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BRIEF REPORT

Skin diseases in Turkish soldiers

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ABSTRACT

This study aimed to determine the prevalence of skin diseases among soldiers who were assigned duties in Kahramanmaraş, a province of east Mediterranean region of Turkey. One hundred eighty-eight soldiers were assessed for skin diseases by a complete dermatological examination and the findings were recorded to a form. Apart from the low number of older ones, the soldiers were of 20–22 years. The diagnosis of superficial fungal infections was made by the use of potassium hydroxide preparations in addition to clinical appearance. On completion of the study period, the data were evaluated, and patients were grouped. Pitted keratolysis was the primary dermatologic disease in 34.5% of the soldiers, 29.2% were diagnosed with oral candidiasis, and 25.5% suffered from tinea pedis. Among the soldiers suffering from a cutaneous disease, dyshidrotic eczema (18.6%), intertrigo (excluding candidal intertrigo) (17%), acne (17%), seborrheic dermatitis (14.9%), plantar hyperkeratosis (14.3%), contact dermatitis (13.8%), and folliculitis (12.2%) were the other most frequent dermatoses. Other less frequent dermatoses were asteatotic eczema, callus, onychomycosis, traumatic onychodystrophy, and so on. We conclude that the prevalence of skin diseases in soldiers is very high and is one of the major public health problems that have a significant burden on our nation.

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Introduction

Dermatological diseases have been a universal problem in military deployment as well, but few epidemiological reports on the prevalence of skin disease in military personnel exist.¹ In this study, we detected the high frequency of skin diseases in the soldiers in our region.

Methods

One hundred eighty-eight soldiers were evaluated for skin disorders in 2 days. All participants were then asked about any skin problems that they might have and subsequently all were examined by two dermatologists and a family physician experienced in dermatologic cases regardless of their response. Information regarding age and the presenting disorders was recorded. Diagnosis of various skin conditions was based generally on characteristic clinical features, but the diagnosis of mycoses was confirmed by potassium hydroxide preparation. All diagnoses were made by the

consensus of the commission. On completion of the study period, the data were evaluated. A total of 36 dermatologic disease entities were categorized.

Statistical analysis

Data were expressed as mean values \pm standard deviation, range, or as number of subjects and percentages. Analyses were performed by using SPSS software, version 9.05 for Windows (SPSS Inc., Chicago, IL, USA).

Results

All participants were male and in the age range of 20–31 years (mean age: 21.5 ± 1.85). Military service durations varied from 1 to 24 months (mean duration 7.94 ± 3.85 months). The overall prevalence of one or more identifiable/apparent skin conditions was 97.3% (183 soldiers).

The most common skin diseases requiring medical therapy and their respective prevalence were superficial fungal infections (51.5%), pitted keratolysis (34.5%), and dyshidrotic eczema (18.6%). Intertrigo and acne were each seen in 32 (17%) patients, 27 (14.3%) patients suffered from plantar hyperkeratosis, and 26 (13.8%) patients presented with contact dermatitis (Table 1).

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Table 1 The most common skin diseases requiring medical therapy.

Dermatose	Number of patients	%
Superficial fungal infections	97	51.5
Pitted keratolysis	65	34.5
Dyshidrotic eczema	35	18.6
Intertrigo	32	17.0
Acne	32	17.0
Plantar hyperkeratosis	27	14.3
Contact dermatitis	26	13.8
Folliculitis	23	12.2
Pityriasis capitis simplex	23	12.2
Asteatotic eczema	17	9.0
Callus	15	7.9

A total of 97 soldiers suffered from superficial fungal infections, oral candidiasis (55 patients; 29.2%), tinea pedis (48 patients; 25.5%), onychomycosis (11 patients; 5.8%), and tinea versicolor (3 patients; 1.5%).

The most frequent physical dermatoses were callus in 15 (7.9%) patients and traumatic onychodystrophy in 9 (4.9%) patients (Table 2).

The most frequent eczemas were dyshidrotic eczema in 35 (18.6%) patients, intertrigo in 32 (17%) patients, and seborrheic dermatitis and pityriasis capitis simplex in 28 (14.9) patients. These numbers were followed by contact dermatitis, asteatotic eczema, and nummular eczema (Table 3).

