

# Health problems of peacekeepers carrying out mandatory tasks in Chad, Central Africa

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## ABSTRACT

**Background.** The article presents the results of the author's own studies concerning the morbidity profile in the group of soldiers serving in the Polish Military Contingent (PMC) deployed to Chad in the period May 2008–April 2009 within the framework of a European Union operation (EUFOR) and a United Nations peacekeeping mission (MINURCAT).

**Material and methods.** The conducted analysis was based on medical records of soldiers ( $n = 540$ ) treated at Level 1 (FOB Iriba) and Level 2 (HQ Abeche) medical centres located in the operational zone where the PMC was stationed. Irrespective of the evaluation of diseases of particular organs and systems, parasitological examination for the presence of intestinal parasitic diseases using a light microscopy were carried out.

**Results.** The research has demonstrated that the most serious health problems occurring in the group of Polish soldiers in the given period included: skin diseases (22.7%), respiratory tract diseases (18.9%), digestive tract diseases (12.9%), and non-battle injuries (9.2%).

**Conclusions.** Parasitological examinations toward intestinal parasitic diseases, conducted among Polish soldiers ( $n = 247$ ) in the mission area in April 2009, revealed the occurrence of protozoan pathogens (55 cases of *Giardia intestinalis*, 2 cases of *Entamoeba histolytica/dispar*).

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**Key words:** Chad, Central Africa, soldiers, health problems, parasites

## INTRODUCTION

In April 2008 a preparatory group consisting of Polish soldiers initiated the construction of the North Star military base in Eastern Chad. After 4 months a Polish Military Contingent (PMC) executing mandatory tasks within the framework of an European Union operation (EUFOR since 15<sup>th</sup> March, 2009) and later, as a part of a UN peacekeeping mission (MINURCAT – *United Nations Mission in the Central African Republic and Chad*), was relocated to the base. The main aim of this military operation, conducted with the participation of Polish soldiers, was to secure safety and stabilization in Eastern Chad, a country which has sheltered thousands of refugees fleeing from neigh-

bouring Sudan. The assignment of the Polish Armed Forces in Africa terminated on 17<sup>th</sup> December 2009, following a one-and-a-half-year presence there. Throughout the analysed period three rotations of Polish soldiers were relocated to Africa, the 2<sup>nd</sup> rotation being the most numerous (November 2008–May 2009 more than 300 persons). The mandatory tasks of the PMC Chad were executed in extreme environmental conditions – completely different from those prevailing in a temperate climate zone. Military service in Chad was quite a challenge for Polish soldiers since their last deployment in the classical tropics, in the intertropical convergence zone, took place in the period 1992–1993 in Cambodia and in 1994 in Haiti.

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The aim of the article was to present the results of the research concerning the prevalence of diseases and injuries in the group of soldiers of the Polish Military Contingent assigned to a temporary duty in an EU operation (EUFOR) and a UN peace-keeping mission (MINURCAT) in Chad in the period May 2008–April 2009.

## MATERIAL AND METHODS

The basis of the study concerning the morbidity profile of soldiers serving in the Polish Military Contingent engaged in Chad was the personnel documents of 220 military personnel deployed to Chad during the 1<sup>st</sup> rotation (May–November 2008), and 320 military personnel during the 2<sup>nd</sup> rotation of PMC (December 2008–April 2009). The conducted analysis was based on medical records of Polish soldiers treated at Level 1 (FO Iriba) and Level 2 (HQ Abeche) medical centres located within the operational area. The results of this retrospective study were further analysed by means of a computer program, *Statistica*, which calculated the structure rate of diseases and injuries. Changes in confidence level  $p < 0.05$  were considered important. Irrespective of the analysis of sickness profile, parasitological examinations to assess the presence of intestinal parasitic disea-

