

### A review of common diseases in military bases

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**Abstract:** A myriad of diseases in military bases have made individuals visit medical clinics. Among them are orthopedic diseases such as stress fractures, infectious disease such as mycoplasma pneumonia and neisseria meningitis and dermatologic diseases including scabies, lice and athlete's foot. Not only can these diseases spread easily among individuals in military bases, but they can also cause problems for their families. Raising the awareness of soldiers, army officers and others who work in these environments with such prevalent diseases can, to a great extent, prevent the epidemic among soldiers, their family and other members of the society. Also, vaccination against transmittable infectious disease like pneumonia and meningitidis can dramatically reduce the prevalence of this fatal disease in military forces and military bases.

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#### Introduction

Physical fitness of military forces plays a key role in their success or failure. Therefore, a significant practice during the time of peace or war is the achievement and maintenance of such fitness (1-6). Although, these exercises are necessary and beneficial, they can cause irreparable injuries and may endanger people health and their physical abilities. Some of these injuries can disable people for months, years and even whole life (7-9). According to some research, the most prevalent reason for soldiers' visiting clinics was found to be excessive exercises. Such exercises comprise 72% of the reasons for such visits. Among these injuries, muscular-skeletal types were the most common (10-13).

The body of research worldwide and including Iran is also indicative of the fact that physical exercises have been the most prevalent reasons for soldiers' visiting clinics (14, 15). Above 60 percent of these injuries have been musculoskeletal injuries (16-22).

#### 1. Stress fractures

Stress fracture is considered as an incomplete fracture which is usually in the form of a minor crack in lower parts of body especially feet. Such fracture is commonly caused by too much, and unfitted to one's abilities, pressure on feet and improper use of one's lower parts of body (23, 24). Alone, such pressure might not be able to produce fracture, but recurrently they can result in minor or hairline fractures in bones. Under such circumstances, patients are commonly faced with severe pain, skin redness and edema often caused by military parades or heavy exercises. Day in

day out, these problems are exacerbated until they become disabling of physical activities. They are even capable of preventing an individual's performance all in all (25).

#### Diagnosis

Once one doubts the occurrence of stress fracture, the first step is to diagnose the injury through a simple X-ray imaging. In case, no sign of fracture is witnessed via simple radiography, the same process can recur 2 to 3 weeks later. If there is a need for a rapid diagnosis of the disease, from the beginning one could request an MRI (26, 27).

#### Prevention

In a body of research, cushion insoles are found to be effective to reduce the severity of stress fracture in the lower part of body among novice soldiers. Moreover, other research has indicated that prescription of supplementary calcium and vitamin D is effective in preventing stress fractures (26).

#### Treatment

Using crutches and keeping a balance of activities are recommended to those who find it difficult to tolerate the weight of their body. Sedatives are recommended to those who suffer from sharp pains. A number of studies have found that the use of pneumatic splints facilitates the healing of fractures. Once the severity of pains is reduced and clinical examinations also attest to the improvement of health, the patient can gradually begin his/her daily activities, and little by little become more active in accordance with one's ability level (28, 29).

Depending on the severity of injury, it takes from 4 to 12 weeks for the stress fracture to be healed. It

might even take longer. The initial treatment for these patients would be to limit one's activities so far as there is a significant reduction in pains. Upon making sure that the case is a stress fracture, the treatment process should start. That is because any delay in one's treatment is directly correlated with the delay in recovery of normal conditions (26, 30).

Every two to three weeks, the patient is supposed to be reexamined. One's performance and any case of alteration in the examined symptoms should be checked for. Once the patient has no report of pain, it is time to begin his/her daily activities gradually (31).

Besides supportive treatments and rest, sedatives can be recommended to patients who suffer from stress fracture. Such sedatives are acetaminophen or even non-steroidal anti-inflammatory drugs although some studies have revealed that such drugs do not necessarily result in any treatment of the fracture (32).

