
Prevalence of Acute Respiratory Tract Diseases Among Soldiers Deployed for Military Operations in Iraq and Afghanistan

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Abstract

Respiratory diseases are one of the most common health problems among service personnel assigned to contemporary military operations which are conducted in areas characterized by adverse environmental conditions. This article reviews the results of the studies into the prevalence of acute respiratory tract diseases among soldiers of the Polish Military Contingent deployed to Iraq and Afghanistan. The article also discusses a number of factors which increase the prevalence of diseases diagnosed in the population of soldiers on a military mission in different climatic and sanitary conditions. Retrospective analysis was based on medical records of Polish troops treated on an outpatient basis in Iraq in 2003–2004 ($n = 871$) and in Afghanistan in 2003–2005 ($n = 400$), 2009 ($n = 2,300$), and 2010 ($n = 2,500$). The intensity rates were calculated and were then used to calculate the prevalence of diseases per 100 persons in a given population of the military personnel. We found that acute respiratory tract diseases were one of the most common health problems treated in outpatient medical facilities in all four study populations. The incidence rate was 45.6 cases in Iraq in 2003–2004, and in Afghanistan it amounted to 61.8 in 2003–2005, 45.3 in 2009, and 54.8–100 persons in 2010. In conclusion, the prevalence of respiratory diseases was closely related to the

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environmental factors, such as sand and dust storms, extreme temperature changes, unsatisfactory sanitary conditions, and common disregard of basic principles concerning disease prevention.

Keywords

Disease prevention • Military medical service • Prevalence • Respiratory tract diseases • Soldiers

1 Introduction

Military operations which were launched in Iraq or Afghanistan are carried out in areas in which difficult environmental conditions prevail. As a result of ongoing hostilities, there is an increased risk of various diseases and injuries among the local population, and in the population of military personnel serving in the international coalition forces. The factors which are responsible for increased prevalence of infectious and non-infectious diseases in the population of soldiers participating in contemporary combat operations (Soltis et al. 2009; Aronson et al. 2006) include adverse environmental conditions, such as desert climate in Iraq, high mountain climate in Afghanistan, sand and dust storms, extreme temperature changes within 24 h, unsatisfactory sanitary conditions, and common disregard of basic principles concerning disease prevention. The most common health problems reported by military personnel who are treated in outpatient medical facilities, apart from traumatic profile associated with battle and non-battle injuries, include respiratory, gastrointestinal, and skin diseases, with the predominance of upper airway infections.

The aim of this article was to present the results of search into the prevalence of respiratory tract diseases among soldiers of Polish military contingents deployed to Iraq and Afghanistan. A number of different factors which increase the prevalence of diseases diagnosed in the population of soldiers on a military mission in different climatic and sanitary conditions were also taken into account.

2 Methods

The study was approved by the Ethics Committee of the Military Institute of Medicine in Warsaw, Poland.

2.1 Data Collection

The analysis of acute respiratory tract diseases diagnosed in the members of Polish Military Contingents relocated to Iraq and Afghanistan was based on medical records and laboratory tests results of soldiers treated on an outpatient basis (initial visits, excluding check-up appointments) in military health care facilities. The study population was divided into four groups:

- sick calls in the Polish Field Hospital in Iraq in the period 2003–2004 – 871 soldiers stationing in two military bases: Camp Juliet and Camp Lima in Karbala Province;
- outpatient medical facility of the Polish Military Contingent in Afghanistan in the period 2003–2005 – 400 soldiers stationing in Bagram Airfield in the Parwan Province;
- sick calls in the Polish Field Hospital in Afghanistan in 2009–2300 soldiers stationing in Forward Operating Base Ghazni in the Ghazni Province;
- sick calls in the Polish Field Hospital in Afghanistan in 2010–2500 soldiers stationing in Forward Operating Base Ghazni in the Ghazni Province.

