

Sickness profile among Polish troops deployed to Afghanistan in the years 2003–2005

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ABSTRACT

Background. This article presents the results of individual research concerning the sickness profile in the group of soldiers of the Polish Military Contingent (PMC) deployed to Afghanistan within the international stabilization forces in the years 2003–2005.

Material and methods. Retrospective analysis was based on medical records of 400 Polish troops treated ambulatorily from November 2003 to October 2005 in the PMC out-patients clinic providing medical support in the operation Enduring Freedom in Bagram Air Base (north-eastern Afghanistan). All initial visits ($n = 1001$) were included in statistical analysis. Incidence rates of diseases and injuries were calculated per 100 persons.

Results. The main reasons for ambulant treatment in the group of Polish soldiers were respiratory system diseases (61.8 cases/100 persons), skin diseases (55.0 cases/100 persons), non-battle injuries (39.8 cases/100 persons), and digestive system diseases (32.8 cases/100 persons).

Conclusions. Health problems occurring among troops of the Polish Military Contingent were closely related to the effects of environmental factors (extreme range of temperature within 24-hours and throughout the year, unsatisfactory sanitary conditions), and sports accidents in the mission area.

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Key words: sickness profile, soldiers, Afghanistan

INTRODUCTION

In response to the events which took place in New York and Washington on 11 September 2001 the coalition forces serving under the authority of NATO decided to intervene immediately. A month later operation Enduring Freedom was launched in the territory of Afghanistan, which was thought to be a hiding place for the terrorists responsible for the attacks. A Polish Military Contingent (PMC) has been engaged in north-eastern Afghanistan as a part of the allied forces under American command since March 2002. In the years 2002–2006 the Polish Military Contingent comprised a total of 100 soldiers (including

a medical section with 2–3 medical doctors) rotated every 6 months (400 soldiers serving from November 2003 to October 2005). PMC was primarily tasked with the development of Bagram Air Base fortifications, demining the military base area, marking borderlines of mine fields, and disposing of landmines, unexploded ordnance, and misfires.

Contemporary military operations, especially in the region of the Middle East and Central Asia, have recently been executed in diverse climatic and sanitary conditions, which are frequently unfamiliar for their participants. The extreme range of temperatures between day and night, and between the seasons,

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low hygienic standards, and warfare determine the occurrence of numerous diseases and injuries not only among the local people but also among soldiers of military operations, who represent the population of immigrants. The most frequent health problems in combat zones are respiratory system diseases, digestive system diseases, dermatoses, battle injuries resulting from combat activities, and non-battle injuries, i.e. traffic accidents, sport traumas [1].

One group of illnesses that pose common health problems in a combat zone are respiratory system diseases. The aetiological factors are primarily *Streptococcus pneumoniae*, *Mycoplasma pneumoniae*, and *Haemophilus influenzae* [2]. During the Gulf War in 1991 diseases of the respiratory tract were the most frequently reported illnesses occurring among soldiers of the coalition forces taking part in the *Desert Storm* and *Desert Shield* operations [3]. Acute respiratory infections resulted in increased sickness and absenteeism among the population of Soviet soldiers deployed in Afghanistan in the 1980s. Within their first year of service in Afghanistan as many as 43% of Soviet soldiers were afflicted with acute bronchitis and/or pneumonia, mainly in the autumn/winter season, which was definitely caused by unfavourable weather conditions [4]. In regions of contemporary military operations medical services put special emphasis on prophylaxis of airborne diseases, which is primarily based on preventive vaccination against influenza and pneumococcal infections as well as treatment by means of guided pharmacotherapy [5-7].

