by the efficacy of the containment measures, then malaria transmission will not be re-established in Bahrain"*[8].

TABLE 2
Pockets* founds positive for mosquito breeding 1971 – 1990

Year	Anopheles	Culex	Total +ve pockets
1971	123	17277	17400
1975	351	12962	13313
1980	202	6303	6505
1985	325	9062	9387
1990	180	7898	8078

* A pocket is collection of stagnant water found during spraying operations.

The success of the malaria control programme in eliminating the indigenous transmission of malaria since 1979 is largely due to the spraying operations controlling the breeding places of both the adult mosquito and its larvae[9].

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