

# Comparative analysis of health problems among military personnel in a case study of the UN peacekeeping mission in Lebanon and the stabilization operation in Iraq

Ocena porównawcza zachorowań personelu wojskowego na przykładzie misji pokojowej ONZ w Libanie i operacji stabilizacyjnej w Iraku

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**Abstract.** Aim: The article presents the incidence of diseases and injuries in the Polish military personnel serving in the UN peacekeeping mission in Lebanon and the stabilization operation in Iraq. Material and methods: The comparative retrospective analysis was based on medical records of 537 Polish military personnel who were hospitalized in the UN Hospital (Level 2) in Lebanon in the period 1992–2001 and 222 Polish soldiers treated on an inpatient basis in the Medical Support Group (Field Hospital, Level 2) in Iraq in the period October 2003 – June 2004. The analysis was carried out based on structure rate and intensity rate per 100 persons. Results: The most common health problems diagnosed in the UN peacekeepers serving in Lebanon were non-infectious and infectious gastrointestinal diseases, non-battle injuries, respiratory tract diseases and mental disorders. Whereas, the service personnel assigned to a combat mission in Iraq were mainly hospitalized due to traumas (battle and non-battle injuries), mental disorders as well as non-infectious and infectious gastrointestinal diseases. Conclusions: The traumatic profile and the intensity rate of diseases and injuries of the UN peacekeepers deployed to areas of a relatively stable military situation and the profile and the intensity rate observed in soldiers relocated to a combat zone were different.

**Key words:** Iraq, Lebanon, morbidity, Polish soldiers

**Streszczenie.** Cel: W pracy przedstawiono wyniki dotyczące występowania chorób i obrażeń ciała wśród polskich żołnierzy pełniących służbę w misji pokojowej ONZ w Libanie oraz w operacji stabilizacyjnej w Iraku. Materiał i metody: Porównawcza analiza retrospektywna została oparta na dokumentacji medycznej 537 żołnierzy narodowości polskiej hospitalizowanych w Szpitalu ONZ (poziom 2.) w Libanie w latach 1992–2001 oraz 222 polskich żołnierzy leczonych szpitalnie w Grupie Zabezpieczenia Medycznego (Szpital Polowy, poziom 2.) w Iraku w okresie 10.2003–06.2004. Analizę wykonano w oparciu o wskaźnik struktury oraz wskaźnik natężenia w przeliczeniu na 100 osób. Wyniki: Najczęstszym problemem zdrowotnym personelu misji pokojowej ONZ w Libanie były nieinfekcyjne i infekcyjne choroby układu pokarmowego, urazy niebojowe, choroby układu oddechowego oraz zaburzenia psychiczne. Z kolei personel wojskowy misji bojowej w Iraku, realizowanej w strefie działań wojennych był hospitalizowany głównie z powodu obrażeń ciała (urazy niebojowe i bojowe), zaburzeń psychicznych oraz nieinfekcyjnych i infekcyjnych chorób układu pokarmowego. Wnioski: Profil urazowy oraz wskaźnik natężenia chorób i urazów żołnierzy ONZ stacjonujących w regionie o ustabilizowanej sytuacji militarnej różnił się od profilu i wskaźnika natężenia obserwowanego wśród żołnierzy pełniących służbę w strefie działań wojennych.

**Słowa kluczowe:** Irak, Liban, polscy żołnierze, zachorowalność

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## Introduction

Present-day military operations in the Middle East and Central Asia have been carried out in areas characterized by extreme climatic and sanitary conditions, which are completely unfamiliar to service personnel, especially those coming from temperate climate areas. Polish troops have been participating in international peacekeeping and stabilization missions (UN, EU, NATO) for more than 50 years. Military personnel represents a population of 'long-term travelers' stationed in the Third World countries for a period of several months. Polish soldiers are also the largest professional group executing mandated tasks, working throughout a set period of time in different parts of the world. The areas to which military personnel are deployed are typically characterized by escalation of armed conflicts, changeable weather conditions and unsatisfactory standards of hygiene and sanitation. These three elements determine the occurrence of various diseases and injuries. Severe weather conditions increase the incidence of respiratory tract diseases. Low level of sanitation results in high incidence of infectious and non-infectious gastrointestinal diseases. Environmental factors, such as climate or standards of hygiene and sanitation, may have many common features regardless of the type of a military mission carried out in the same region, whereas the differences in the intensification of combat operations have a major impact on the intensity and structure rates of the traumatic profile. The Middle Eastern UN peacekeeping missions (UNIFIL in Lebanon) have been carried out in a relatively stable geopolitical environment. Therefore, battle injuries among the peacekeepers are extremely rare. The situation is entirely different as far as combat operations are concerned. In this case, attacks on soldiers serving in the coalition forces are commonplace. A classic example of such a mission is the military operation in Iraq, which has been rightly regarded as one of the most dangerous combat operations in the world.