A retrospective study made it possible to estimate the intensity rate which was used to calculate the prevalence of cases of diseases per 100

persons (see below). The four study populations were of random composition. Changes in the confidence level of $p < 0.05$ were assumed to be relevant. The data collected, were then presented in the form of figures.

2.2 Case Definitions

Diseases affecting particular organs and systems were diagnosed in accord with the ICD-9 CM classification: respiratory, circulatory, gastrointestinal, musculoskeletal, neurological, urogenital, eye, ear diseases, contagious and parasitic diseases, mental disorders, and injuries. Detailed diagnoses of specific disease entities were interpreted in compliance with the same classification.

2.3 Statistics

The basis for calculating the intensity rate was the number of admissions according to diagnosed diseases used as a numerator divided by the total number of people in the study population within the analyzed period as a denominator ($n = 871$ soldiers of PMC Iraq; $n = 400$ soldiers of PMC Afghanistan in years 2003–2005, $n = 2,300$ in 2009, $n = 2,500$ in 2010) multiplied by the coefficient $C = 10^k$ ($k = 0, 1, 2, 3, \dots$, in the statistical analysis $k = 2$), which was used to calculate the prevalence of cases of diseases per 100 persons in the study population. STATISTICA PL software was used to calculate the final scores.

3 Results

The research demonstrated that respiratory tract diseases were the most common health problem treated on an outpatient basis in medical facilities supporting Polish Military Contingents in Iraq and Afghanistan in all four study populations. The prevalent health problems reported among 871 Polish military personnel treated in the sick call of the Polish Field Hospital in Iraq in years

2003–2004 were respiratory tract diseases (45.6 cases per 100 persons), dermatoses, injuries, and gastrointestinal diseases (Fig. 18.1).

Respiratory illnesses diagnosed in the group of 871 soldiers serving in Iraq included 397 cases of acute upper respiratory tract diseases: cold (26.9/100 persons), pharyngitis and/or tonsillitis (13.3/100 persons), sinusitis (3.1/100 persons), and bronchitis (2.3/100 persons). There was an increased prevalence of diseases in March–April and again in September–October, that is, when the Polish contingent rotated its troops and when the newly-arriving soldiers were undergoing the acclimatization process to adjust to environmental conditions prevailing in the theater of operations.

The most common health problems reported among 400 soldiers treated in the outpatient medical facility of the Polish Military Contingent in Afghanistan in the years 2003–2005 were respiratory diseases (61.8 cases/100 persons), dermatoses, injuries, and gastrointestinal diseases (Fig. 18.2).

Two hundred forty seven cases of respiratory tract illnesses were diagnosed among 400 soldiers serving in Afghanistan. The sickness consisted of cold (37.8/100 persons), pharyngitis and/or tonsillitis (17.0/100 persons), sinusitis (4.3/100 persons), bronchitis (1.0/100 persons), pneumonia (0.5/100 persons), and others (1.2/100 persons).

The prevalent health problems reported among 2,300 Polish military personnel treated in the sick call of the Polish Field Hospital in Afghanistan in 2009 were respiratory diseases (45.3 cases per 100 persons), injuries, gastrointestinal, and skin diseases (Fig. 18.3).

One thousand forty three cases of respiratory tract illnesses were diagnosed in the group of 2,300 soldiers relocated to Afghanistan in 2009. The sickness consisted of cold (31.0/100 persons), pharyngitis and/or tonsillitis (11.2/100 persons), sinusitis (2.0/100 persons), bronchitis (1.0/100 persons), and pneumonia (0.1/100 persons).