Melanocytic nevi were detected in 82 (43.6%) soldiers. Other skin conditions that were commonly observed were male pattern baldness and scars (Table 4).

Discussion

This study examines the prevalence and spectrum of skin diseases in soldiers. Skin disease has been an important health concern in military personnel throughout history,² particularly during active combat. During World War II in the southern Pacific, 20% of soldiers seeking medical attention suffered from a dermatological process,^{1,3} whereas in the Vietnam War, 12.2% of all outpatients had a skin disease.¹ Although the dermatological disease is often thought as relatively minor, it is associated with significant morbidity and can have a major impact on active military operations. Contributory factors are climatic (heat and ultraviolet exposure), the occlusive effect of protective clothing, cramped living conditions, and the stress of deployment.⁴

In the literature (in also Turkish literature), a comprehensive study investigating the prevalence of skin diseases in soldiers is not available. There are a few retrospective studies on the soldiers admitted to the clinic seeking for medical treatment of skin diseases. The frequency of skin diseases among military personnel who seek medical care was reported as 16% in a study by Selvaag.¹ In that study, among the 222 soldiers with skin disease, 42 were eczema, 28 venereological diseases, and 23 acne cases were reported. The other skin diseases frequently seen in the study were superficial fungal

Table 2 Frequency of physical dermatoses.

Dermatose	Number of patients	%
Callus (13 patients on foot, 2 patients on hand)	15	7.9
Traumatic onychodystrophy	9	4.9
Tattoo	4	2.1
Dermatitis artefacta	4	2.1
Phototoxic reaction	2	1.1
Actinic cheilitis	2	1.1
Burns	1	0.5

Table 3 Frequency of eczemas.

Eczema	Number of patients	%
Dyshidrotic eczema	35	18.6
Intertrigo	32	17.0
Inguinal	18	9.6
Interdigittale	9	4.9
Axillary	7	3.7
Seborrheic dermatitis + pityriasis capitis simplex	28	14.9
Contact dermatitis	26	13.8
Primer irritant	25	13.3
Allergic	1	0.5
Asteatotic eczema	17	9.0
Nummular eczema	2	1.1
Atopic dermatitis	1	0.5
Neurodermatitis	1	0.5

infections, herpes simplex infection, nevi, callus, and superficial bacterial infections of skin. Selvaag's study population was not only soldiers but also included relatives of soldiers and civilian personnel. In this regard, his study had differences from our study in the distribution of common skin diseases. However, eczema, acne, superficial fungal infections, nevi, callus, and bacterial diseases were encountered frequently in both studies.

The most common skin disease is superficial fungal infection (51.5%) in our study. This prevalence was higher than in the Turkish general population from Kocaeli (7.4%).⁵ In a Medicosocial clinic in Konya, two of three patients of whom were Turkish university students at a similar age with our participants, the rate of superficial fungal infection was reported as 9.6%.⁶ Oral candidiasis (29.2%) and tinea pedis (25.5%) had the highest prevalence in our study. In Turkish military personnel, hospital-based studies reported a very low incidence of candidiasis (0.2% in Northern Cyprus⁷ and 0.12% in Erzincan⁸) (Erzincan's values were calculated by us according to the article). Both civil and military cases admitted to military hospital dermatology polyclinic in Eastern Anatolia were reported to have 0.72% incidence of candidiasis.⁹ This low prevalence of candidiasis can be explained with the negligence of the patients to seek for treatment because of the low morbidity and disability of that disease.

According to overall opinion, in soldiers, tinea pedis was more frequent than in general population. The frequency of tinea pedis was reported as 12.2% in Cyprus⁷ and 6.7% in Erzincan⁸ among Turkish soldiers who were admitted to seek medical treatment for skin diseases. This rate was 1.8% in the study of Eastern Anatolia

Table 4 Frequency of other dermatoses.

