

Malaria

Human and Physical Factors



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Malaria



Physical and Human Factors

Today I will:

- Know the physical and human factors which put people at risk of contracting malaria

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Physical Factors
(these are the natural / environmental risk factors)



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The Vector: The **female anopheles mosquito**. When a female bites, she also injects an anticoagulant (anti-clotting chemical) into the prey to keep the victim's blood flowing. She finds her victims by sight and smell, and also by detecting their warmth. The males do not feed on blood, they sip plant nectar instead.

Mosquitoes have a life cycle of around 30 days

The mosquito is often a carrier of diseases, such as malaria, encephalitis, yellow fever, dengue fever, dog heartworm, West Nile virus, and many others.




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Hot and wet climates. Mosquitoes can only survive in temperatures between 15 and 40 degrees Celsius. They also breed in stagnant water created by heavy rainfall



In 1998 in Kenya for example, four months of heavy rain created large areas of flood water which provided suitable breeding ground for mosquitoes and caused a 500% increase in malaria cases.

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Areas of shade: So that the mosquito can digest its blood meal



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Human Factors
(risk factors causes by the action of people)



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Nearby settlements: building towns next to reservoirs which provide a blood reservoir for the mosquito to feed



Without people the mosquito could not feed

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Stagnant water
such as that
created by
irrigation
ditches, dam
reservoirs or
paddy fields
allows the
mosquitoes to
lay their eggs



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Bare skin: particularly around wrists and ankles where blood is closer to the skin. People are particularly vulnerable at dusk and dawn.



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Movement of people from place to place. War and hazards can displace large numbers of people, whereby infected people move into malaria free areas, where people's immunity is non-existent, so that the disease spreads very rapidly.



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Not completing courses of drugs means that the parasite may not have been eradicated from the bloodstream



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(i) Physical factors:

- The vector (female Anopheles **mosquito**) must be present.
- **Hot and wet climates** such as those experienced in the Monsoon areas of the world (e.g. India).
- Temperatures between **15°C** and **40°C**.
- Areas of **shade** in which the mosquito can digest blood.
- **Stagnant water** so that the mosquito can lay its eggs

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Human factors:

- Nearby **settlements** to provide a 'blood reservoir'.
- Man made areas of **stagnant water** such as irrigation channels, reservoirs or poor drainage that leaves standing water uncovered
- Exposure of **bare skin**.
- Migration, increased trade, tourism and the **movement of people**.
- Not **completing courses of drugs**.

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Physical	Human
Vector = female anopheles mosquito	Settlement
Hot and wet climate	Stagnant water
15 - 40°C	Bare skin
Shade	Migration
Stagnant water	Lack of drugs

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Malaria: Exam Type Question



Exam Question

With reference to Malaria or another water-related disease, **explain** the **human** and **physical** factors which put people at risk of contracting the disease **(10)**

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Malaria: A perfect answer!



Model Answer

Physical Factors

Areas of stagnant water created by heavy rain provide suitable breeding habitats for the female anopheles mosquito to lay larvae in. Hot wet climates like those experienced in the tropical rainforests or monsoon areas of the world provide ideal conditions for mosquitoes to breed and therefore spread the disease. In 1998 in Kenya for example, four months of heavy rain created large areas of flood water which provided suitable breeding ground for mosquitoes and caused a 500% increase in malaria cases. This is exacerbated in regions where temperatures are extremely high, for example reaching 40 C. In addition, areas where there is significant shade and shelter, where the mosquito can digest human blood, contribute to the spread of malaria.

Human Factors

If settlements are nearby water areas such as lakes and reservoirs this increases the likelihood of the disease. Such settlements become “human blood reservoirs” for the mosquitoes. In such settlements a lack of money can result in a lack of sanitation, as well as poor drainage and irrigation, all of which increase the likelihood of malaria. In addition, the push towards building new dams and HEP reservoirs (sometimes as aid projects) in developing countries creates vast pools of stagnant water and vast breeding grounds for mosquitoes. Stagnant water can also be caused by irrigation systems, poor sanitation and growing of rice in paddy fields. Civil wars and internal unrest in some countries as well as famine and natural disasters can lead to large scale migration, whereby infected people move into malaria free areas, where people’s immunity is non-existent, so that the disease spreads very rapidly.