The most common health problems reported among 2,500 Polish military personnel treated in the sick call of the Polish Field Hospital in Afghanistan in 2010 were respiratory diseases

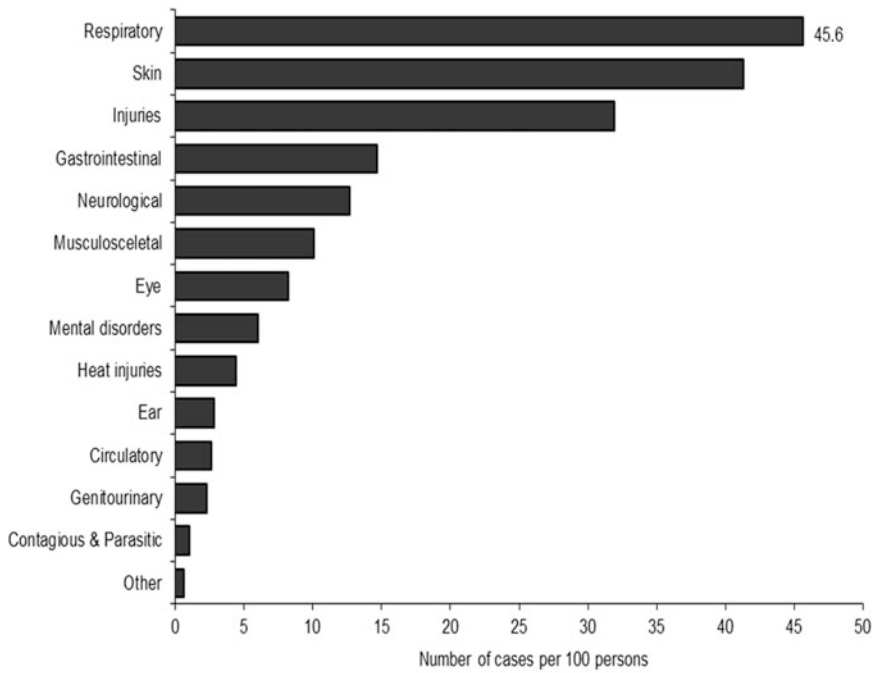


Fig. 18.1 Sickness profile in soldiers serving in the Polish Military Contingent in Iraq ($n = 871$), treated on an outpatient basis in Polish Field Hospital in 2003–2004

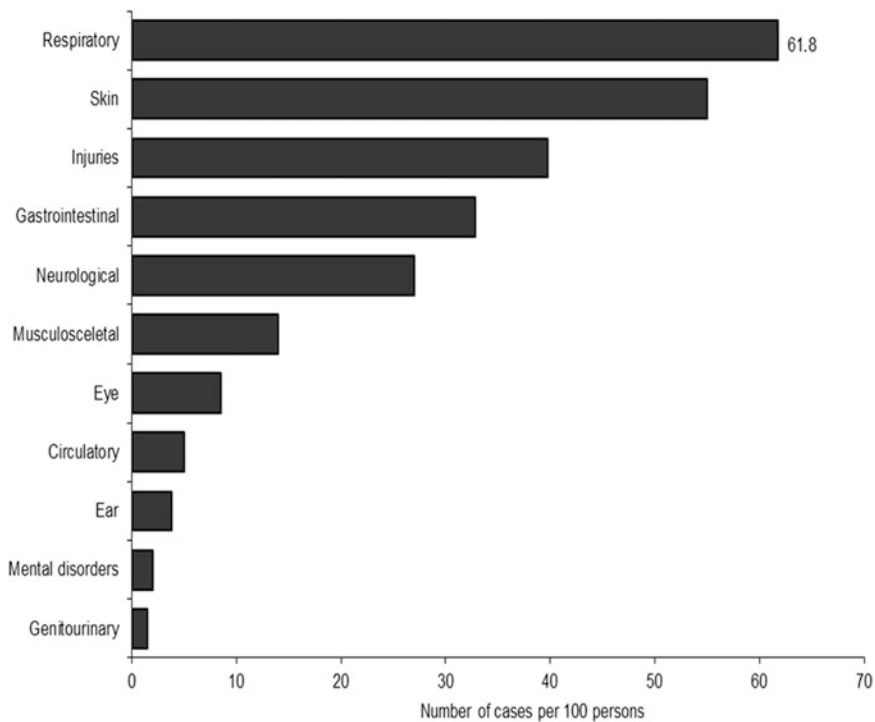


Fig. 18.2 Sickness profile in soldiers serving in the Polish Military Contingent in Afghanistan ($n = 400$), treated in the PMC outpatient clinic in years 2003–2005