Besides the muscular-skeletal diseases, there are other prevalent diseases among soldiers and the personnel working in military forces. The majority of them are induced by insects and arthropods. Other reasons for such epidemic are the aggregation of individuals in military bases, soldiers' hospices, bunkers at the war times along with having no access to primary sanitation facilities in these places which can help to further spread the diseases in these areas. Insect-induced diseases are common among soldier outpatients visiting the clinics in military bases (33). In the following, we would, more in depth, discuss the diseases conveyed by insects.

## 2. Scabies

Scabies appears as a result of parasitic contamination induced by a microscopic mite-like insect called *Sarcoptes scabiei*. The body stuff of this insect is infectious for human beings. The skin diseases induced by this insect is prevalent among the soldier residents of hospices. By digging tunnels into the surface of skin, this insect lays eggs inside the depth of these tunnels and is reproduced (33).

Human body shows reaction against this insect and this reaction is in the form of severe itchiness. Then through so much scratching of the skin, these tunnels are ruined and this insect is further reproduced. About 3 or 4 weeks after the residence of this insect on skin, irritation begins. Therefore, one might not be aware of the problem at the outset (34).

### Disease transmission

This disease can be transmitted through direct body touch as during an intercourse or can even be transmitted indirectly through touching somebody else's personal stuff such as towel, clothes, blanket or using an infected individual's beddings. The epidemic of this disease is vast and rapid in military hospices (35).

## Symptoms

There are mainly three symptoms of this disease (36):

1. Those related to the mite itself:

The tunnels dug by this insect can be observed between fingers, on the wrist, forearms and genitals.

2. Those related to body reaction against the mite:

Among them are pimples or small to big bumps severely itching and blushes on the infected areas such as the waist, genitals, thighs or armpits.

3. Those related to skin irritation

Due to severe itching, several scratches are created on skin which could be infected or allergic. They are commonly linear in shape and can, to a great extent, help to diagnose the disease. Too much itching prevents patients from having adequate sleep. Even warming one's body cannot stop the irritation. Another symptom is that taking a hot bath adds to the intensity of their skin irritation (36).

### Based on the Iranian studies and other Diagnosis

Usually with the help of the patient's medical history along with clinical symptoms, the physician can diagnose this disease. Occasionally, there is a need for specialized tests for a more precise diagnosis. In this method, through scratching the skin and scrutinizing it under a microscope we can witness the insects' defecates, eggs and even the mite itself (37).

### Prevention

- Following personal hygienic rules and daily cleansing
- Not resting in unhygienic or crowded environments
- Identifying the infected individuals, separating them from others and treating their disease (37).

### Treatment

In this method, before any medical treatment, the patient is supposed to wash his body with warm water and soap. He should boil his clothes and bedding sheets for 4 to 5 minutes and then expose them to sunlight. Having been dried, the stuff should be ironed (38).

Different medical treatments are applicable for this disease. In this method the patient is required to cover his whole body (downwards from the throat) with topical solutions and wait for a whole night. Then the body could be washed. The following week, the same procedure should recur. In this disease (scabies), besides the patient, his/her family is expected to follow the same treatment procedure. The most commonly consumed medication to treat this disease includes permethrin, malathion, sulfur and lindane. In this disease, the signs of skin irritation disappear after

3 to 4 weeks and the patient should be patient enough in the meantime (38).

### 3- Lice

A louse is a blood-sucking insect which lives in human's head, body and pubis and feeds on blood to survive. This insect can only live in human body and targets all age groups. Among girls it is more prevalent. Mostly in autumn and winter it infects more people (39).

After the insect's blood-sucking, the skin becomes stinging and itchy which could result in scratches and skin surface infections such as impetigo. In case it is diagnosed and treated at the right time, its epidemic could be prevented (40).

#### Types of lice

There are three types of lice in human body: head lice (the most prevalent), body lice and pubic lice. Body lice are capable of transmitting important diseases such as typhus, relapsing fever and trench fever (39).

#### Head lice

These insects reside in the head skin especially in the back of the head and also behind ear. They are reproduced through laying eggs near the root of hair shafts, close to the head skin. This is called a nit. Nits are tightly attached to the skin and cannot be easily separated. Therefore, taking a bath alone cannot help to get rid of them (41).