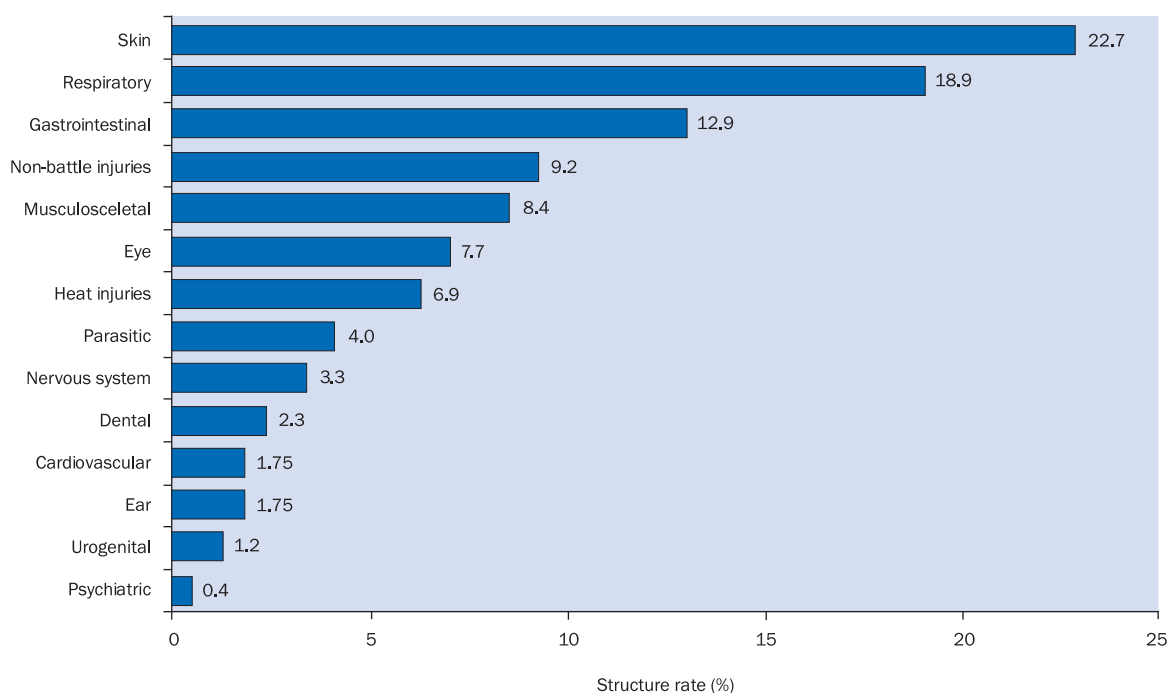
ses were carried out. The diagnostics of intestinal parasites was performed by stool testing method using a light microscope (direct smear in Lugol's solution).

## DIRECT SMEAR IN LUGOL'S SOLUTION

Approximately 2 mg of faeces is taken with a glass rod and applied onto a slide, a drop of Lugol's solution is added, and the material is smeared over the surface area of 4 cm<sup>2</sup>. Next, a cover slide is placed on top of the preparation and the material is examined microscopically under appropriate magnification. Material prepared by means of such a method allows the diagnostician to conduct an initial analysis of non-concentrated material, while staining a smear with Lugol's solution improves the quality of the picture of detected parasites.

## RESULTS

Individual studies, carried out in the mission area, demonstrated that the most serious health problems occurring in the group of Polish soldiers in the period May 2008–April 2009 included: skin diseases, respiratory tract diseases, digestive tract diseases, and non-battle injuries (Figure 1). The most commonly occurring skin diseases (325 cases) were



**Figure 1.** Prevalence of diseases and injuries in the group of soldiers of the Polish Military Contingent in Chad from May 2008 to April 2009. Source: PMC Chad. Own studies

allergic dermatoses (allergic dermatitis, 65; contact eczema, 20; insect bite reaction, 27), viral diseases (herpes type 1, 45), pyodermas (folliculitis, 30), mycoses (foot mycosis, 28), and others (cheilitis, 39). The occurrence of the above-mentioned diseases was certainly determined by the harsh climatic conditions characteristic of the intertropical convergence zone.

The diseases of the respiratory tract were dominated by upper respiratory tract diseases (257 cases). They were mainly caused by disregard of basic preventive measures by military personnel (drinking cold beverages and setting low temperatures in air-conditioned rooms with the outside temperature exceeding 40°C). Body injuries were of non-battle character. Wounds (58), contusions/sprains (37), and skin burn (29) dominated.