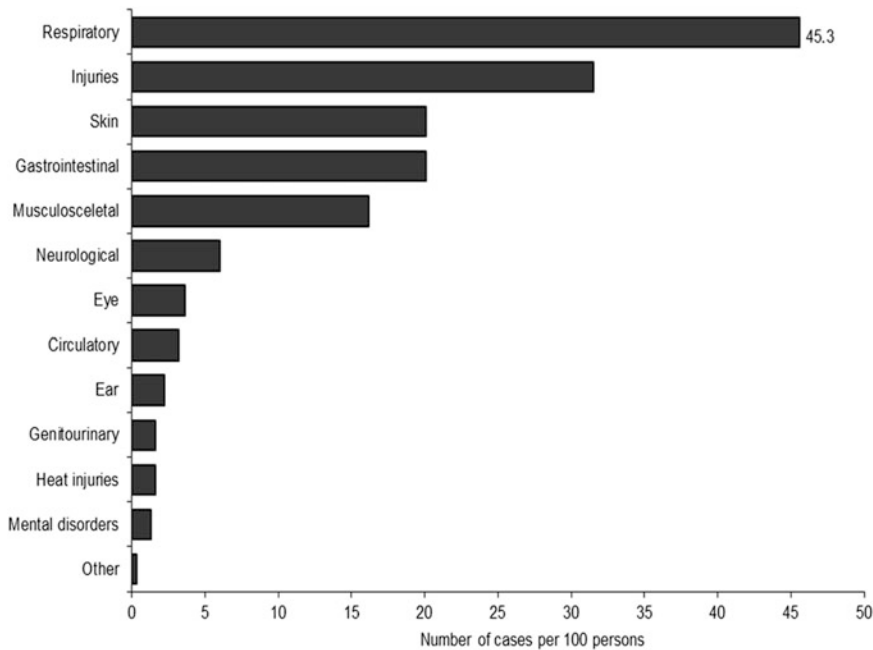


Fig. 18.3 The sickness profile in soldiers serving in the Polish Military Contingent in Afghanistan ($n = 2,300$), treated on an outpatient basis in Polish Field Hospital in 2009

(54.8 cases per 100 persons), injuries, skin, musculoskeletal, and gastrointestinal diseases (Fig. 18.4).

One thousand three hundred and sixty nine cases of respiratory tract illnesses were diagnosed in the population of 2,500 soldiers serving in Afghanistan in 2010. The sickness consisted of cold (33.9/100 persons), pharyngitis and/or tonsillitis (15.8/100 persons), sinusitis (3.7/100 persons), bronchitis (1.3/100 persons), pneumonia (0.1/100 persons). As always, increased prevalence of the diseases was observed in March–April and in September–October, when the Polish contingent rotated its troops.

Medical personnel supporting Polish Military Contingents in Iraq (2003–2004) and Afghanistan (2003–2005, 2009–2010) at Level 1 (outpatient medical facility) and Level 2 (field hospital) had limited diagnostic capabilities as far as the treatment of acute respiratory diseases was concerned. Bacteriological and viral diagnostic procedures were unavailable. Therefore, patients exhibiting acute respiratory symptoms routinely received antibiotics to treat the infection. As a rule, a course of antibiotics was administered only on the basis of

physical examination of the patient and additional tests such as erythrocyte sedimentation rate (ESR), complete blood count (CBC), and chest and sinus X-rays.