## Aim

The aim of the article was to compare the incidence of diseases and injuries reported in the group of the Polish military personnel involved in the UN peacekeeping mission in Lebanon and stabilization mission in Iraq who were hospitalized in medical facilities at level 2.

## Organizational structure and tasks of the UNIFIL Hospital in Lebanon

The Polish Military Medical Unit (Field Hospital UNIFIL) was established as a part of the United Nations Interim Force in Lebanon in 1992, when it took over mandatory tasks previously fulfilled by the Swedish contingent.

In 1992, the staff of the medical unit totaled 88 people, including 11 physicians (1 general surgeon, 2 orthopedic surgeons, 2 anesthetists, 2 internists, 1 urologist, 1 ophthalmologist, 1 neurologist and 1 epidemiologist). The number of medical personnel had been gradually reduced. In 2001, it totaled 42 people, including 7 physicians (2 surgeons, 2 anesthetists, 3 internists). The UNIFIL Hospital consisted of the sick call (9 nurses, 2 X-ray operators), a 20-bed internal and surgical ward with a pre-operating and operating rooms (11 nurses), a laboratory (3 diagnosticians), a pharmacy (3 pharmacists), a dentist's office (1 dentist) and a psychologist's office (1 psychologist). The UN Hospital in Lebanon represented a level 2 medical facility. It provided specialist medical assistance (surgical and internal) to UNIFIL personnel and to the local people as part of the humanitarian aid. If the level 2 hospital was incapable of providing appropriate therapeutic or diagnostic measures, patients were transferred to a level 3 medical facility in Lebanon (Saida) or Israel (Haifa) [1].

## Organizational structure and tasks of the Medical Support Group (Field Hospital) in Iraq

The Medical Support Group (MSG, Polish Field Hospital) represented a level 2 medical facility. It was a part of the Multinational Division Center South (MND CS) and was established as soon as Polish troops were deployed to Iraq, i.e. in August 2003. The MSG provided qualified medical assistance with elements of specialist medical assistance to personnel of the Coalition Forces and to the local people as part of the humanitarian aid. In the period 2003–2004, the number of the MSG personnel ranged from 45 to 54 people, including 11 physicians (2 general surgeons, 2 orthopedic surgeons, 1 anesthetist, 2 internists, 1 dermatologist, 1 ophthalmologist, 1 psychiatrist, and a radiologist). The Polish Field Hospital consisted of the sick call (3 nurses), a surgical-anesthetic area with a pre-operating room, a 2-bed operating room and a 4-bed intensive care unit (5 nurses), a 30-bed hospital ward (2 nurses), a laboratory (3 diagnosticians), a pharmacy (1 pharmacist), a dentist's office (1 dentist) and a psychologist's office (1 psychologist). In cases of diseases or injuries that could not be diagnosed or treated in the MSG, patients were transferred to a level 3 medical facility, i.e. Combat Support Hospitals in Baghdad and Balad [2].

## Material and methods

The retrospective analysis was based on medical records of Polish military personnel hospitalized in the UN Hospital in Lebanon in the period 1992–2001 (420 men and 37 women) as well as on medical records of Polish inpatients treated in the Medical Support Group in Iraq