Another health problem among participants of military missions are digestive system diseases, which are primarily related to unsatisfactory sanitary standards in the regions of the forces' deployment, contamination of soil and water, incorrect systems of purifying drinking water, and the terrible condition of plumbing and sewage systems, and of water purification plants [8]. The occurrence of the diseases is further facilitated by neglect of military personnel to comply with recommendations regarding the rules of personal hygiene as well as food and feeding hygiene [9]. The most frequently occurring pathogen of contagious diseases of the digestive system among the population of the military personnel undergoing medical treatment is enterotoxic *Escherichia coli*. Other pathogenic factors included *Shigella*, *Salmonella*, *Campylobacter*, *Cryptosporidium*, *Giardia intestinalis*, *Entamoeba histolytica*, and *Rotaviridae*. In 20-30% of cases the aetiological factor remained unspecified (negative microbiological test) [10-12].

A significant problem connected to the occurrence of food and water-borne diseases is the fact that a large number of the diseases were not diagnosed in terms of the aetiology of their pathogens. For this reason data regarding the causes of sickness prevalence may not be fully credible [14]. The occurrence of acute gastroenteritis among military personnel is typically associated with the consumption of food from the local market and drinking water from unknown sources [15, 16].

Skin diseases constitute a separate group of health problems in hot climate areas. A large number of cosmopolitan dermatoses gain particular significance owing to the frequency of their occurrence and intensification of changes [17]. Research conducted among the UN peacekeepers in South-East Asia demonstrated that dermatoses constituted the largest group of all health problems, with mycoses of groin and feet prevailing. Significant problems were also pyodermas, such as furunculosis or ecthyma [18]. Frequent occurrence of dermatoses is undoubtedly influenced by uniforms and footwear maladjusted for work or military service in the hot and humid climate. Similar diseases occur in dry, hot climates; nevertheless, the exacerbation of such diseases is much less there [19]. Individual research conducted among the population of the Polish Military Contingent in Iraq and Afghanistan indicated that skin diseases, with allergic dermatoses as the prevailing ones, belonged to the group of the most frequently occurring health problems among outpatients [20].

Military service is burdened by a number of another risk factors which can bring to high prevalence of non-battle injuries. The most frequent traumas are caused by sport or car accidents [21]. In addition to the health hazards listed above, environmental factors such as changeable weather conditions may also be a considerable threat. A commonly occurring health threat among soldiers executing mandatory tasks in hot climate areas are heat injuries. They represent a wide spectrum of symptoms of moderately serious intensification in the course of diseases such as heat exhaustion and heat cramps, to life-threatening conditions such as heat stroke [22, 23]. A distinctive feature of hot and dry climate areas are the frequently distressing sand and dust storms. The effects of wind, sand, and dust are often eye, skin, and respiratory tract diseases [24].

The stabilization mission in Afghanistan represents a group of military operations in which the risk of health damage or death is particularly high. The areas of combat operations are at risk from terrorist

attacks. Virtually every day there are bombings and ambushes with the use of improvised explosive devices, firearms, or artillery weapons. It has been estimated that shrapnel wounds amount to 2/3 of all body injuries sustained in the contemporary battlefield [25, 26]. As yet, over 1 million soldiers of the coalition forces have taken part in the operations in Iraq and Afghanistan. More than 20,000 of them have sustained battle injuries while executing military tasks, 46% of the injured required medical evacuation to a home country. Injuries resulting from the blast of explosives, anti-personnel mines, mortars, and grenade launchers prevailed [27, 28].

Past experience gained from military operations points to the fact that a certain percentage of soldiers executing military tasks in extreme situations are incapable of adapting to existing conditions and therefore must be evacuated to their home country for medical reasons [29]. Presently, psychiatric disorders amount to 10% of all medical evacuations of American military personnel from combat zones in Iraq and Afghanistan [30]. According to representatives of the American health service the most commonly occurring psychiatric disorder among soldiers homebound or evacuated from the territory of Iraq and Afghanistan is PTSD [31, 32]. The number of American soldiers homebound from operations *Iraqi Freedom* and *Enduring Freedom* complaining of PTSD has been estimated at 15% of the total population participating in both military missions [33]. In recent years the percentage of military personnel exposed to a traumatic event increased, while participation in combat actions has dropped considerably [34].

