CONTROLLING INSECTS AND DISEASE IN DISPLACED POPULATIONS

Ethiopians on the move. Displaced populations may be particularly susceptible to malaria *Photo by J.M. Goudstikker/UNHCR*

Diseases carried by insects are often a hazard for displaced populations. Frequently their importance is exascerbated when compared to local people populations (Table 1). As the majority of displaced populations are in Africa, Asia and Latin America, some of the commonest insect-borne diseases include malaria, typhus, sleeping sickness and dengue. Yet there is very rarely discussion or research on the control of insect vectors (insects which carry disease) in refugee health care.

Malaria

80% of the world's 14 million refugees, and a very large proportion of displaced people, are in areas where malaria is endemic. Leading NGOs include it as one of the five major causes of illness and death of refugees and displaced people (Nieburg *et al* 1989). The following examples illustrate why refugees and displaced people are particularly at risk.

The long and dangerous trek from Kampuchea through the jungle to the Thai border brought many Khmer refugees into contact with the highly infective forest mosquito. After 1983, many Khmer refugees were moved to the Kampuchean side of the border within the forested habitat of these vectors. Outbreaks of fighting sometimes resulted in the evacuation of these camps, but where monitoring was possible, it showed that in some cases, relocation of camps resulted in dramatic reductions in malaria transmission. This illustrates the potential for avoiding malaria where camps can be appropriately sited. As resistance to both chloroquine and Fansidar (prophylactic drugs) is widespread in this area, mosquito control in the camp environment is considered essential in reducing transmission, and therefore drug-resistant parasites (Meek 1989).

Afghan refugees who have fled into the North Western Frontier

Table 1.

Why insect-borne diseases may be exacerbated in refugee/displaced populations

1. Refugees may move from a non-malarious area into a malaria zone (or from one malaria zone to another where the parasite strains differ) and therefore lack the levels of immunity experienced by the local population.

2. Refugees may flee through an area which is infested with certain insect vectors (e.g. tsetse flies which transmit human and cattle sleeping sickness or sandflies, the vectors of kala azar).

3. Refugees may have to settle on land which local people do not inhabit because of insect vectors (e.g. blackflies, the vectors of river blindness).

4. Refugees may lose their livestock (in which case insects which bite both humans and animals will only feed on humans).

5. Refugees may live in unhygienic and crowded camps where certain vector populations may dramatically increase (e.g. clothing lice, the vectors of louse-borne typhus and relapsing fever and filth flies which transmit diarrhoeal diseases and trachoma).

Such problems may be compounded by the breakdown of national vector control programmes during such periods of stress.

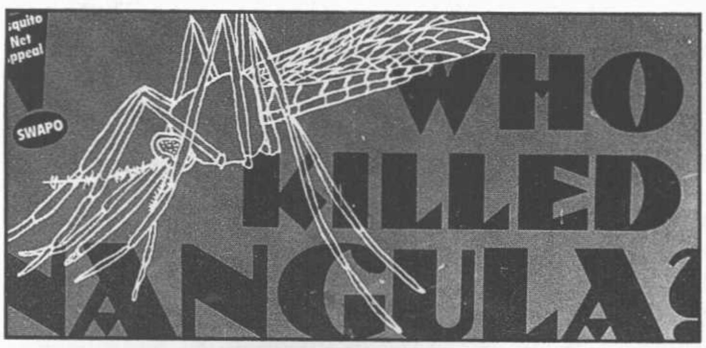
Province of Pakistan have much higher rates of malaria than the local people population. They were victims of their own lack of immunity, but poor understanding of the epidemiology of malaria led local health authorities to believe wrongly that the refugees were a dangerous source of infection for the local population (Suleman 1988). Malaria has also been a serious problem for Ethiopians and Eritreans who had to descend from the hills to mosquito infested valleys in order to avoid the ravages of war.

Water storage containers in a Vietnamese refugee camp in Malaysia: the breeding site of Aedes mosquitoes which transmit dengue *Photo by A. Hollmann/UNHCR*

Control measures

1. Environmental control in preference to chemicals

Prior to the 1950s, nearly all control programmes were based on environmental management with particular emphasis on the destruction of potential vector breeding sites. But environmental management was all but forgotten after the spectacular early successes of chemical control with DDT in the 1950s and 1960s. Now, widespread insect resistance to insecticides (in particular DDT) and the relatively high cost of new alternative chemicals (such as pyrethroids) have renewed interest in community-based, environmental control programmes. Such programmes can involve filling in or draining habitats of the mosquito larvae, introducing larvae-eating fish to ponds, wells and rice fields and using traditional insect repellents, such as the burning of citrus peel.



Malaria epidemics in refugee camps in Angola prompted this SWAPO appeal poster for bednets *Photo by M.C. Thomson*

In refugee situations, however, chemical control is sometimes tried as a first measure, rather than as a last resort. The water supply systems provided by aid organizations or the national authority can act as new breeding sites for mosquitos and increase risk to refugees, as for example in the dry season in parts of Africa. There is such a risk wherever water is left standing, as for example in water tanks, or through leakage and poor maintenance. If appropriate action is to be taken, water engineers and maintenance personnel must appreciate the importance of such breeding sites in malaria transmission.