in the period October 2003 – June 2004 (221 men and 1 woman). 6,000 soldiers, members of the Polish Military Contingent, were involved in the UN peacekeeping mission in Lebanon in the period 1992–2001. The first and second rotation of Polish troops assigned to Operation *Iraqi Freedom* totaled 4,800 soldiers. The statistical analysis was based on medical records of 457 Polish service members hospitalized in the UN Hospital in Lebanon and records of another 222 Polish soldiers treated on an inpatient basis in the Medical Support Group in Iraq. The study was complete, i.e. each Polish patient hospitalized in the aforementioned medical facilities within the analyzed period was subjected to retrospective analysis. The data, which have been collected, were then presented in the form of figures and tables. The diagnosed diseases and injuries affecting different organs and systems were analyzed in line with the ICD-9-CM classification: respiratory, circulatory, gastrointestinal, musculoskeletal, skin, nervous, genitourinary, sense organs diseases, mental disorders, injuries. Detailed diagnoses of particular disease entities were analyzed in compliance with the same classification. The basis for calculating the intensity rate was the number of hospital admissions according to diagnosed diseases or injuries used as a numerator and the total number of people in the study population in a given period used as a denominator ( $n = 6,000$  service personnel of the PMC Lebanon;  $n = 4,800$  service personnel of the PMC Iraq), multiplied by the coefficient  $C = 10^k$  ( $k = 0, 1, 2, 3, \dots$ , in this statistical analysis  $k = 2$ ). The intensity rate was used to calculate the incidence of diseases and injuries per 100 persons in the study group. STATISTICA PL software was used to calculate the final scores.

## Results

The research demonstrated that the most common health problems diagnosed in 457 Polish patients who were hospitalized in the internal and surgical ward of the UNIFIL Hospital from 1992 to 2001 were non-infectious gastrointestinal diseases (19%, 1.60/100 persons), non-battle injuries (16.4%, 1.38/100 persons), respiratory tract diseases (13.1%, 1.10/100 persons), contagious and parasitic diseases (10.3%, 0.87/100 persons), and mental disorders (8.1%, 0.68/100 persons) (Figure 1, Table 1).

Non-infectious gastrointestinal diseases (96 cases) included acute gastroenteritis – 33, alcohol poisoning – 21, gastritis – 13, appendicitis – 8, other – 21. Injuries were of a non-battle nature (83 cases: contusion/dislocation/sprain – 22, fracture – 21, craniocerebral injury – 16, contused/incised/lacerated wounds – 10, burns – 4, other – 10). One soldier was hospitalized due to a battle injury (shrapnel wound). Diseases of the respiratory tract (66 cases) included pneumonia – 25, bronchitis

– 17, tonsillitis – 6, pharyngitis – 4, other – 14, while contagious and parasitic diseases (52 cases) included staphylococcal food poisoning – 26, hepatitis A – 8, angina – 5, chickenpox – 3, influenza – 2, scabies – 2, other – 6. In addition, a large number of patients were hospitalized due to mental disorders (41 people: neurosis – 30, adaptation disorders – 10, acute stress reaction – 1) and 21 patients required hospital treatment for alcohol poisoning. This fact raises the question whether Polish military personnel had been carefully screened before being relocated to overseas service in a peacekeeping mission, during which duty-related stress factors are a marginal phenomenon in comparison to stress factors observed during a combat operation.