The aim of the present article has been to analyse the sickness profile in the population of Polish soldiers deployed to Afghanistan, treated ambulatorily in the years 2003–2005. This paper is also an attempt at itemising the factors which influence diseases in the examined population.

MATERIAL AND METHODS

DATA COLLECTION

The retrospective analysis of the sickness profile in the population of 400 Polish soldiers deployed to Afghanistan between November 2003 and October 2005 was based on ambulatory records: archival medical documentation from the first level of medical assistance according to NATO procedures (ambulant treatment in the PMC out-patients' clinic). First aid medical care and treatment of sick and injured

personnel on the first level is the responsibility of every national unit. In the Polish Military Contingent in Afghanistan medical care was provided by 2–3 doctors (general practitioners). The essential activities of the GP's duty included medical care in urgent situations, stationary treatment of ill and injured soldiers for whom a return to service was considered (to 3 days), ambulatory treatment within internal medicine, minor surgery, other fields of medicine (ophthalmological, dermatological, etc.), and MEDEVAC (medical evacuation) duty. Patients requiring treatment for periods longer than three days were directed to the U.S. Combat Support Hospital (CSH) located in the same military base (Bagram Airfield). In cases of major surgery or specialist treatment beyond the contingent capability, Polish soldiers were sent to the U.S. CSH mentioned above. Patients requiring treatment and/or rehabilitation exceeding more than 21 days were evacuated to their home country.

The medical documentation was taken from 400 patients treated ambulatorily from November 2003 to October 2005. The analysis presents a complete research study, i.e. every Polish soldier serving in the Enduring Freedom operation was examined and subjected to statistical assessment. Incidence rates of diseases and injuries were calculated per 100 persons. $p < 0.001$ – 0.05 was considered significant. All initial visits in the PMC outpatients' clinic were included. No deaths or evacuations to Poland because of medical reasons were observed in the analysed period. Soldiers of the Polish Military Contingent deployed to Afghanistan in the years 2003–2005 were replaced in the mission area every 6 months (November–April, May–October). One six-month mandate was numbered accurately at 100 soldiers during that time. Before deployment to Afghanistan every soldier was screened by a medical board in Poland. Only healthy troops were allowed to take part in the military operation abroad.

CASE DEFINITIONS

Principal diagnoses were analysed according to major ICD-9-CM groups (International Classification of Diseases, 9th Revision, Clinical Modification): respiratory system, circulatory system, digestive system, musculoskeletal system, skin, nervous system, sense organs (eyes, ears), genitourinary system, mental disorders, infectious/parasitic, and injuries. Particular diagnoses of individual cases in major groups were analysed according the same classification.

STATISTICS

The primary outcome was that incidence rates per 100 persons treated ambulatorily in the analysed period (November 2003–October 2005) were estimated. Using the number of visits according to the diagnosed disease categories (excluding revisits for the same complaint within two weeks) as the numerator, the total number of examined patients ($n = 400$) as the denominator, multiplied by the rate $C = 10^k$ ($k = 0, 1, 2, 3...$ in the statistical analysis $k = 2$ was used), numbers of illnesses per 100 persons by disease categories were determined. STATISTICA PL program (license No SN: SP 7105488009G51) was used for calculation of the results.

RESULTS

Medical documentation of ambulant treatment of 400 Polish soldiers serving in Afghanistan from November 2003 to October 2005 was included in the analysis. A total of 1001 initial visits were recorded during the study period. From these 1001 cases (250.25 cases per 100 persons) respiratory system diseases accounted for 61.8 cases/100 persons, skin diseases 55.0 cases/100 persons, non-battle inju-

ries 39.8 cases/100 persons, and digestive system diseases 32.8 cases/100 persons, of the total number of diseases and injuries occurring in the study population (Figure 1).

