DEPARTMENT OF THE NAVY
U.S. NAVAL SUPPORT ACTIVITY
BAHRAIN
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NAVSUPPACT BAHRAININST 6200.1F
N00
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U. S. NAVAL SUPPORT ACTIVITY BAHRAIN INSTRUCTION 6200.1F

Subj: PREVENTION OF HEAT INJURY

Ref: (a) NAVMED P-5010-3, Prevention of Heat and Cold Stress Injuries (Ashore, Afloat, and Ground Forces)
(b) BUMEDINST 6220.12B, Medical Surveillance and Notifiable Event Reporting

Encl: (1) Heat Stress Flag Conditions and Control of Physical Activities
(2) Types, Prevention, and Treatment of Heat Stress Casualties

1. Scope. This instruction applies to the Naval Support Activity (NSA) Bahrain and tenant commands.

2. Cancellation. NSABAHRAINIST 6200.1E

3. Background. References (a) and (b) establish guidelines for the prevention of heat stress illness and injury and the uses of the Wet Bulb Globe Temperature (WBGT) in regulating training during hot weather. The WBGT index has proven to be the most practical means for characterizing the effect of the environment on the individual.

4. Information

a. Water Intake. Per reference (a), there will be no rationing of drinking water. All personnel will be allowed and encouraged to take frequent opportunities to satisfy their thirst; however, it must be remembered that normal thirst demands frequently do not meet the body's requirement for water replacement. The body is highly dependent on water to cool itself in a hot environment. An individual subjected to high temperature may sweat and lose water in excess of one quart per hour. This fluid loss must be replaced or a rapid rise in body temperature and heart rate will occur followed eventually by heat illness/injury.

Note: Hydration and the replenishment of fluid loss is an absolute requirement for All Hands on board NSA Bahrain.

b. Water loss must be replaced, preferably by periodic intake of small amounts of water throughout the work period. During periods of moderate activity, with moderate environmental conditions prevailing, water requirement will be one pint or more per hour. This is best taken at 20-30 minute intervals. As activities or conditions become more severe the intake should be increased accordingly. Thirst is not an adequate stimulus for water intake; even with ample

water supplies, a person will frequently dehydrate by one or two quarts unless drinking is encouraged or required by supervisory control. In fact, some over-hydration is strongly recommended. This is particularly true in case of unacclimatized personnel, Sickle Cell Anemia trait, fair skin, blond or red hair personnel. Water intake must be sufficient to replace that lost by sweating.

c. All personnel must consume adequate amounts of water before, during, and after any exposure to extreme temperatures. Consumption of at least 10 fluid ounces after each 1.5 mile is recommended for personnel participating in strenuous physical activities.

d. Water will be readily available to participants during runs exceeding 1.5 miles. Participants will be encouraged to sip water as they desire. Exercising personnel must be monitored for signs and symptoms of dehydration. Due to dehydration effects of alcohol and caffeine, consumption of these substances is not recommended within 24 hours of strenuous activity.

e. Salt Replenishment. Salt replenishment for acclimatized personnel is normally adequate through normal daily meal consumption. Salt tablets are **not** to be taken unless prescribed by a physician.

5. Acclimatization. Acclimatization refers to the physiologic adaptation which occurs over a succession of days with individuals exposed to environmental heat stress which results in reducing the strain caused by the heat stress. For example, acclimatization results in increased and more efficient sweating. That is, the sweat rate increased while the amount of sodium lost per millimeter of sweat decreases. Sweating also begins at a lower core body temperature after acclimatization. Acclimatization also results in lowered cardiovascular strain manifested primarily by a lower heart rate.

a. Although good physical conditioning may increase the rate of acclimatization exercise training in cool weather is not a substitute for heat acclimatization. Heat acclimatization will decrease after a few days away from the heat exposure; therefore personnel returning from leave in a cooler environment will require some degree of re-acclimatization.

b. Regular exercise of gradually increasing intensity and duration in the heat is the most effective method of acclimatization. However, some degree of acclimatization will occur in individuals engaging in little activity. Acclimatization can be expected in 7-10 days; however, maximum heat tolerance should not be expected for several more days.

c. It should always be kept in mind that the benefits of heat acclimatization can be decreased or nullified by such things as sleep loss, infection, dehydration, and salt depletion.

d. The effects of pregnancy on the rate of heat acclimatization are not known, therefore a more gradual approach to acclimatization in coordination with medical is recommended.

6. Definitions

a. Dry Bulb temperature (DB) is the temperature of the surrounding air. It is roughly proportional to the rate of heat exchange by conduction.

b. Globe Temperature (GT) is the temperature at the center of a six-inch black globe. It is roughly proportional to the rate of heat exchange by radiation and convection.

c. Wet Bulb temperature (WB) is the temperature of a wetted temperature sensor. It is roughly proportional to the rate of heat exchange by evaporation.

d. Wet Bulb Globe Temperature Index (WBGTI) is a combined reading. The WBGT equals 0.70 WB plus 0.20 GT plus 0.10 DB. It is a generally accepted measure of heat stress.