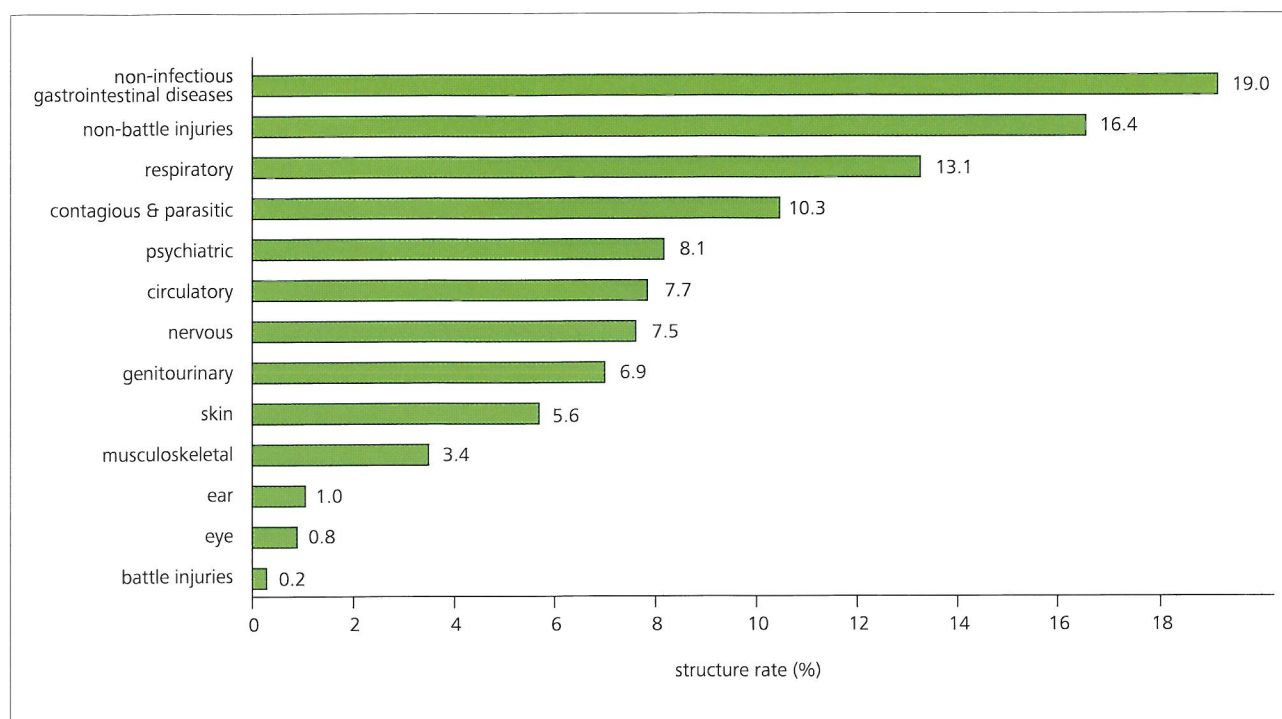
The most common causes of hospitalization among 222 Polish inpatients treated in the Medical Support Group in Iraq in the period October 2003 – June 2004 were non-battle injuries (20.2%, 1.02/100 persons), battle injuries (14.4%, 0.73/100 persons), mental disorders (11.9%, 0.61/100 persons) and non-infectious gastrointestinal diseases (11.5%, 0.58/100 persons) (Figure 2, Table 2).

The vast predominance of injuries and a large number of psychiatric disorders in the disease profile observed among soldiers serving in the PMC Iraq was closely related to the specific character of military service in a combat zone: bombing of military bases, attacks on convoys and patrols, traffic accidents or injuries sustained while executing assigned duties having no connection to external factors.

The observed injuries were either non-battle (49 cases: contusion/dislocation/sprain – 22, fracture – 11, craniocerebral injury – 6, eye injury – 3, contused/incised/lacerated wounds – 3, burns – 2, multiorgan trauma – 1, gunshot wound/friendly fire – 1) or battle (35 cases: contused/incised/lacerated wounds – 12, acoustic trauma – 11, shrapnel wound – 5, gunshot wound – 4, multiorgan trauma – 3). The diagnosed mental disorders (29 cases) included adaptation disorder – 16, acute stress reaction – 5, neurosis – 5. Non-infectious gastrointestinal diseases (28 cases) included acute gastroenteritis – 13, inguinal hernia – 5, appendicitis – 4, other – 6. Thanks to the availability of microbiological diagnostic procedures, it was possible to identify a number of contagious diseases (12 cases), among which gastrointestinal infections caused by enterotoxigenic *Escherichia coli* prevailed.

## Discussion

Military service in peacekeeping and stabilization missions carried out in extreme environmental conditions is burdened with a number of risk factors, which increase the incidence of diseases and injuries [3]. Increased morbidity and traumatism are associated with the effects of



**Figure 1.** Incidence of diseases and injuries among Polish peacekeepers serving in UNIFIL (n = 6,000), hospitalized (n = 457) in the period 1992–2001  
Source: PMC Lebanon. Own studies

**Rycina 1.** Występowanie chorób i obrażeń ciała wśród polskich żołnierzy pełniących służbę w UNIFIL (n = 6 000), leczonych szpitalnie (n = 457) w latach 1992–2001