The examination allowed the description of the sickness profile according to age and rank. Soldiers from the age group 25–40 made up 90% of the Polish Military Contingent. Officers made up 17.9% and non-commissioned officers 82.1% of the examined group. The highest frequency of diseases and injuries occurred in the age group of 25–40-year-olds, which was connected with the highest number of soldiers from this age group in the examined unit. Health problems appeared among 23.6% of officers and 76.4% of non-commissioned officers in the analysed period.

Respiratory system diseases accounted for 24.5% of the total number of diseases and injuries (1001) diagnosed and treated ambulatorily in the population of Polish troops serving in Afghanistan from November 2003 until October 2005. Among them, upper respiratory tract infections dominated (including pharyngitis, tonsillitis, sinusitis) (Table 1). The most commonly occurring dermatoses (24.2% of the total

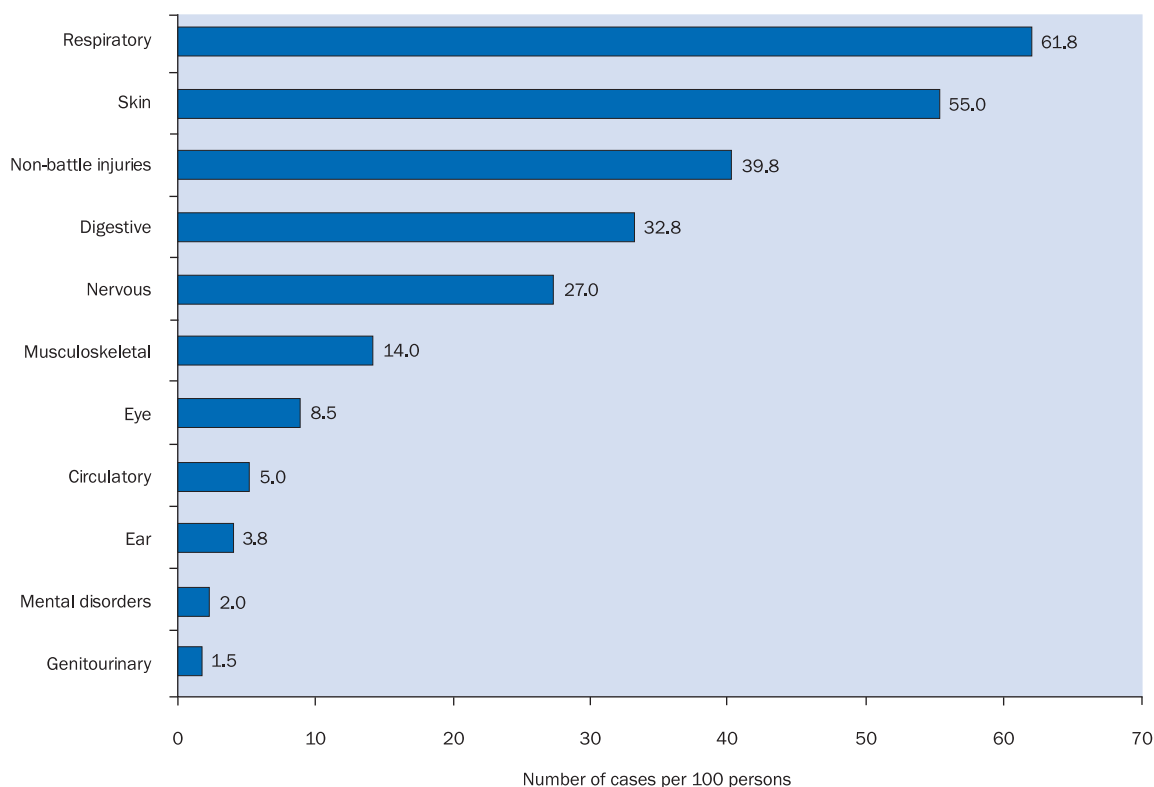


Figure 1. Incidence of diseases and injuries per 100 persons in the group of Polish soldiers ($n = 400$) treated in the PMC outpatients' clinic in Afghanistan from November 2003 to October 2005
Source: PMC Afghanistan 2005

