

Problems Concerning Preventive Medicine Among Representatives of Temperate Climate in the Tropics

K. Korzeniewski*, R. Olszański

The Military Institute of Medicine, Department of Maritime and Tropical Medicine,
81-103 Gdynia 3, Grudzińskiego St. 4, Poland

Abstract

Preventive medicine, especially prophylaxis of diseases is an extremely important issue in hot climate areas. It is common knowledge that tropical and subtropical climate affects the human body by series of abiotic and biological factors and organisms which are adapted to by the local population or has to be adapted to by the foreign population in that situation. Correct health status, efficiency of the human organism and adaptive properties are essential for the maintenance of health in particular for representatives of temperate climate living in these conditions. This article presents information how to operate in order to prevent from the rise and spread of contagious and non-contagious diseases in the tropics.

Keywords: preventive medicine, hot climate area

Introduction

The concept of prophylaxis is defined as all activities taken to support and strengthen the health status of the population. The name "prophylaxis" means also counteracting the onset of disease and actions which enable treatment of those infected and also prevent the disease from spreading. Prophylaxis concerns every illness, contagious as well as non-contagious [1].

The concept "health" according to the World Health Organization definition means not only *lack of diseases or ailment* but also *complete physical, mental and social status*, as well as problems of hygiene in the tropics. Rules for health protection in those conditions are extremely important. They concern issues of appropriate life style and work, rules and conditions of rest, norms of behaviour, contact and cooperation with the local population, problems with food and feeding hygiene, accommodation, clothing, prevention and elimination of infections and parasitic invasions, and also mental hygiene [2,3].

Medical Qualification of Candidates For Work in the Tropics

The first and fundamental condition of health support in a hot climate area is the appropriate mental and physical status of people. It is extremely important while referring representatives of temperate climate to work in areas in tropical, or subtropical zones [4,5]. The medical qualification of candidates requires physicians with an adequate knowledge to be entitled to carry out examinations. These doctors should be not only well-educated in this subject, but also their activity should be supervised by experts. Examination of candidates for work in the tropics must include a complete physical and mental checkup and be followed by serious consideration of their ability to adapt to the working and living conditions in their new location [6,7]. Every person after positive qualification should be acquainted with conditions of life and work in the selected country and the historical, political, economical and cultural aspects characteristic for the region of stay. Before departure every person should take required vaccinations in the right time [8,9].

*Corresponding author; e-mail: kktropmed@wp.pl

Period of Readjustment

Living and working conditions in tropical and subtropical countries differ fundamentally from conditions in countries with temperate climates. It concerns not only climatic conditions, but also the whole of social and biological environment. Because of this people who come into a new environment, need some period for readjustment and adaptation. During that time they have to adapt to different conditions. A human body adapts by the thermal regulation of circulation, respiratory, alimentary and urinary system. We need to remember, that the period of adaptation can be more difficult for some people, particularly those who are elderly or overweight. For these people problems connected with dehydration and loss of electrolytes through evaporation and perspiration can appear biochemical disorders. Because of this particular attention should be given to the supply of a suitable quantity of liquids and salt [10-12].

Work and Rest Hours

During a period of readjustment the organism adapts itself psychologically and sociologically to the new lifestyle and work, it must rearrange its "physiological meter" and adapt to the new daily routine and environment. In the hot climate area the hours of work and rest must be established relative to the type of job and working conditions, including the season of the year and the physical and mental effort to be expended. It is considered that work hours in the hot climate during the wintertime are the same as in the temperate climate but in extreme conditions 6 hours should be enough. In the summertime, in the hot climate, the best choice is to start working early in the morning, break working about midday for 2 hours and continue work in the afternoon. Dehydration caused by intensive sweating, should be alleviated during work by drinking salted, boiled or mineral water or unsweetened tea [4,13,14].