Dermatose	Number of patients	%
Nevi	82	43.6
Melanocytic	77	40.9
Becker	2	1
Epidermal	2	1
Anemic	1	0.5
Male Pattern Baldness	76	40.4
Scars	18	9.6
Hypertrophic	8	4.6
Postoperative	5	2.7
Burns	5	2.7
Varicocele	14	7.4
Skin tags	11	5.9
Warts	6	3.2
Verruca vulgaris	5	2.7
Verruca plantaris	1	0.5
Postinflammatory hyperpigmentation	4	2.1
Postinflammatory hypopigmentation	4	2.1
Palmar hyperkeratosis	2	1

dermatology outpatients⁹ and 4.1% in Central Anatolian Medico-social clinic study.⁶

In our study, the cases with the diagnosis of tinea pedis were confirmed by potassium hydroxide examination. The mycological point prevalence of tinea pedis was reported to be 27.3% in Israeli soldiers similar to our study. However, the clinical point prevalence rate was reported as high as 60%.¹⁰ In fact, most of the cases with negative mycological examination were possible to be a case of intertrigo, dyshidrotic eczema, or plantar hyperkeratosis because these diseases can be misdiagnosed as tinea pedis clinically. In our comprehensive study, the prevalence of these diseases were mentioned separately.

Pitted keratolysis (34.5%), dyshidrotic eczema (18.6%), intertrigo (17%), plantar hyperkeratosis (14.3%), and contact dermatitis (13.8%) constituted an important and large part of skin diseases in our study. Pitted keratolysis is a common disorder among members of the military. Its incidence was reported in non-Turkish soldiers to be between 48.5% and 77.1% previously.^{11,12} In a recent hospital-based study, the frequency of pitted keratolysis was reported as 12.8% among Korean male soldiers complaining of plantar lesions.¹³ In Turkey, in a hospital-based Eastern Anatolia study with civil and military subjects, 1.5% of patients were diagnosed with pitted keratolysis,⁹ on the other hand, no cases were reported in Kocaeli study evaluating general population⁵ and in a Medico-social clinic study in Central Anatolia.⁶

Dyshidrotic eczema is a disease that can be seen commonly in the soldiers. It is believed that hyperhidrosis is not one of the causative factors but that emotional stress is a more important prerequisite for dyshidrotic eczema.¹⁴ In Eastern Anatolia, which has a cold climate, hospital-based study of civil-military cases reported a 0.6% prevalence of dyshidrotic eczema.⁹ No cases of dyshidrotic eczema were reported in Kocaeli study evaluating general population.⁵ The combination of extreme heat and nervous tension may be largely responsible for the large number of cases seen in our study.

Predisposing factors for intertrigo include being clothed in nonabsorbent clothing, marked sweating because of excessive clothing or covers, and lack of proper hygiene.¹⁵ Therefore, high prevalence of intertrigo is expected in soldiers like the rate of 17% in our study. However, intertrigo was not reported in general population-based Kocaeli study.⁵

Plantar hyperkeratosis was encountered frequently in our study but not mentioned in other military-based studies. It was evaluated to be related with hyperhidrosis and occlusion in addition to atopy. Increased water content of the stratum corneum will dilute the enzymes and change the pH value important for the corneodesmolysis.¹⁶ As a result, in macerated skin, the stratum corneum shows retentional hyperkeratosis and is shed in large sheets.

In a hospital-based study performed in Turkey, contact dermatitis was the most encountered (13.2%) skin disease in the general population.¹⁷ Furthermore, it was also the most frequent diagnosis in Eastern Anatolia study covering civil and military personnel in the dermatology outpatient clinic with a rate of 9.55%.⁹ Contact dermatitis was not the most frequent disease in our study, although its prevalence was 13.8%.

Our study was performed in summer. We believe that our region's high temperature and humidity in summer are

predisposing factors for the frequent skin diseases. Any sexually transmitted disease could not be detected because of the lack of further confirmatory examinations in our observational study, whereas among Turkish soldiers who were admitted to the Girne Military Hospital Dermatology Outpatient Clinic in Northern Cyprus, the frequency of sexually transmitted disease was reported to be 6.5%. Scabies was the most common sexually transmitted disease in that study, genital warts and molluscum contagiosum were the other ones.¹⁸

The high frequency of cutaneous diseases in facilities, such as military service in which humans live in crowded populations will be decreased by preventive measures and educational studies. Moreover, both loss of working power and medical expenses will be kept in the least possible level. As declared by Selvaag,¹ "good clinical experience in dermatology is of paramount importance in military medicine, and if possible, the military should appoint a dermatologist to its medical team to rapidly diagnose and treat the large number of soldiers with cutaneous diseases."

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