#### Symptoms of affliction with head lice

- Observing lice or nits by the roots of hair shafts and close to the skin
- Severe itching in head skin and the back of ears followed by skin surface infections such as impetigo and hives especially on the throat (41).

#### Ways of transmission

- Coming into direct contact with the infected individual
- Coming into indirect contact through touching the personal stuff such as towel, comb, hat, scarf and clothes which were used by infected people (41).

#### Prevention (42)

- Following personal hygiene rules
- Regular bath (at least once a week)
- Recurrent daily combing of hair
- Refraining from using others' personal stuff especially in dormitories, hospices or schools
- Using one's own personal stuff at a barbershop
- Washing one's clothes and personal stuff in hot water and then drying them
- Early treatment to prevent the epidemic of the disease

- Examining the patient's family and other individuals who were in close contact with him or her and treating them as soon

#### Treatment

In order to treat pediculosis, they will usually make use of permethrin shampoo (1%). In order to kill the lice and detach nits, hair should be first washed with an ordinary shampoo and just then we can use the permethrin shampoo (1%) which should be washed after 10 minutes with warm water and with the help of a fine-toothed comb. In case the lice are still there after one month, this procedure should be repeated (43).

### 4. Athlete's foot (tinea pedis)

This disease is a fungal infection induced by tinea pedis. In the majority of cases, it appears between the toes or under the feet. It has got three main patterns:

#### a. Inter digital tinea pedis:

The most prevalent part of body susceptible to this disease is between the 4th and 5th toe. However, it can later afflict the other toes as well.

The main reason behind the appearance of this disease is the snuggling of toes frequently caused by wearing tight shoes. This way, a warm and wet environment is created for the growth of fungi. In this disease, the skin of the infected area gets dehydrated and starts to come off. Wrinkles and superficial cracks also appear. This disease could appear in the form of severe itchiness often after taking the shoes or socks off.

Bacterial infections can also mount on fungal infections exacerbating the condition and delaying the treatment. Usually due to the involvement of other areas as well, nails get infected too. This would result in fungal infections in nails which is called Onychomycosis.

#### b. Chronic desquamation infection of feet (Hyperkeratotic plantar):

Also known as tinea pedis in the chronic form, it is harshly resistant to treatment. The patient's heels get covered in white and silvery peelings and the skin looks reddish or pink and consistently itchy and cracked.

#### c. Acute vesicular tinea of feet:

When inflamed, a chronic infection between toes could lead to this disease. It would create vesicles under the feet or behind them. These vesicles might join each other and create bigger blisters once their underlying serums are accumulated. Besides the infecting of skin, in this disease, there is also a secondary chance of producing bacterial infections.

Fungal infections might be followed by the appearance of a group of blisters in the same area or other parts of body. This could be considered as an allergic reaction known as Id reaction. These blisters

are often sterilized but they could be accompanied by some skin irritation (44, 45).

#### **Prevention**

Considering the fact that this disease can be spread in warm and wet areas, walking barefoot is one of the best ways of preventing such infections. Keeping the toes and the skin between them dry is another effective way of preventing this fungal disease. However, the best way of prevention is to frequently wash one's feet and socks and having them dried as well as wearing clean shoes. Even in order to stop sweating inside shoes, one could choose to wear bigger sizes of them. Making use of absorbent powders, or inserting pieces of cotton between toes are among other effective ways of preventing such infections (46).

**Diagnosis** KOH test is a specialized technique to diagnose fungal diseases (47).

**Treatment** Even without any special medical treatment, up to 40% of patients recover their health naturally and without intervention. However, there exists a variety of topical and oral medical methods to this aim(48).

**Topical medication** Butenafine, terbinafine and sertaconazole are prescribed for topical use twice a day for two to four weeks. In the treatment of acute vesicular tinea, a daily use can be made of bandages soaked in Burow's solution for several times each taking 30 minutes along with other topical medications (49).