Environmental factors, in addition to disregard of health prevention measures, resulted in numerous cases of heat injuries (89, caused by high air temperature) and conjunctivitis (79, connected with heavy insolation and dust). A high morbidity rate was also observed, as relates to the occurrence of musculoskeletal diseases. They typically included overload of the osteoarticular system (62) and lumbosacral spine overload (30), in most cases connected with incompetent weightlifting/gym training or aerobic training at the base).

Acute gastrointestinal disorders dominated among digestive tract diseases (185 cases). Patients suffering from such disorders were only provided with symptomatic treatment, and the diseases were not considered infectious since medical services were incapable of conducting diagnostic procedures for the presence of digestive tract pathogens.

Parasitological examinations for the presence of intestinal parasitic diseases were conducted in the group of soldiers serving in the PMC Chad (n = 247) at the North Star base in April 2009. The examination, conducted by means of a light microscope (direct smear in Lugol's solution) demonstrated numerous protozoan infestations (55 cases of *Giardia intestinalis*, 2 cases of *Entamoeba histolytica/dispar*).

## DISCUSSION

Chad is a landlocked country located in Central Africa. The major geographical regions in Chad are the Sahara desert zone in the north, the Sahelian belt in the centre, and a savannah zone, supplied with rainfall, in the south. The temperatures in the

Sahara desert range from 49°C in May (the warmest month) to 36°C in December. Bothersome sand and dust storms occur in the region. The central part of the Sahelian belt (the place of deployment of Polish soldiers) demonstrates similar temperatures as those prevailing in the Sahara. The dry season lasts for 8 months (from October to May). The average annual rainfall amounts to approximately 700 mm. The southern part of the country, where the subtropical climate prevails, is characterized by temperatures ranging from 41°C in March to 14°C in December. The wet season lasts from May to October. The average annual rainfall totals 900–1200 mm [1–3].

Merely 42% of the citizens have access to uncontaminated drinking water, while 9% have access to sanitary fittings which comply with basic sanitary requirements [4, 5].

Chad is regarded as a high-risk country in terms of the occurrence of infectious and parasitic diseases. This situation is mainly influenced by contamination of water and soil (sewage and excrement) and limited access to uncontaminated drinking water [6, 7]. A high incidence of diarrhoeas occurs in the territory of the whole country regardless of the season. Due to a large number of asymptomatic carriers it might seem that diarrhoeas do not constitute a serious health problem among the local people. The major contagious and parasitic aetiological factors of diarrhoeas are enterotoxic *Escherichia coli*, *Campylobacter spp.*, *Salmonella spp.*, *Shigella spp.*, adeno- and rotaviruses, and protozoa (*Entamoeba histolytica s.l.*, *Giardia intestinalis*) [8].

The most serious health problems diagnosed in the group of Polish soldiers executing mandatory tasks within the framework of the EUFOR/MINURCAT military operations in eastern Chad in the period 2008–2009 included: skin diseases, respiratory tract diseases, digestive tract diseases, non-battle injuries, eye diseases, and heat injuries (being the result of harsh environmental conditions prevailing in the tropical climate, and disregard of basic health prevention measures). A medical examination of biological specimens (stool) of soldiers serving in the PMC Chad, conducted in the mission area, demonstrated a large number of protozoan infestations of the digestive tract. Military medical services in the mission area have limited capabilities of conducting parasitological diagnostics. Therefore, there is a strong necessity to establish a research centre functioning under the authority of

the Polish Armed Forces, whose aim would be to conduct parasitological examinations after a tour of duty executed in different climatic and sanitary conditions. Such a research centre could be set up on the basis of the Epidemiology and Tropical Medicine Department of the Military Institute of Medicine in Gdynia, whose main objective, in accordance with decision no. 442 of the Minister of National Defence of 29.12.2009, is to realize *A program of prevention of intestinal parasitic diseases among soldiers serving in the Polish Armed Forces assigned to an overseas tour of duty in the years 2010-2014* [9]. In cases of positive or doubtful results of parasitological examinations, the subcontractors of the preventive program mentioned above, in the domain of verifying results conducted by means of 3 methods of light microscopy, will be the Department of Tropical Medicine and Parasitology of the Medical University of Gdansk (Professor Myjak et al.), and the Department and Clinic of Tropical and Parasitic Diseases of the Medical University of Poznan (Professor Stefaniak et al.).

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