4 Discussion

Respiratory tract diseases are one of the major health problems occurring in areas where combat operations are conducted. Such a situation is primarily influenced by difficult climatic and sanitary conditions, overpopulation, and mass migrations. High incidence of diseases is reported both in the population of immigrant soldiers participating in military operations as well as among the local people (Gray et al. 1999). *Streptococcus pneumoniae*, *Mycoplasma pneumoniae*, and *Haemophilus influenzae* remain the most common etiological factors causing respiratory tract diseases in both of the aforesaid populations (Gray et al. 2005; Earhart et al. 2001). During the Gulf War that took place in 1991, respiratory tract diseases were one of the most frequent health problems diagnosed among coalition forces

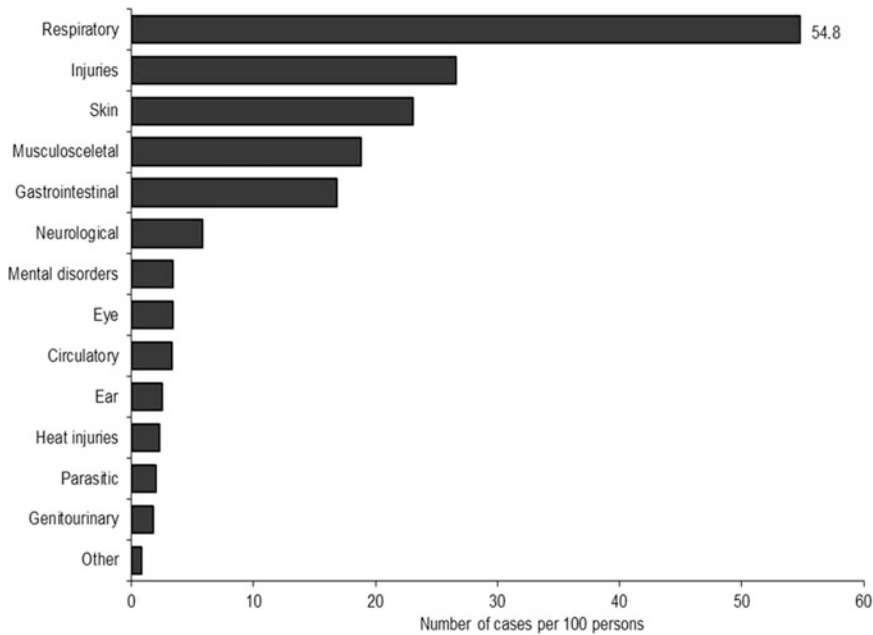


Fig. 18.4 The sickness profile in soldiers serving in the Polish Military Contingent in Afghanistan ($n = 2,500$), treated on an outpatient basis in Polish Field Hospital in 2010

fighting in operations *Desert Shield* and *Desert Storm* (Hyams et al. 1995). Acute respiratory tract infections, mainly in the form of bronchitis and pneumonia, represented one of the most common causes of sickness absence among Soviet troops stationing in Afghanistan in the 1980s. According to Novozhenov and Gembitski (1998), as much as 43 % of service personnel suffered from acute bronchitis and/or pneumonia within the first year of service in Afghanistan. The majority of soldiers developed respiratory tract illnesses in the fall/winter season, which was undoubtedly influenced by severe climatic conditions. Currently, military medical services put special emphasis on preventing air-borne diseases before the deployment of troops to areas of operations. Prophylactic actions are primarily based on preventive vaccinations against influenza and pneumococcal infections, and treatment by means of targeted pharmacotherapy (Crum et al. 2003; Earhart et al. 2001). The research conducted by Sanders et al. (2005) in the population of American service personnel taking part in operations *Iraqi Freedom* and *Enduring Freedom* in the

period 2003–2004 also revealed that respiratory diseases remain the most frequent health problems in soldiers deployed to areas in which different climatic and sanitary conditions prevail. Sixty nine percent of the respondents complained of at least 1 episode of a respiratory tract infection and 14 % of more than 3 episodes. The incidence of respiratory tract diseases surged drastically during direct combat operations. Nearly 40 % of patients reporting respiratory diseases admitted to smoking at least 10 cigarettes per day, which, in connection with environmental conditions (extreme temperature changes within 24 h, sand, and dust storms) may notably increase the prevalence of such illnesses. Pneumonia was diagnosed in 3 % of American soldiers complaining of respiratory diseases; those patients were mainly treated on an outpatient basis (Aronson et al. 2006). Most cases of pneumonia diagnosed in the population of the U.S. Forces personnel serving in Iraq in the period March 2003–March 2004 were either of bacterial or viral etiology, and 18 patients were diagnosed with idiopathic eosinophilic pneumonia (two died) (Shorr et al. 2004).