Due to health reasons and discipline of life and work during the stay in the tropics, it is necessary to find time to rest. Rational rest is needed for keeping fit and mentally efficient. Regular sleep, at least 7 hours per day is essential, as is midday rest in the hottest part of day. The way of spending free time, which should be designed for sport games, tourism, favorite leisure activities is also important. Local conditions are not always and not everywhere conducive to go to for sport. It happens that newcomers from other parts of the world often come to a region where there are not any sport facilities, such as a swimming pool, a beach or even partners for play. But even in such situation it is necessary to try to organize a period of recreation which will take into consideration an everyday dose of exercises, mainly in the open air. During a day off, trips, sightseeing of historic monuments will give some kind of escape from the routine of everyday life. It is necessary to avoid boredom, and monotony. It helps to keep good

fitness and good humor. During a long stay in the hot climate region it is also important to establish connections with local population, their culture and customs. Owing to these contacts, life in foreign countries can be interesting, and cure home sickness and the longing for family and nostalgia for the home country. It is also needed to avoid casual sexual contacts with unknown partners, as well as tattooing and piercing of various parts of the body, thus giving some protection from sexually and blood transmitted diseases. Vacations should be spent usually in other surroundings, away from the place of work, preferably in the homeland. It helps to keep ties with family and with own professional environment [15-17].

Personal Hygiene

In the hot climate it is extremely important to obey principles of personal hygiene. Underwear must be washed and changed everyday. Skin and teeth must be cleaned, and a hot shower taken at least once a day. Bathing in the sea should be taken in the appointed places, far away from outlets of sewage and jellyfish [18,19]. Appropriate care of skin, which is extremely exposed to effects of weather, and hygienic care with the appropriate cosmetics is very important. Cosmetics should be chosen which protect skin against infection, solar radiation, excessive damp in folds of skin and also retain the function of perspiration and sebaceous glands. Protection of the lipid coat of skin and the work of sebaceous glands influence correct evaporation of sweat, which is an essential factor of thermal control. Thus cosmetics should not make the dry skin, but only remove dirt. Oral hygiene is also of great importance because caries spreads easier and faster in the tropics. Teeth should be brushed at least three times daily with the use of water devoid of pathogenic germs. The body should be protected against the sun and overheating. Sunbathing should be moderate (the first day of stay not more than 15 minutes), never at noon. It is necessary to use creams with high UV protection factors [20].

Clothing

In the tropics, it is important to wear proper clothing which is adapted to local climatic and work conditions, and local habits. In the hot climate clothing should be permeable to air, best made from cotton, linen or silk, easy to wash and non-crumpling [21,22]. In the subtropical, mountainous or hilly countries where winters and nights are cold, advisable is warm clothing, the best made of wool. In the hot climate it is necessary to wear a headgear and sunglasses (sun protection). Footwear must be comfortable and not close-fitting. The best thing to do is wearing shoes made of leather, lace-ups, with thick soles. It is very important for protection from arthropods and reptiles bites. It is necessary to also remember that while collecting plants, stones, etc. in terrain it is important to

protect the hands with gloves. It is necessary to also use a flashlight in the dark. All objects in cracks, caves, and at home (e.g. in a wardrobe) should be handled only when they can be easily seen [23,24].

Accommodation

During the stay in a tropical or subtropical zone, the standard of accommodation is most important. Rooms should be spacious with working order sanitary devices, kitchen and dining facilities, as well as fridges, fans and air conditioning. Permanent supply of running water is essential. The source of water delivery must be protected against rodents and insects. The place of residence should be equipped with bathroom or at least a shower which can be used without any limits. It is needed to draw attention to windows in rooms which should be fitted with insect screens. On the vents and windows near the floor, permanent meshes against rodents, insects and reptiles should be fitted. Air conditioning in apartments, and houses, which decrease temperature and humidity of air, is necessary. Favorable for health is the fall of temperature to 26-28°C. It is needed to remember that one of the conditions necessary for good health is sleep and many people in the tropics suffer because of insomnia. That's why bedrooms should have air-conditioning, beds should be situated some, distance from walls and doors. Stream of air from air conditioning should not be directed to the place of sleep because in most of cases it leads to respiratory tract infections. The bed itself should be fitted with mosquito netting, which protects against all insects. It is important the net should be tucked under the mattress. Rooms must be kept clean, and floor should be cleaned with water and detergent, and after with disinfectant. Special hygiene rules must concern the kitchen, dining facilities and food stores in order to prevent the building of nests by rodents and insects and spreading of pathogenic microorganisms. During cleaning of the accommodation area it is necessary to beware of scorpions, spiders, scolopendras, and snakes which can hide in places difficult to reach. It is necessary to fight against them according to established rules of disinfection. There are many chemical agents for killing insects mainly in sprays which should be used with high caution because of their toxicity [24,25].