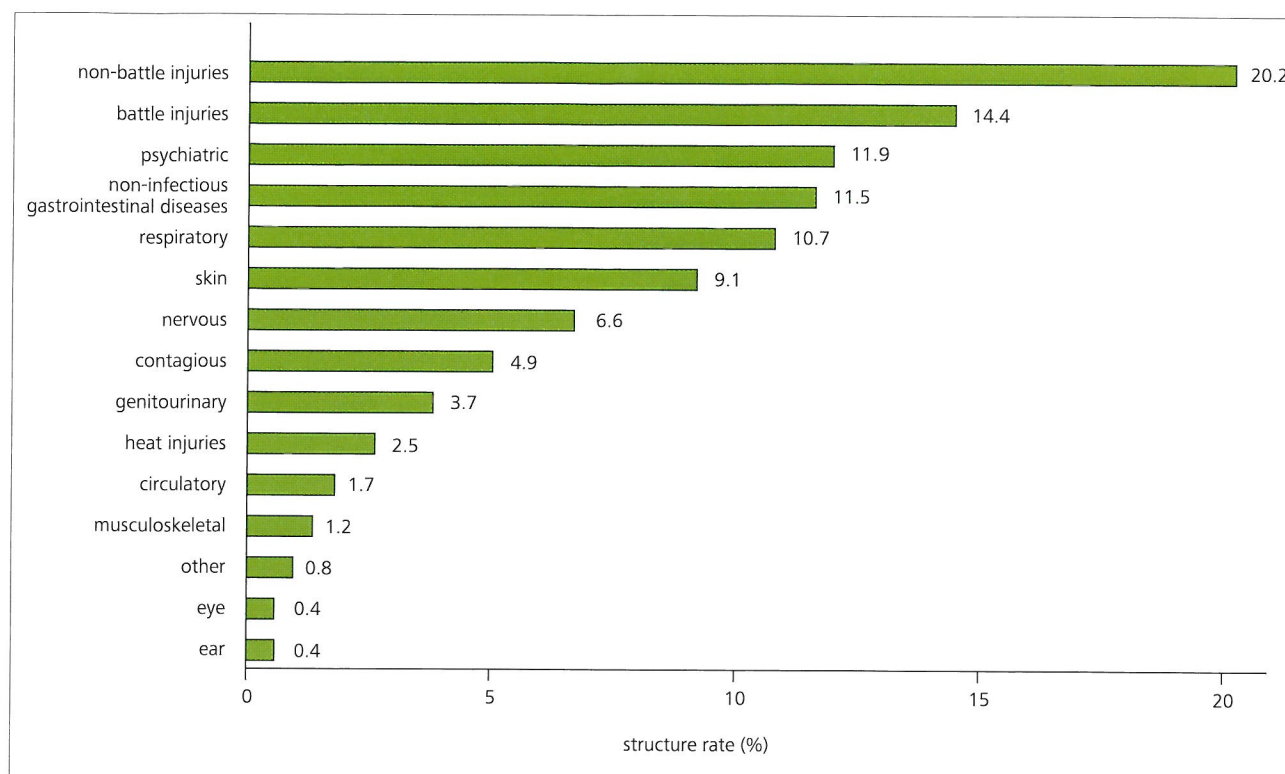
**Table 1.** Incidence of diseases and injuries among Polish peacekeepers serving in UNIFIL (n = 6,000), hospitalized (n = 457) in the period 1992–2001

**Tabela 1.** Występowanie chorób i obrażeń ciała wśród polskich żołnierzy pełniących służbę w UNIFIL (n = 6 000), leczonych szpitalnie (n = 457) w latach 1992–2001

Diseases & injuries	Military personnel of PMC Lebanon Hospital treatment (n = 457)		
	Number of cases	Structure rate [%]	Intensity rate (per 100 persons)
non-infectious gastrointestinal diseases	96	19.0	1.60
non-battle injuries	83	16.4	1.38
respiratory	66	13.1	1.10
contagious & parasitic	52	10.3	0.87
psychiatric	41	8.1	0.68
circulatory	39	7.7	0.65
nervous	38	7.5	0.63
genitourinary	35	6.9	0.58
skin	28	5.6	0.47
musculoskeletal	17	3.4	0.28
ear	5	1.0	0.08
eye	4	0.8	0.07
battle injuries	1	0.2	0.02
total	505	100.0	8.41

Source: PMC Lebanon. Own studies





**Figure 2.** Incidence of diseases and injuries among Polish soldiers serving in Iraq ( $n = 4,800$ ), hospitalized ( $n = 222$ ) in the period October 2003–June 2004  
Source: PMC Iraq. Own studies