Table 1. Incidence of respiratory system diseases in the group of Polish soldiers (n = 400) treated in the PMC outpatients' clinic in Afghanistan from November 2003 to October 2005

Type of respiratory system disease	Number of cases	Incidence (per 100 persons)
Cold	151	37.75
Pharyngitis	59	14.75
Sinusitis	17	4.25
Tonsillitis	9	2.25
Bronchitis	4	1.0
Pneumonia	2	0.5
Others	5	1.25
Total	247	61.8

Source: PMC Afghanistan 2005

Table 2. Incidence of skin diseases in the group of Polish soldiers (n = 400) treated in the PMC outpatients' clinic in Afghanistan from November 2003 to October 2005

Type of skin disease	Number of cases	Incidence (per 100 persons)
Allergic diseases	75	18.75
Viral diseases	58	14.5
Pyodermas	35	8.75
Mycoses	27	6.75
Miliaria	7	1.75
Others	18	4.5
Total	220	55.0

Source: PMC Afghanistan 2005

number of diseases and injuries) were allergic and viral skin diseases (Table 2). The predominant number of respiratory system and skin diseases (nearly half of all diagnosed cases) was closely related to the effects of environmental factors such as an extreme range of temperature and heavy insolation.

As for injuries, battle injuries were not diagnosed and treated in the analysed period; non-battle injuries prevailed (musculoskeletal system contusions) (Table 3). They were typically the result of sporting activities, since football and volleyball tournaments were regularly organized in Bagram Airfield among national contingents. The most commonly occurring digestive system diseases were acute gastrointestinal disorders/diarrhoeas (Table 4). They typically occurred within the first few weeks following the soldiers' assignment to a new post in Afghanistan, during the adaptation period to different environmental conditions, and in the next months as a result of low hygienic standards in the military base.

DISCUSSION

This article provides an assessment of the sickness profile among Polish troops serving in the military operation in Afghanistan. Nearly half of the visits of ambulant patients were due to respiratory tract infections and dermatoses. The retrospective study design and the method used to identify diseases in this study have one basic limitation, which may influence the validity of the results. In our study the diagnosis was established by medical doctors, but misclassifications of cases are possible, especially among respiratory and digestive system illnesses and skin diseases, where cases have not been diagnosed with regard to the aetiology of their pathogens (no diagnostic confirmation of clinical examination). Additionally, clinical examinations for confirmation of symptoms and conditions reported by general practitioners were not confirmed by specialists, and illness outcomes included in the study may not equate to specialists' diagnoses and may not reflect the full spectrum of sickness profile.

Table 3. Incidence of non-battle injuries in the group of Polish soldiers (n = 400) treated in the PMC outpatients' clinic in Afghanistan from November 2003 to October 2005

Type of non-battle injury	Number of cases	Incidence (per 100 persons)
Musculoskeletal contusion	73	18.25
Burn	27	6.75
Superficial injury	20	5.0
Head contusion	8	2.0
Heat injury	4	1.0
Others	27	6.75
Total	159	39.8

Source: PMC Afghanistan 2005

Table 4. Incidence of digestive system diseases in the group of Polish soldiers (n = 400) treated in the PMC outpatients' clinic in Afghanistan from November 2003 to October 2005

Type of digestive system disease	Number of cases	Incidence (per 100 persons)
Acute gastroenteritis/diarrhoea	101	25.25
Gastritis	16	4.0
Stomatitis	5	1.25
Others	9	2.25
Total	131	32.8

