

# Prevalence of infectious diseases in the population of United Nations soldiers in Lebanon

Krzysztof Korzeniewski

Military Institute of Health Service

Department of Epidemiology and Tropical Medicine, Gdynia, Poland

## ABSTRACT

### Aim of the study

This article aims to outline the prevalence of contagious diseases in the population of soldiers deployed within the United Nations Interim Force in Lebanon (UNIFIL). The risk factors which influence the incidence of infectious diseases are discussed and particular attention is paid to environmental factors.

### Material and Methods

The material of this retrospective study derived from medical records of 2,054 soldiers of various nationalities treated in the UNIFIL Hospital within the years 1993-2000. The clinical examination of patients was complete and the results were subjected to statistical and epidemiological analysis.

### Results

Contagious and parasitic diseases accounted for 10.6% of all hospitalizations within the analyzed period. It was demonstrated that among all patients hospitalized in the United Nations Hospital in Lebanon salmonellosis (55 cases, mainly soldiers of the Irish nationality) and staphylococcal food poisoning (31 cases, mainly Polish soldiers) were the most commonly occurring health problems; this was undoubtedly connected with an outbreak of an epidemic in military contingents. Among parasitic diseases helminthiasis of gastrointestinal tract (51 cases, partly multiple infestations, mainly soldiers of the Nepalese nationality) prevailed.

### Conclusions

A surge in the prevalence of infectious diseases resulted from mass food poisoning in the Irish (1996), and the Polish (1998) contingents. Moreover, infestation of the digestive tract, especially in the Nepalese contingent, posed a considerable health hazard. Except for cases of the afore-said illnesses the epidemiological situation of UNIFIL from 1993 to 2000 can be regarded as satisfactory, which was mainly due to effective work of sanitary services of the UN mission.

**Key words:** infectious disease, communicable disease, soldiers, United Nations, Lebanon

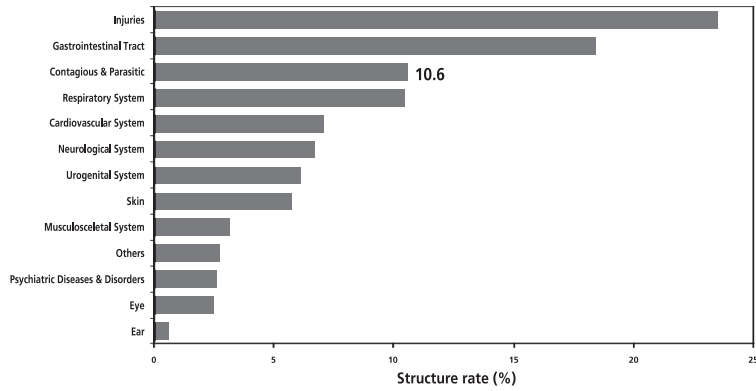
## INTRODUCTION

In recent decades an escalation of armed conflicts has been observed in Asia, particularly in the Middle East and Central Asia. Interventions of international organizations have led to an establishment of a series of peacekeeping and stabilization missions. The UN and NATO military contingents consist of soldiers coming from different countries and different continents. Each region of the deployment of Multi-National Forces has its own specific characteristics. A many-thousand population of soldiers, who represent a group of immigrants, are temporarily deployed in the territory of a country characterized by environmental conditions different to the ones prevailing in their home countries. The population of peacekeepers differs considerably in many respects. Common existence of representatives of different races, religions and nationalities, people of different culture, habits and attitude towards personal hygiene, feeding and accommodation all contribute to an increased occurrence of various contagious and parasitic diseases.<sup>1,2</sup> There is a clear correlation between increasing incidence of infectious diseases and disregard of basic principles of hygiene and prophylaxis, aimed at reducing the risk of falling ill.<sup>3,4</sup> Issues concerning prophylaxis gain particular importance in hot climate areas.

The major risk factors which influence morbidity rates and prevalence of diseases in hot climate areas are high temperatures, humidity, poor sanitary and hygienic standards of a region, especially low standards of public sanitation, lack of safe sources of drinking water or domestic sewage treatment facilities as well as widespread use of excrement as manure to irrigate cultivated fields. The factors mentioned above influence both the occurrence of endemic infectious and parasitic diseases and also increase the risk of cosmopolitan infectious diseases.<sup>5</sup>

Apart from water- and food-borne diseases, which pose a major epidemiological threat, particular attention should be paid to other ways of transmission, among which respiratory, vector-borne illnesses and sexually transmitted diseases are the centre of attention of sanitary services.<sup>6</sup> Regions such as the Middle East and the peacekeeping mission in Lebanon, where thousands of UNIFIL (United Nations Interim Force in Lebanon) soldiers have been deployed, require expertise in

**Corresponding author:** Lt. Col. Krzysztof Korzeniewski MD, PhD  
Military Institute of Health Service  
Department of Epidemiology and Tropical Medicine  
Grudzińskiego St. 4  
81-103 Gdynia 3, Poland  
E-mail: kktropmed@wp.pl



