Epidemiological characteristics of tinea pedis in the military

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Abstract

Background: Tinea pedis is one of the widespread diseases of the world, which can infect people of all ages and sex. Approximately 70% of the world's population has suffered this pathology at least once in a life. The main causative pathogens of tinea pedis are: trichophyton rubrum, trichophyton mentagrophytes, epidermophyton floccosum.

Aim: The aim of this study is to represent epidemiological characteristics of Tinea pedis based on some researches conducted on military personnel of different countries.

Methods: The review of the literature has been carried out using the "ScienceDirect", "Scopus" and "PubMed" scientific bases in order to define relevant scientific works - published in English.

Results and conclusions: According to the research analysis, prevalence of tinea pedis in the militaries is remarkably higher than in the civilians, more common in men than in women. The research revealed correlation between military branches, military ranks and prevalence of Tinea pedis. Also researches claimed that fungal infections are highly prevalent in military personnel deployed on combat and peacekeeping operations. (TCM-GMJ October 2018; 3(2):P8-P11)

Keywords: Tinea pedis; Epidemiology; Military.

Introduction

Tinea pedis got widespread in the second part of the 20th century. It was caused by the increase in urbanization, intensive development of sports and fitness facilities(1), but it is worth to note that prevalence of tinea pedis in the militaries is remarkably higher than in the civilians. According to the few available literary data dermatophytosis is one of the common disease in military personnel (2). Hermetic clothes, sweatiness, physical and emotional stress, contagiousness – (common shower room, barracks, water pools) are risk factors of skin diseases, for which military personnel is considered to be a risk causing population.

As tinea pedis has contagious and recurrent nature, this pathology is the most common disease in dermatomycosis. For this reason it represents a medical and social problem, particularly in militaries. This pathology is skin fungal disease which mostly damages interdigital web spaces or the sides of the feet.(1) Regular usage of military boots makes favorable environment for the disease to spread, which makes militaries different from the civilians.

Aim

The aim of this study is to represent epidemiological characteristics of tinea pedis based on some researches conducted on military personnel of different countries.

Materials and Method

We searched epidemiological research material in the databases of “ScienceDirect”, “Scopus”, “PubMed”, “ResearchGate” and “Google Scholar” published in English. We used following search terms: “tinea pedis”, “epidemiology”, “fungal infection”, “soldiers”, “army forces”, “military” and “prevalence”.

Results and Discussion

The literary sources obtained by us reveal that skin diseases, respiratory infections and disease of the musculoskeletal system are the most frequent reasons for military personnel to seek medical care. This testifies to the research analysis conducted in Oslo Military Hospital in Norway, according to which 1360 patients with upper respiratory disease was the primary reason for seeking medical attention in 20% of the patients, 21% visited the
The researchers have received similar results even when the prosecution took statistical data from the military hospital and compared them with the data of the civil sector. They determined and compared the prevalence of skin conditions between civilian and military populations. For this reason 3382 has been surveyed in the Turkish military hospital (including 1148 militaries and 2234 civilians). Among militaries the most frequent dermatological condition was tinea pedis (15.8%) , it was 4.4% among civilians. The results obtained showed that it is necessary to take preventive measures in Army (8).

As it is known, militaries often take part in peacekeeping missions which additionally supports spreading tinea pedis. In order to disclose dermatological diseases, Chinese researchers surveyed militaries of United Nations participating in peacekeeping mission in Libya. The research was prospective covering 1658 militaries among which 62% was Asian. It was found out that dermatitis and eczema are the leading nosology (27%), as for tinea pedis, it was noted in 13%, particularly in tropical regions (9). According to the research analysis held in different hot points of the world, one of the mostly widespread skin diseases was warts – 10.7%, fungal infection – 10.4%, acne – 9.0%, nonspecific eczematous conditions – 7.1%. It is worth to note that hot and humid climate in Vietnam, East Timor, was connected to the bacterial and fungal infections, while in dry climate, Bosnia, Iraq where eczematous conditions made up a larger part of the dermatologic case-load (10).

Interesting research was held among policemen in the city Abidjan, Africa, during which the epidemiology of tinea pedis was determined. 303 policemen involved in the research, 233 of which (76.9%) had a positive diagnosis after mycological examination. Causing factors were Trichophyton interdigitale (in 40.3% of the total cases), Microsporum langeronii (in 30.0%) and Microsporum rubrum (in 15.5%). The duration at the police school and the practice of sports activities were statistically associated with the occurrence of the disease(11). Researches held in Singapore showed that 24.5 cases from every 100 service-men were characterized with dermatological problems (6.7% of which were fungal infections) (12).