Source: PMC Afghanistan 2005

In recent decades an escalation of armed conflicts has been observed in the Middle East and Central Asia. Interventions of international organizations have led to the establishment of a series of peace-keeping and stabilization operations. The UN and NATO military contingents consist of soldiers from different countries and continents. Each region of the deployment of multinational forces has its own specific characteristics. Several thousand soldiers, who represent a group of expatriates, are temporarily deployed in the territory of a country characterized by environmental conditions different to those prevailing in their home countries. The co-author of this article, in the period from March to August 2005, conducted the retrospective analysis of the sickness profile in the population of 2870 American soldiers deployed to north-eastern Afghanistan and treated ambulatorily in the U.S. Combat Support Hospital in Bagram Airfield (the total population of U.S. troops stationed in Bagram at that time was approx. 7000). Incidence rates of diseases and injuries per 100 persons among American soldiers were considerably lower than in the population of 400 Polish soldiers examined in a similar period, but the sickness profile

was very similar, and cases of diseases and injuries, and the environmental risk factors causing illnesses among U.S. troops were comparable. The most common health problems in the examined population of 2870 American soldiers were non-battle injuries (21.7/100 persons), respiratory system diseases (17.3/100 persons), skin diseases (15.9/100 persons), and digestive system diseases (13.3/100 persons). Among non-battle injuries musculoskeletal contusions (11.9/100 persons) and joint sprains (6.4/100 persons) prevailed, as a result of sports accidents. Cases of colds (10.0/100 persons) dominated in the group of respiratory system diseases. Acute gastroenteritis/diarrhoeas (9.7/100 persons) prevailed among digestive tract diseases. Allergic diseases (5.6/100 persons) dominated in dermatoses [1].

Afghanistan is a mountainous country (Bagram Air Base is located at 1450 m above sea level), where a dry continental climate prevails with an extreme range of temperatures within 24-hours and throughout the year, and heavy insolation. Great differences in summer and winter temperature and of day and night temperature are a remarkable feature of the Afghan climate. In the country's capital, Kabul (lo-

cated 60 km from Bagram Air Base, at 1800–2000 m above sea level), the summer temperatures rise to approximately 35°C, the air humidity is 37–39%, and there is no rainfall at all. The winter temperature in Kabul typically drops below –10°C. The temperature range between summer and winter months in Afghanistan is one of the highest in the world. During the winter season the temperature may fall below –40°C in high mountain areas, while during the summer season the heat exceeds +45°C in the eastern parts of the country [24]. Therefore, military service in the Afghan territory triggers the occurrence of certain diseases closely related to the prevailing environmental factors. The diseases commonly include upper respiratory tract infections, sunburn following prolonged exposure to sunlight, and skin diseases such as photodermatoses. Being assigned to a region characterized by particularly low sanitary conditions also had its consequences and resulted in the increased occurrence of acute gastrointestinal disorders. Afghanistan has been identified as a country of high-risk as far as the occurrence of communicable diseases is concerned [35, 36]. The primary reasons for such a situation are contamination of water and soil, limited access to uncontaminated drinking water, and a large number of asymptomatic carriers of infectious and parasitic diseases among the local people [37, 38]. Military personnel assigned to stabilization mission in Afghanistan are not exposed to infectious risk factors to such an extent as the local population. This is mainly due to effective work of hygiene services. Nevertheless, as far as maintaining combat effectiveness is concerned, knowledge of existing health hazards concerning communicable and non-communicable diseases, battle and non-battle injuries, is of great importance for each of the military mission's participants as well as for all unit commanders.

CONCLUSIONS

1. The sickness profile in the group of soldiers of the Polish Military Contingent deployed to Afghanistan within the international stabilization forces in years 2003–2005 was dominated by respiratory system diseases, dermatoses, non-battle injuries, and digestive system diseases.
2. Health problems occurring among Polish troops were closely related to the effects of environmental factors (extreme range of temperature within 24-hours and throughout the year, unsatisfactory sanitary conditions), and sports accidents in the mission area.

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