2. Back to bednets

Bednets are widely used throughout the world, which is indicative of their popularity. They have also become important in some refugee health care programmes, as illustrated by the appeal for bednets put out by the South West African People's Organization on behalf of Namibian refugees when they were in Angola. Whilst they do reduce the nuisance of mosquitoes, bednets alone may not be very successful at protecting individuals and communities from malaria (Table 2). Currently there is a surge of interest in bednets impregnated with insecticide (usually pyrethroid). Widespread trials throughout the world (including China, Vietnam, Solomon Islands, Papua New Guinea and Gambia) have shown it to be a valuable technique which is effective against both nuisance biting and malaria transmission (WHO 1989). Pyrethroid insecticides are attractive as they have low toxicity for humans and are safe even for infants (permethrin-treated bednets have been endorsed by WHO Expert Committee for Malaria). Impregnated bednets may also reduce pests and vectors other than mosquitoes. If newly impregnated nets are left to dry on

Table 2.

Why bednets alone may not protect people from malaria

1.Mosquitoes may bite people before they go to bed or when they leave their beds during the night.

2. Mosquitoes may enter bednets from underneath the bed or where bednets are improperly tucked in or are torn.

3. Parts of the body which lean against the net are exposed.

4. Hungry mosquitoes deprived of feeding from one peron are likely to feed on their unprotected neighbour.

the beds, then bedbugs may be eradicated. Headlice may also be eliminated if they come into contact with the impregnated net while the host is sleeping. Impregnated beds are attractive as the impregnation can be done at a local level by community or health workers or, in emergencies, before dispatch from the factories.

Mosquitoes also transmit a number of arboviral diseases such as dengue as well as parasitic worms such as those which cause elephantiasis, although the type of mosquito involved, its ecology and hence control differ for each disease. A very readable text on the subject (aimed at health planners and epidemiologists) has been published by WHO 'Geographical Distribution of Arthropod-borne Diseases and their Principle Vectors' (WHO/VBC/89.987)

Sleeping Sickness
Sleeping sickness in domestic animals (transmitted by the tsetse fly) is a major constraint on livestock production throughout much of Tropical Africa. National tsetse fly control programmes tend to break down in times of war (eg in Zimbabwe during the Independence struggle, and currently in Mozambique and Uganda), and tsetse flies can recolonize previously controlled land reintroducing both animal and human sleeping sickness. Refugees may be forced to move with their cattle into a tsetse-fly belt which can result in the decimation of their herds if emergency veterinary services are not made available.

National control programmes are usually based on extensive spraying of adult resting sites with insecticide. But, an ingenious technique for trapping tsetse has recently been developed in which the flies are attracted to a trap or insecticide impregnated trap, by synthetic cow smells. This method has been widely used in Zimbabwe, but local testing of the technique is needed before it can be introduced in a new area as a control measure, since the behaviour of the insects tends to vary from one place to the next.

Kala azar
Kala azar is transmitted by sandflies in sub-Saharan Africa. An epidemic of the disease has recently been reported in Southern Sudan where it is estimated that tens of thousands of people have died in the last few years. The epidemic apparently started in 1984, but had gone unnoticed by outsiders for several years, hidden by the inaccessibility of the war-zone in the South of the country. The disease was first observed amongst displaced people arriving in Khartoum who had fled the South. The cause of the epidemic is as yet unknown but the movement of displaced people may be enhancing its spread, as infected people bring the parasite into areas where the vectors are found. As with sleeping sickness control, measures against the vectors (usually the spraying of resting habitats with insecticides) are extremely difficult in the midst of a war.

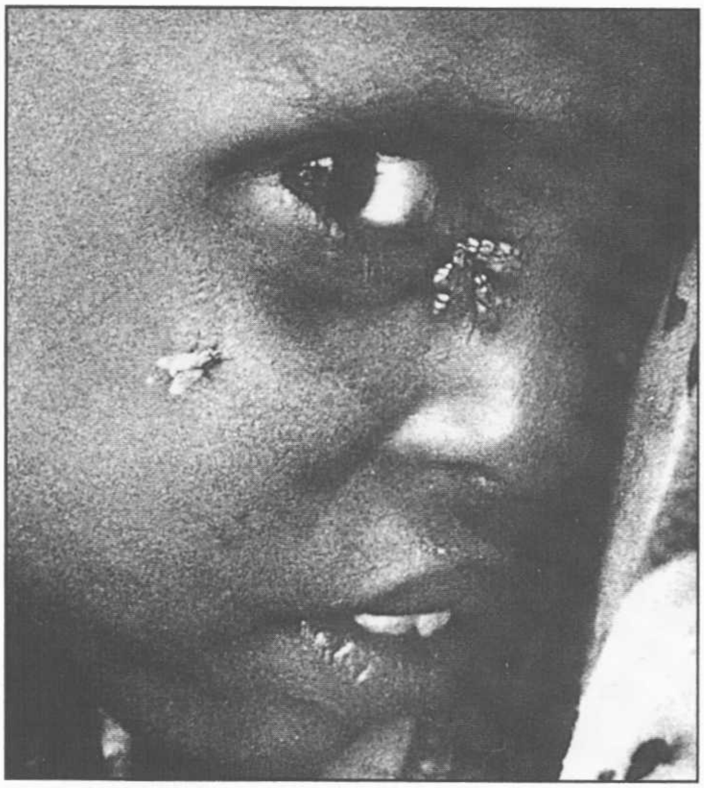
Lice
Epidemics of typhus and relapsing fever are common in refugee camps. The clothing (body) lice which transmit these diseases thrive in cool climates where people are crowded together, unable to regularly wash themselves or their clothes. Recently such epidemics have occurred in refugee camps in Ethiopia, Somalia and Sudan. As both diseases can be fatal, lice control in potential epidemic conditions is essential.