Water Supply

In the field of water supply it is necessary to obey established norms - 20 liters of water daily for one person for consumer purposes, and 80-100 liters for one person for shower and other purposes. Water from a tap should be filtered or chemically decontaminated by chlorination in order to ensure physical and biochemical conditions of sewage decomposition and reduce pathogenic factors. Ice used for cooling drinks should be made from the verifiable source of water, the best is boiled water. To protect water

sources supplying housing developments, it is required to remove sewage and garbage in such a way, that direct or indirect contact of water with waste is excluded. Agricultural utilization of waste, applied for centuries, affects health status in twofold way. On the one hand the level of nutrition for the population rises due to increasing crops, on the other hand, if it is not applied in the right way, it leads to the spreading pathogenic microorganisms [21,23].

Food and Feeding Hygiene

The caloric demand of the human body is less in a hot climate than in a temperate zone. That is why, in the tropics, it is necessary to adequately decrease the quantity of received alimentary components in the daily diet. The caloric demand of man depends on many factors, such as age, weight, basic and total metabolism. Excessive consumption of food causes overheating of the body, obesity, and often digestive disorders. Food must include all essential nutritious components. Groceries should be stored properly in refrigerators. In the hot climate more vegetable fat should be consumed (olive oil, margarine). Proper supply of carbohydrates should be taken into consideration in the daily menu (rice, corn). Vegetables and fruits should be washed and disinfected before consumption. A well planned meal schedule is essential and the amount of food should be less than in the temperate climate. Breakfast should be light, lunch not too high in calories. Lunch time, which takes place in the hottest part of a day, is the worst time for a meal, especially for foreigners from a moderate climate. A daily 4-meal schedule is best for most consumers. During the highest temperatures, at midday, most advisable is a light meal with a large amount of drinks. Lunch should be in the afternoon, and dinner in the evening. In the hot climate people should avoid drinking alcohol. Menu should be varied and contain a high amount of vegetables and fruits. Iced drinks and ice cream should be avoided (can cause respiratory tract infections), and also too hot dishes because of damage to the mucous membrane of the gastrointestinal tract. All dishes should be eaten on the day of their preparation and the rest of food can not be stored for consumption till another day [26,27]. Special attention should be paid to the preparation of meals and sanitary conditions of the kitchen, canteen and food stores. In the hot climate food poisoning is mainly because of inappropriate preparation and storage, especially cooled food, can appear easily. Food can be contaminated by carriers of pathogenic microorganisms (people or animals) or can come from sick animals (meat), because very important is the exact veterinary examination of animals before slaughter. A basic element in the prevention of food poisoning is protection of foodstuffs before contamination by people or animals (rats, mice, cockroaches, flies, etc.) and sanitary supervision (parasitological and bacteriological stool examination, general examination of health status) people who work in the production and sale of foodstuffs (canteens, restaurants). Extremely important is execution of physical, chemical and bacteriological examination of

food samples and water (potable and for other consumer aims), and also smear tests taken from kitchen facilities. Undertakings mentioned above cause elimination of existing threats in an essential way [7,23].

Conclusions

Effective prevention from incidence of diseases and progress of morbidity is based on correct medical and epidemiological protection of the population. The essence of this protection with reference to personnel leaving for work abroad, in the hot climate region especially and also their homecoming without a detriment to health is:

1. Epidemiological reconnaissance target place of work which should have anticipative character and be realized by sending reconnaissance group to the future theatre of activities.
2. Training of medical personnel protecting own and foreign population (before departure).
3. Health qualification before departure eliminating people with diseases which are contraindicated to stay in different environmental conditions.
4. Organization of health service during a stay in the hot climate area with correct prophylaxis (vaccinations, medical trainings in the field of hygiene).
5. Regular control of hygiene and sanitary conditions of accommodation, food and feeding.
6. Control examinations after homecoming within the confines of epidemiological protection, judgment about health status and assertion of possible health detriment.