#### **Oral medications**

- Lamisil (250 mg) can be taken every day for two weeks.
- Sporanox (200 mg) can be taken twice a day for a week.
- Diflucan (150 mg) can be taken once a week (48).

**Treatment of Id reaction** Cold and wet bandaging or topical steroids (5th rating) could be recommended. If required, prednisolone can be used for a short time. In the treatment of Id reaction, a simultaneous use can be made of topical anti-fungal creams (50).

### **5. Oxyuriasis (pinworm)**

This disease is transmitted by a pinworm which lives as a parasite in human intestines. This parasite can be found all over the world and can target people from all economic and social statuses. Children are the most susceptible age group to this disease. However, all age groups particularly those dwelling in aggregated centers are prone to it (51).

#### **Symptoms**

Fortunately, despite its high prevalence, the symptoms of this disease are limited. Therefore, its diagnosis is easy and fast. The most prevalent symptom is nightly anal itching especially during sleep. This could lead to insomnia. This symptom

appears as the result of the migration of the female worm to the outside of the anus in order to lay eggs, and as the result of its frequent movements it induces irritation. In children, this disease can be accompanied by stomachache and loss of weight as well. Among girls, vaginal irritation could also occur due to the migration of the female worm to this area (52).

#### **Endangered individuals**

Infection with this disease is commonly witnessed among people residing in overpopulated regions. Among such places are kindergartens, nursing homes and also mental hospitals and military bases (52).

#### **Ways of transmission**

This disease is primarily transmitted by following ways:

a. Through scratching the anus, the eggs of this parasite are transmitted to one's nails, clothes and beddings. If one inserts one's hand in mouth, these eggs can be transmitted to the inside of body and be further spread.

b. Due to their excessive lightness, these eggs can be floating in the air and can enter the mouth easily and be even swallowed.

c. The eggs can remain alive in the air of a room for a couple of weeks. With one's food, water, use of hands and even the objects with which an individual's skin might come into contact or the use of shared objects, these eggs can be transferred and infect other people (52).

#### **Diagnosis**

This disease is often diagnosed with the help of the patient's history and clinical symptoms. However, the diagnosis will be confirmed only once the worm is witnessed. In shape, they resemble white and too thin threads that are even observable by naked eyes. Lab-based tests can be also used in the diagnosis process. In this method, a scotch tape is applied anally at night and the next day, is taken out before getting up. Then the worm and its eggs can be scrutinized via a microscope (52).

Moreover, the direct testing of defecates can reveal the worm or its eggs using a microscope.

#### **Prevention**

- Washing one's hands with water and soap after defecation and before eating one's meal
- Regular cutting of one's nails
- Avoiding the use of contaminated water, food or fresh vegetables grown in contaminated areas
- Boiling water before drinking it in regions with no access to running water
- Avoiding the use of human manure in agriculture
- In places where there is frequent and shared use of devices as the use of guns in military bases or



toys in kindergartens, people are advised to wash up with water and soap every time after using a device. This helps to prevent the transmission of the disease to a great extent (52).

#### **Treatment**

The optional cure for this disease is mebendazole (100 mg) whose consumption should recur 10 days or two weeks after the first time. All of the patient's family members as well as those who come into direct contact with him or her are advised to follow the same treatment procedure. The patient's underwear and his/her sheets or blanket should be boiled and dried out in the sunlight. Then they need to be ironed so that the eggs are ruined and the transmission of the disease is totally stopped (53).

#### **6. Neisseria meningitidis**

*Neisseria meningitidis* is a gram negative bacteria and the leading cause of meningitis bacterial infection. This bacterium can also cause meningococemia. The bacterium colonized in human nasopharynx mucous and involves meninge in several situations such as stressors and in immune system weakening. In USA 2500-3500 cases of meningococcal meningitis occur yearly (about one case in 100,000 people). High risk populations for meningococcal meningitis are under 5 year children, high school student, and dormitory residents.