Research conducted during the initial stage of the operation *Iraqi Freedom* in 2003 demonstrated approximately 100 cases of pneumonia among American military personnel; 15 % of which ended up in acute respiratory failure and required treatment in an intensive care unit (Gottlieb 2003; Oransky 2003). The major threat to the life and health of soldiers serving in the coalition forces relocated to Iraq and Afghanistan are undoubtedly battle injuries. Nevertheless, the prevalent health problems in the above mentioned population are different types of diseases, especially respiratory tract infections (Peoples et al. 2004). Respiratory diseases have been the major source of sickness absences, hospitalizations, and unfitness for service over the last several decades. The research conducted among American soldiers evacuated from the theater of operations for medical reasons demonstrated that more patients were evacuated due to respiratory illnesses than owing to battle injuries (James et al. 1982). Infectious diseases diagnosed in the population of military personnel assigned to contemporary armed conflicts account for merely 2.8 % of all diagnoses. This is associated with the fact that complex laboratory diagnostic procedures are unavailable inside the theater of operations. A large number of respiratory tract diseases which are diagnosed as non-infectious, may be of bacterial or viral etiology (Harman et al. 2005). Approximately 40–70 % of all military personnel staying inside the operational areas in Iraq and Afghanistan report to health care facilities due to upper respiratory tract infections. Medical personnel have no capabilities to perform bacteriological or virological diagnostic procedures. Therefore they typically administer a course of antibiotics although in some cases antibiotic treatment has no clinical justification and may facilitate the emergence of pharmacotherapy resistant microorganisms (Sanders et al. 2005).

The sickness profile observed among the Iraqi and Afghan populations is similar. Respiratory tract diseases represent the leading cause of morbidity in both adults and children less than 5 years of age (Prasad 2006; Dyer 2004). The factors which determine mass incidence of respiratory tract diseases are malnutrition, limited access to medicines and basic health care,

collapse of the immunization program, migrations, and overpopulation, especially in refugee camps (Korzeniewski 2009, 2006).

If medical services operating in a mission area implemented appropriate disease prevention measures (sanitation, hygiene, and anti-epidemic support), the risk of developing of infectious or non-infectious diseases would be greatly reduced (Morris et al. 2011; Smith et al. 2009).

5 Conclusions

The prevalence of respiratory diseases among soldiers deployed to military operations in Iraq and Afghanistan was closely related to the effects of environmental factors (sand and dust storms, extreme range of temperature within 24 h, unsatisfactory sanitary conditions) and to disregard of basic principles of disease prevention.

Increased prevalence of diseases was observed throughout March–April and September–October, i.e., when the Polish contingent rotated its troops and when the newly-arriving soldiers were undergoing acclimatization process to adjust to environmental conditions prevailing in the theater of operations.

Medical personnel supporting Polish Military Contingents in Iraq and Afghanistan had limited diagnostic capabilities as far as treatment of acute respiratory diseases was concerned (bacteriological and virological diagnostic procedures were unavailable).

Acknowledgments We acknowledge the permission of the Commanders of the Polish Military Contingents in Iraq (2003–2004) and Afghanistan (2003–2005, 2009–2010) as well as the Chiefs of Military Health Services of the operations *Iraqi Freedom*, *Enduring Freedom* and ISAF to use medical records of military personnel for scientific publications.

Conflicts of Interest The authors declare no conflicts of interest in relation to this article.

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