7. Computing the WBGTI. Enclosure (1) provides instructions for manual computation of the WBGT index for determining heat stress flag conditions and guidelines for physical activity. MOPP gear adds10°F to the WBGT Index for Easy Work and adds 20° F to the WBGT index for Moderate and Hard Work; body armor adds 5° F to the WBGT index. Adhere to Work-Rest Cycles outlined in reference (b).

8. Responsibilities

a. Naval Branch Health Clinic will:

(1) Maintain a manual WBGT meter for backup to NSA Bahrain Safety Department.

(2) Upon request, provide training and technical expertise on the use of the WBGT meter and the calculation and interpretation of the WBGT index.

(3) Upon request, provide information and training of the prevention, recognition, and first aid treatment of heat illness or injury to supervisory personnel. Detailed information is provided in enclosure (2).

(4) Ensure the emergency medical service (ambulance) is available for treatment of heat stress injury/illness.

b. Supervisory personnel will:

(1) Utilize this information and guidelines to implement heat stress prevention programs and to programs and to protect against heat stress injury.

(2) Limit personnel exposure to heat stress conditions based on flag conditions.

(3) Monitor their personnel for signs of heat stress/heat illness.

(4) Provide cool drinking water and encourage personnel to drink, in small quantities, one pint (at least two full drinking glasses) or more per hour.

(5) Immediately refer and person suspected of heat injury to the Naval Branch Medical Clinic Bahrain.

(6) Ensure all new personnel are adequately acclimated to the local climate prior to assignment to outdoor or strenuous duty.

(7) Submit safety report as applicable.

c. All personnel

(1) Hydrate and replenish lost fluids.

(2) Exercise individual responsibility for preventing heat stress related illness or injury.

(3) Familiarize themselves with the components of the program, learn to recognize the signs and symptoms of exercise induced heat stress, and exercise at levels appropriate to their existing states of physical fitness and local acclimatization period.

9. Review and Effective Date. Per OPNAVINST 5215.17A, NSA Bahrain Clinic will review this instruction annually on the anniversary of its effective date to ensure applicability, currency, and consistency with Federal, DoD, SECNAV, Navy policy, and statutory authority using OPNAV 5215/40 Review of Instruction. This instruction will automatically expire five years after effective date unless reissued or canceled prior to five year anniversary date, or an extension has been granted.

D. B. GUENTHER

Distribution:
NAVSUPPACT BAHRAININST 5216.1U (List I and II)

HEAT STRESS FLAG CONDITIONS
AND
CONTROL OF PHYSICAL ACTIVITES

1. Limitations for exercise and for activities in the field should be guided by the Wet Bulb Globe Temperature Index (WBGTI) with the flag system as follows:

a. White Flag. When the WBGT index is less than 80, extremely intense physical exertion may precipitate heat exhaustion or heat stroke, therefore, caution will be taken.

b. Green Flag. When the WBGT index is between 80 and 84.9, discretion is required in planning heavy exercise for unacclimatized personnel. This is a marginal heat stress limit for all personnel.

c. Yellow Flag. When the WBGT index is between 85 and 87.9, strenuous exercise and activity will be curtailed for new and unacclimatized personnel during the first three weeks of heat exposure. Outdoor classes in the sun will be avoided when the WBGT index exceeds 85.

d. Red Flag. When the WBGT index is between 88 and 89.9, the strenuous exercise will be curtailed for all personnel with less than 12 weeks of living and working in hot weather.

e. Black Flag. When the WBGT index is 90 or above, strenuous, non-essential outdoor physical activity will be suspended for all personnel. Essential activities are deemed as those activities associated with schedules exercises or other major training evolution where participation would cause undue burden on personnel or resources, be excessively expensive, or significantly reduce a unit's combat readiness. Essential outdoor physical activity will be conducted at a level that is commensurate with personnel acclimatization as determined by the unit's Commanding Officer in coordination with the unit's medical officer or medical personnel. All efforts should be made to reschedule these activities during cooler periods of the day.

2. The current condition can be accessed by using the following link: https://intranet.me.navy.mil/flag%20condition/heatstressed.asp.