**Rycina 2.** Występowanie chorób i obrażeń ciała wśród polskich żołnierzy pełniących służbę w Iraku ( $n = 4\,800$ ), leczonych szpitalnie ( $n = 222$ ) w okresie 10.2003–06.2004

such environmental factors as considerable differences between cultures and people, ongoing hostilities, changeable weather conditions, unsatisfactory standards of hygiene and sanitation in the areas of deployment [4]. Cultural differences arouse the feeling of alienation among a closed military community, while combat operations result in the occurrence of mental disorders and battle injuries [5,6]. Low level of hygiene and sanitation increases the incidence of infectious and non-infectious gastrointestinal diseases [7]. Diarrheas of bacterial or protozoan etiology are extremely common among military personnel relocated to hot climate areas. Diarrheal diseases are considered the most annoying health problem among service personnel deployed to overseas operations; they are diagnosed in approx. 40–50% of all soldiers [8]. The highest risk of developing gastrointestinal disorders occurs in the Third World, especially in the Middle East, Africa and Southeast Asia [9]. Gastrointestinal disorders typically occur within the first month of deployment to a new post. The most common etiological factor is enterotoxigenic *Escherichia coli* (30–70% of all cases). The etiological factor in approx. 20–30% of the diagnosed gastrointestinal disorders is not known (negative microbiological tests) [10]. Another serious health problem identified

in the population of military personnel is stress associated with the execution of mandated tasks. Other important factors, which contribute to the occurrence of mental disorders, apart from the escalation of an armed conflict, are professional relationships (conflicts with superiors or subordinates, inability to execute assigned duties) and social relationships (differences in age, education and worldview) among participants of a military mission. It has been reported that untreated mental stress develops into a chronic disorder and may manifest itself in the form of neurotic or psychosomatic disorders, depressive reactions or personality change [11]. The major health problem, however, which is reported in the population of service members deployed to a military operation in a combat zone, is high incidence of injuries; wounds sustained in combat, injuries suffered while carrying out assigned duties (traffic accidents) or activities not connected with military service (sports injuries) [12,13].

## Conclusions

The incidence of diseases in the group of Polish soldiers serving in the UN peacekeeping mission in Lebanon was

**Table 2. Incidence of diseases and injuries among Polish soldiers serving in Iraq (n = 4,800), hospitalized (n = 222) in the period October 2003 – June 2004****Tabela 2. Występowanie chorób i obrażeń ciała wśród polskich żołnierzy pełniących służbę w Iraku (n = 4 800), leczonych szpitalnie (n = 222) w okresie 10.2003–06.2004**

Diseases & Injuries	Military personnel of PMC Iraq Hospital treatment (n = 222)		
	Number of cases	Structure rate [%]	Intensity rate (per 100 persons)
non-battle injuries	49	20.2	1.02
battle injuries	35	14.4	0.73
psychiatric	29	11.9	0.61
non-infectious gastrointestinal diseases	28	11.5	0.58
respiratory	26	10.7	0.54
skin	22	9.1	0.46
nervous	16	6.6	0.33
contagious	12	4.9	0.25
genitourinary	9	3.7	0.19
heat injuries	6	2.5	0.13
circulatory	4	1.7	0.08
musculoskeletal	3	1.2	0.06
other	2	0.8	0.04
eye	1	0.4	0.02
ear	1	0.4	0.02
total	243	100.0	5.06

Source: PMC Iraq. Own studies

directly associated with the effects of environmental factors, low standards of sanitation in the areas of deployment and common disregards of basic principles of health prevention (contagious diseases, gastrointestinal and respiratory tract diseases). Numerous injuries were an effect of sports activities or traffic accidents. A high number of military personnel were hospitalized due to mental disorders, and a considerable number of soldiers required hospital treatment for alcohol poisoning. This fact raises the question whether Polish military personnel had been carefully screened before beginning overseas service in a peacekeeping mission, during which duty-related stress factors are a marginal phenomenon in comparison to stress factors observed during a military operation carried out in a theater of war. The problem of battle injuries in the PMC Lebanon within the analyzed period was practically non-existent (only 1 case in 10 years). The disease structure reported in the group of Polish soldiers engaged in the combat mission in Iraq was entirely different. Prevailing health problems in soldiers hospitalized in the Medical Support Group were injuries (battle and non-battle) and mental disorders strictly connected with duties in a warfare zone.

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