References

1. KOLARZYK E. Selected problems of hygiene and ecology of man. Jagiellonian University, Kraków 2000 (in Polish).
2. JETHON Z. Preventive and environmental medicine. Hygiene - Clinical ecology - Health. PZWL, Warszawa 1997 (in Polish).
3. JĘDRYCHOWSKI W. Epidemiology, introduction and research methods. PZWL, Warszawa 1999 (in Polish).
4. GALUBIŃSKA K. The work environment and mental and physical efficiency. PZWL, Warszawa 1976 (in Polish).
5. ROGOZIŃSKI A., PAŁKA M. Health requirements for the manual work. IWZZ, Warszawa 1985 (in Polish).
6. KIERZNIKOWICZ B. Selected problems of health service in medical assistance of UN military contingents in the tropics. *Scalpel* 3-4, 11-17, 1993 (in Polish).
7. KOCUR J., BUCZYŃSKI A., KIERZNIKOWICZ B. Sanitary and mental protection of UN peacekeepers. Conference "Medical Service of Polish Army in UN Peace Missions", Sopot 1999 (in Polish).
8. AMERICAN COMMITTEE ON CLINICAL TROPICAL MEDICINE AND TRAVELERS HEALTH. Health Hints for the Tropics, American Society of Tropical Medicine, Northbook II, USA 1996.
9. KIERZNIKOWICZ B., DEGA K. Selection of candidates for UN and other international organization peace missions in different climate conditions in the light of occurring threats. In: KIERZNIKOWICZ B., KNAP J. Health Service of the Polish Army in Peace Missions. Eurostar Ltd., Warszawa 2001 (in Polish).
10. FAUST V. *Biometeorologie. Der Einfluss von Wetter und Klima auf Gesunde und Kranke.* Hippokrates Verlag, Stuttgart 1978 (in German).
11. KOZŁOWSKI S. Limits of adaptation. *Wiedza Powszechna, Warszawa* 1986 (in Polish).
12. TOMASZEWSKI R. Cardiological problems in the tropical countries, *Doctor's News* 64, 7-8, 1991 (in Polish).
13. DOLMIERSKI R., NITKA J., KWIATKOWSKI S., WÓJCIK P. A work impact on mental and physical status of man in the tropics, *International Maritime Health* 29(3-4), 329, 1978 (in Polish).
14. STEFFEN R., RICKENBACH M., WILHELM U., HELMINGER A., SCHAR M. Health problems after travel to developing countries, *Journal Infection Diseases* 156(1), 84-91, 1987.
15. BERNARD K.W., GRAITCER P.L., VAN DER VLUGT T., MORAN J.S., PULLEY K.M. Epidemiological surveillance in Peace Corps volunteers: a model for monitoring health in temporary residents of developing countries, *Int. J. Epid.* 18(1), 220-6, 1989.
16. DINMAN B.D., STEPHENSON R.R., HORVATH S.M., COLWELL M.O. Work in hot environments. Field studies of work load, thermal stress and physiologic response, *J. Occup. Med.* 16, 785-791, 1974.
17. KORZENIEWSKI K. Epidemiological analysis of diseases and traumas occurred among people treated in the United Nations Interim Force in Lebanon Hospital from 1993 to 2000. Doctoral dissertation, Łódź 2002 (in Polish).
18. CENTERS FOR DISEASE CONTROL AND PREVENTION. Health Information for International Travel 2003-2004. <<http://www.cdc.gov/travel>>
19. DAWOOD R. Traveller's health. Oxford University Press, Oxford 1986.
20. KOZMIŃSKA-KUBARSKA A. Tropical dermatology and venereology. PZWL, Warszawa 1994 (in Polish).
21. HILL D.R., PEARSON R.D. Health advice for international travel, *Annual Internal Medicine* 108, 839, 1988.
22. JESKE J. Dermatological infections among people coming back from the tropics, *Parasitological News* 45(3), 395-400, 1999 (in Polish).
23. DEGA K., KIERZNIKOWICZ B. Some problems of health risk during duty in the tropics, *Maritime Review* 9, 39-44, 1998 (in Polish).
24. KORCZAK C.W. Handbook of health in the tropics. PZWL, Warszawa 1975 (in Polish).
25. TOMASZUNAS S. Hygiene of life and work in the tropics. CRZZ, Warszawa 1978 (in Polish).
26. BERTRANDT J., KŁOS A., MIKŁASZ M. Assessment of board of Polish soldiers serving in UN Peace Mission in Syria, *Human Feeding and Metabolism* 23, 1, 1996 (in Polish).
27. JONG E.C., McMULLEN R. The Travel and Tropical Medicine Manual. W.B. Saunders Company, USA 2003.