A research was conducted during the War in Croatia from 1991 to 1992, where the frequency of the spread of foot skin diseases was determined. 1702 Croatian soldiers from 2002 participating in the research were exposed to direct war activities. The control group consisted of 300 new recruits not involved in war activities. Among the 1,702 examined active duty soldiers, dermatomycosis was confirmed in 832 (49%) cases, 170 soldiers reported dermatomycosis before they were stationed on the battlefield (10%), while 662 soldiers (39%) developed the condition during the time of war activities. Dermatomycosis was confirmed only in 30 soldiers (10%) of the control group including 300 recruits(13).

Prior to the military service in Denmark, 665 recruits were examined clinically and microbiologically for tinea pedis. 546 of them were reexamined at the end of
Military service. Clinical signs of dermatophyte infection were 6.2% respectively, during the second investigation it reached 7.0%. The prevalent of tinea pedis was 4.2% during the 9 months of military service. Of those infected at the first visit 41% had persistent infection mainly pathogens was Trichophyton rubrum, where as new infections were largely caused by Trichophyton mentagrophytes (14). Another similar study was conducted during which 73 military personnel were examined for tinea pedis as well as onychomycoses before and after a duty period of 6 months. It was found that the prevalence of the fungal infections prior to the beginning of military service was 16.4% and 32.3% - after the service. During the first examination the dominant pathogens were T.rubrum and T.mentagrophytes, while during the second investigation predominant pathogen was Candida albicans (15). According to the study, significantly high prevalence of tinea pedis was revealed in Brazil and Korea. In Brazil, 44.8% of 221 soldiers had dermatophyte infection. T.rubrum was the most prevalent - 33.3%, T.tonsurans - 13.1%, T.verrucosum - 11.1%, T.interdigitale - 9.1% and T.mentagrophytes - 6.1% (16). The research held in Korea showed that contagiousness of skin diseases was extremely high, particularly, 798(60.4%) soldiers among 1321 ones had one or more skin diseases. Three most widespread diseases were acne (35.6%), tinea pedis (15.2%) and atopic dermatitis (5.1%) The diseases were closely related to the period of military service (17).

We found the lowest rate of tinea pedis only in two works of the surveys conducted among the military. 1024 Italian naval forces cadets of 18-30 years have been checked. 975 (95.21%) of them were men and 49 (4.79%) were women. Studies revealed only 33 (3.2%) cases of clinical-laboratory confirmed tinea pedis, while onychomycosis was confirmed in 2 (0.2%) cases(18). Almost similar results were received as a result of cross-sectional study conducted in Pakistan. A random sample of 350 individuals was selected out of individuals who were undergoing initial military training. Out of 350 subjects on clinical examination tinea pedis was suspected only in 34 (9.71%), and 10 (2.8%) of them cases were confirmed in laboratory (19).

As for the Georgian Armed Forces, in our country, no study has been conducted to research the development and spread of tinea pedis. Giorgi Abramishvili Military Hospital of Georgian Armed Forces has no epidemiological data on tinea pedis, because these diseases are not registered separately. In our work we used 5 old data of the hospital mentioned above. It does not allow any base to conduct any fundamental analysis to determine the reasons of development and spread of tinea pedis. See Table 1.

The table shows that Dermatophytosis consisted 61.53% of total number of mycosis in 2013, 49.32% - in 2014, 63.15% - in 2015, 64% - in 2016 and 64.60% - in 2017.

### Conclusion

Different literary sources confirm that during recent five decades, tinea pedis got worldwide epidemiological and economic problem. Chronic and contagious nature of this pathology makes the disease one of the 21st century medical and social problem.

According to the research analysis, prevalence of tinea pedis in the military is remarkably higher than in the civilians. Based on the analysis of the results obtained, military personnel is considered to be a risk causing population. Among this specific population, risk factors of skin diseases are sweatiness, trauma, contagiousness, violation of hygienic norms, common showers, barracks and especially, wearing military boots intensively and for a long time.

Even though tinea pedis is not a life-threatening pathology, but due to high frequency and contagiousness, it remains one of the most important problems in the world.

In our country, with the exception of the absence of a real epidemiological picture of mycosis, including tinea pedis, there is a need to regulate accounting and develop a large-scale strategy. This will allow us to evaluate the real epidemiological situation, determine the causes of development and spread of the disease and develop appropriate preventive measures.

### Table 1. Mycosis in Giorgi Abramishvili Military Hospital

<table>
<thead>
<tr>
<th>Code</th>
<th>Diagnosis</th>
<th>2013</th>
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<th>2016</th>
<th>2017</th>
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<tr>
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<td>Dermatophytosis</td>
<td>194</td>
<td>147</td>
<td>144</td>
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<td>157</td>
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<tr>
<td>36</td>
<td>Other surface mycosis</td>
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<td>151</td>
<td>77</td>
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<td>60</td>
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<tr>
<td>37</td>
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<td>7</td>
<td>5</td>
<td>26</td>
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<td>Coccidiomycosis</td>
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</tr>
<tr>
<td>47</td>
<td>Mycetoma</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

### References

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of fungal foot infections among Algerian military personnel” Clinical and Experimental Dermatology, vol 32, issue 1, 60–3