**ESSENTIAL INFORMATION
REGUARDING TYPES, PREVENTION AND TREATMENT
OF
HEAT STRESS CASUALTIES**

1. General Information

a. Heat stress conditions result from a combination of environmental factors and physical activity. The normal dry-bulb temperature, radiant heat sources (the sun), airflow, and humidity are all environmental factors which influence the body's "heat perception". These factors are combined into one number, the Wet Bulb Globe Temperature Index (WBGTI) by a special meter. This concept is similar to the "Wind Chill Factor" we hear of in the winter. High temperature with low relative humidity is not as dangerous as high temperature with high relative humidity. This is because high levels of humidity evaporation.

b. The other factors influencing a person's susceptibility to heat stress are the level of physical exertion and certain individual characteristics. Light physical activity such as standing or sitting while operating machinery in high heat or humidity is not as dangerous as heavy work such as jogging or using a pick or shovel. Additionally, individual characteristics such as skipping meals, inadequate fluid intake, use of medications such as diuretics and anti-hypertensive drugs, poor physical condition, obesity, alcoholic beverage consumption, and lack of sleep greatly increase the susceptibility to heat illness. Finally, an individual's level of acclimatization (becoming accustomed to working in high temperature/humidity environments) has a large influence over the relative safety of physical activities during hot weather. Acclimatization is a series of both physical and psychological adjustments to increased heat stress which usually takes 12 weeks or gradual work in a hot environment to occur. Acclimatization can be lost over a period of time (a week, perhaps even a weekend) when removed from the hot environment.

2. Prevention. Follow these rules to avoid heat injury during hot weather.

a. If possible, arrange work or exercise schedules so that the most strenuous jobs are performed during the coolest parts of the workday.

b. Increase the amount of cool water consumed. It is essential that water intake during the workday be about equal to the amount of sweat produced. Avoid excessive use of caffeinated beverages and eat regular meals. Skipping meals may lead to salt depletion.

c. Personnel who are not accustomed to physical activity under conditions of high temperatures are particularly susceptible to heat injury. These persons should be monitored closely in hot and humid environments for signs of heat stress.

d. Individuals with significant or extensive skin disorders such as heat rash should exercise with care since some skin conditions prevent sweating.

e. It is important to remember that acclimatization does increase tolerance to heat, but it **does not make an individual immune to heat stress.**

f. A person who gets sick or dizzy in hot weather should stop exercising or working, rest in a cool place, and drink liquids. If a person says they are sick, believe them.

g. Some information indicates that individuals who have been affected by heat once are more likely to suffer a repeat episode of heat-related illness.

h. If a person stops sweating, **get prompt medical aid**!

3. Types, causes, symptoms and first aid for heat stress. There are three basic types of heat casualties: Heat cramps, heat exhaustion, and heat stroke. Heat exhaustion may progress to heat stroke. Heat stroke is the most serious of the heat conditions and, unless promptly treated, may result in death or permanent brain damage.

a. Heat cramps

(1) Cause: May occur as an isolated condition with normal body temperature or along with heat exhaustion. Usually occurs in individuals already acclimatized to heat. Heat cramps are precipitated by replacement of body water losses without concurrent replacement of salt.

(2) Symptoms: Heat cramps may occur in small areas of the body or involve a large area when major muscle groups have been stressed. Most frequently involved are muscles of the arms, legs, or abdomen.

(3) Treatment: The treatment of heat cramps follows that of heat exhaustion as cramping is usually a component of heat exhaustion. Treatment should consist of placing the casualty in cool and shady place with circulating air; loosen clothing; require the casualty to rest; and give liberal quantities of cool water in small sips.

b. Heat exhaustion

(1) Cause: This illness is caused by strenuous exertion and exposure to high temperatures and humidity. Prolonged exposure to the sun, strenuous activities by non-acclimatized personnel, and the wearing of excessive and restrictive clothing are all contributing factors in the development of heat exhaustion. Heat exhaustion is usually the result of excessive salt depletion and dehydration.

(2) Symptoms: Profuse sweating, shortness of breath, feeling ill, headache, weakness, blurred vision, nausea, and muscle cramps may often occur. After onset, the casualty will have pale, cool, wet skin.

(3) Treatment: Send for medical help and place casualty in a cool, shady place with circulating air; lay casualty down with head level to or lower than feet; strip clothing to underwear; and if the casualty is conscious, give liberal quantiles of cool water in small sips.

c. Heat stroke

(1) Cause: Heat stroke develops from heat exhaustion compounded by the body's decreased sweat rate. Sweating reduces the body's decreased sweat rate. This reduction in sweating reduces the body's cooling process and results in the rapid build-up of internal body heat to dangerous levels. **Heat stroke is a medical emergency!**

(2) Symptoms: Sweating may be absent or present weakness, headache, dizziness, and loss of appetite, nausea, shortness of breath, faintness, or even collapse. Onset is usually sudden and can be

recognized by convulsions, delirium, or loss of consciousness. The skin will be flushed, hot, and dry. Brain damage may occur if body temperature is not lowered immediately!

(3) Treatment: Send for medical help immediately! The primary concern is to lower body temperature as quickly as possible. Move casualty to a cool, shady place (air conditioned if possible). **Do not attempt to make the person drink**. Strip clothing to underwear, apply cool water or ice to the entire body, and fan the patient constantly to promote cooling of the body by the evaporation of the applied water.