The various studies have showed that daily prevalence of this disease in soldiers and military forces is several times more than nonmilitary people so that in some studies its prevalence 17 cases in 100,000 people are reported. In military people due to population density and close contact and psychological stresses, body defense is decreased and finally the colonized meningococcus in throat activated and transferred immediately among people. Hence meningococcal infections have remarkable enhancement in these individuals presenting epidemically. Therefore, different countries perform steps to provide vaccine against current various serotypes in the region and military forces vaccination (54, 55).

#### **Ways of transmission and symptoms**

Meningococcal infection is transferred by respiratory and saliva secretions such as sneeze, cough and direct contact with toys. The initial symptoms include exhaustion, high grade fever, neck stiffness and headache. By development of disease, the patient may experience excitation, altered mental status, nausea, vomiting and photophobia (56).

#### **Diagnosis**

Microscopic observation of the bacteria in cerebrospinal fluid (CSF) separated from patient and bacterial culture in bloody agar medium (Like chocolate agar) are one of the most important diagnosis ways. The bacterium produces oxidase and

catalase biochemically and has the ability to produce acid from glucose and maltose. In cases of meningococemia (blood infection), the bacteria can be separated from blood (57).

#### **Vaccination**

Meningococcus based on antigenic structure of poly saccharide capsule is divided in 12 types which only 6 types can cause epidemic which are more important and include A, B, C, W 135, X and Y. Nowadays, there are commercially vaccines against antigenic capsule of A,C,Y,N-135 serotypes of *neisseria meningitidis* but there is no appropriate vaccine against B serotype. These vaccines seem essential to prevent from meningitis in high risk people. Many studies have shown that the vaccination of high risk people can decrease the presentation of meningococcal meningitis in these populations (58).

#### **Treatment**

Every patient with sign and symptoms of meningococcal meningitis should immediately be treated following aspiration of cerebrospinal fluid by antibiotic drugs especially with third generation cephalosporins like ceftriaxone and cefotaxime. The individual who had contact with the patient during past seven days should be placed under prophylactic treatment by one of the antibiotics including ceftriaxone, macrolides, ciprofloxacin, ofloxacin or rifampine (59). Against current various serotypes in the region and military forces vaccination (54, 55).

#### **7. Mycoplasma pneumonia**

This organism is a current cause for infection of lower and upper respiratory tracts, which is resistant to effective antibiotics on bacterium cellular wall like betalactam due to lack of cellular wall. This organism is of main causes of pneumonia infection among over crowded groups like nursery, schools, military camps and olds sanatorium (60).

#### **Symptoms**

Most patients with mycoplasma pneumonitis infection present with headache, malaise, fever, and sore throat, dry or productive coughs. This Organism can be accompanied by involvement of non pulmonary organs like brain, ear and skin presented as meningoencephalitis, cerebral ataxia ,transverse myelitis, guillain barre syndrome, otitis media, Bullous meningitis, maculopapular rash, multiforme erythema and in severe cases as steven johnson syndrome (61).

#### **Diagnosis**

Diagnosis of this disease is based on a combination of clinical sign and symptoms, radiologic and laboratory findings. Leukocyte count may be increased relatively. In CXR, reticulonodular or interstitial infiltration may be observed especially in lower lobes. In this disease, radiographic findings have

no association with clinical examination and often are more loudly than clinical findings (61).

### Treatment

Pneumonitis arising from mycoplasma pneumonia is usually self limited, however suitable antibiotic treatment shorten its term. Due to difficult diagnosis of this infection, it is suggested that in people suspected to mycoplasma infection, in addition to effective antibiotics against common organisms of pneumonia (like third generation cephalosporin), macrolides should be prescribed too (61).

### Conclusion

Considering the medical significance of the above-mentioned diseases in military bases, it is crucial to raise the awareness of soldiers and their families concerning the prevalent diseases and how they are transmitted, prevented and treated (62-65).

In some cases, it is recommended to record the medical history of soldiers upon their entrance and have them examined for probable skin diseases and reexamined after two weeks to make sure of the non-distribution of such diseases among soldiers (66-68). With regard to stress fractures, it is recommended to provide soldiers with orthopedic medical boots or insoles to prevent injuries induced by harsh strokes during parades (1, 69).

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