Control measures
There are three types of lice all of which may be found amongst refugee communities - head, crab and clothing (body) lice. While the first two may be a nuisance it is the clothing lice which pose a serious health risk as they transmit both relapsing fever and typhus. Shaving children's heads to control lice is a common practice in many parts of the world, but it will have no effect on typhus or relapsing fever transmission and there is therefore no call for authoritarian head shaving regimes in refugee camps.

Lice are extremely sensitive to drying out and the temperatures required to kill adult lice and their eggs are remarkably low (at least 54 °C dry heat for 5 minutes). However, it can be difficult to get this temperature to penetrate throughout clothing, particularly to seams and hems where clothing lice tend to congregate and lay their eggs. Heat treatment, involving either steaming or boiling clothes, is a common technique used to control clothing lice in refugee camps. Wet heat is less effective than dry heat and is expensive in terms of fuel. An alternative system for heating clothes, which is effective and which uses little or no fuel desperately needs developing.

Insecticides may be essential in eliminating clothing lice when there is the threat of typhus or relapsing fever epidemics, but their effectiveness is limited by widespread resistance to DDT, Lindane and Malathion. The efficacy of such programmes will depend on which insecticide is used (some are better than others) and the care with which they are applied. Mass treatment against clothing lice usually involves the use of insecticidal dust, about 50g of which is puffed into the clothes through the neck opening, up the sleeves and from all sides down the loosened waist or trousers. Thorough and careful application in a way that is socially acceptable, is more effective than excessive random dousing with insecticide and should always be accompanied by public education on the dangers of clothing lice and the need for their control. Since lice control is one of the few situations where insecticide is deliberately applied to human beings, chemical formulations of low toxicity are essential.

Filth flies
Filth flies which breed in human faeces and organic waste have become major pests in refugee camps in northern African and in Palestinian camps in Lebanon. Under certain conditions an estimated 42,000 larvae can be produced per kg of human faeces! Some species are particularly attracted to wounds, mucous and eye exudates and can play an important role in the



Filth flies transmit eye infections *Photo by L. Astrom/UNHCR*

transmission of eye infections such as trachoma as well as diarrhoeal diseases. The presence of filth flies is clearly indicative of poor sanitation, a feature which characterises many refugee settings.

Control measures
Latrines which are properly constructed, maintained and used are the most effective long term method for reducing filth flies. They can be designed to minimize fly populations (see Curtis *et al* 1990).

Localized insecticide use can be effective in killing adult flies where they are likely to transmit disease - eg in surgeries, feeding stations and abattoirs. General insecticide spraying campaigns against adult filth flies in refugee camps are not uncommon but are not always successful as filth flies are notoriously quick at becoming resistant to insecticides (as for example in the Palestinian camps).

Requirements of insect vector control programmes
The large number of insect-borne diseases and the large range of insects involved, each with its own ecological and behavioural characteristics, mean that insect control is often the domain of an insect specialist - the entomologist. However, in refugee health care, non-specialized medical or sanitary personnel may be required to consider localised insect control programmes. Environmental control measures combined with public health education should always be the first route of attack, but in practice, enough training and finance is rarely given to support such projects.

Insecticide use, which may be essential in epidemic situations, also has its pitfalls. Spraying may be seen as an end in itself and the effectiveness of spray programmes is rarely monitored. The wrong insecticide, inappropriate application, poorly maintained machinery and absence of spare parts will all reduce the effectiveness of a spray programme, even to the extent that no control what-so-ever will be achieved.

The key to a successful campaign is good, well-informed management, good collaboration between medical and sanitary personnel and refugees themselves, good training and appropriate control techniques which are in line with national control strategies. Access to relevant information is essential and local and national resources must be immediately tapped.

Madeleine C. Thomson
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A number of Non Governmental Organizations (NGOs) and UN agencies, along with national ministries of health, have become involved with the control of insect vectors in refugee health care, but much of the work undertaken is not written up for publication. The author would therefore welcome any information from readers.

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