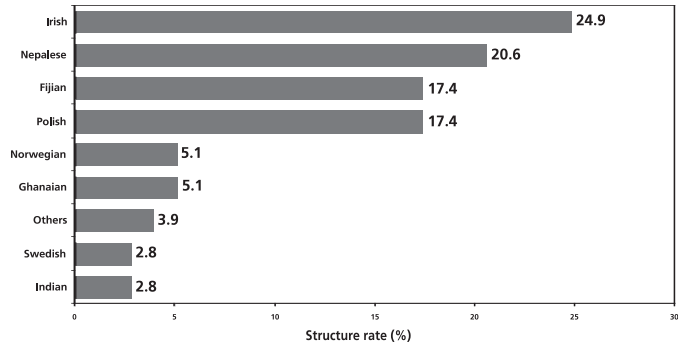
Source: UNIFIL. Own studies.

Figure 1. Prevalence of diseases and injuries in the population of soldiers treated in UNIFIL Hospital from 1993 to 2000 (N = 2054).

**TABLE 1 - Prevalence of contagious and parasitic diseases in the population of soldiers treated in UNIFIL Hospital from 1993 to 2000 (N = 253)**

Year of examination	Number of all admissions	Contagious & parasitic diseases	
		Number of cases	Structure rate [%]
1993	333	74	29.2
1994	359	37	14.6
1995	248	13	5.2
1996	310	56	22.1
1997	208	15	5.9
1998	220	36	14.3
1999	202	16	6.3
2000	174	6	2.4
<b>Total</b>	<b>2054</b>	<b>253</b>	<b>100.0</b>

Source: UNIFIL. Own studies.



Source: UNIFIL. Own studies.

Figure 2. Prevalence of contagious and parasitic diseases in the population of soldiers treated in UNIFIL Hospital from 1993 to 2000 according to nationality (N = 253).

**TABLE 2 - Prevalence of contagious and parasitic diseases in the population of soldiers treated in UNIFIL Hospital from 1993 to 2000 according to nationality (N = 253).**

Nationality	Number of all admissions	Contagious & parasitic diseases	
		Number of cases	Structure rate [%]
Irish	406	63	24.9
Nepalese	293	52	20.6
Polish	379	44	17.4
Fijian	363	44	17.4
Norwegian	156	13	5.1
Ghanaian	155	13	5.1
Others	232	9	3.9
Indian	47	7	2.8
Swedish	23	7	2.8
<b>Total</b>	<b>2054</b>	<b>253</b>	<b>100.0</b>

Source: UNIFIL. Own studies.

the existing risks and preventive medicine procedures which could put a stop to the occurrence and spread of infectious diseases, particularly within the domain of importing disease entities to home countries. The subject matter mentioned above is one of the primary tasks to be dealt with by medical services of military missions in the world.<sup>7</sup>

The aim of this article is to assess the prevalence of infectious diseases in the population of soldiers of different nationalities treated in the Hospital of the United Nations Interim Force in Lebanon. Much attention has been paid to the frequency of incidence of the afore-mentioned diseases and the morbidity structure. Risk factors influencing the incidence of contagious and parasitic diseases, including environmental factors, have been discussed.

## MATERIAL AND METHODS

Upon compiling the epidemiological analysis of infectious diseases occurring in the examined population of soldiers treated in the Hospital of United Nations Interim Force in Lebanon the data included in hospital documentation were used. The conducted analysis was based on medical records of 2.054 patients of different nationalities treated from 1993 to 2000. This retrospective study was designed to determine the rate of morbidity, the rate of transmission dynamics on constant and inconstant bases and the rate of morbidity structure of the studied group.

The examined population was selected out of 38.434 people, military personnel of particular contingents, in the UNIFIL service from 1993 to 2000. The composition of the studied population was random. In total 2.054 soldiers in the UNIFIL service were hospitalized in the UN Hospital in Lebanon from 1993 to 2000. Each of the soldiers treated in the UNIFIL Hospital within the given period was subjected to complete clinical examination, epidemiological and statistical assessment.

The Chi-square test was used to look at the statistical significance of the obtained results. p values <0.05 were considered significant.

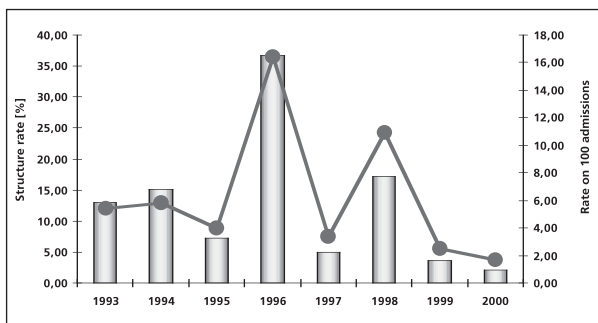
## RESULTS

Contagious and parasitic diseases accounted for 10.6% of all health problems treated within the analyzed period (Figure 1, Table 1). The groups of the most frequently hospitalized patients were those of Irish, Nepalese, Fijian and Polish nationalities (Figure 2, Table 2).

### Contagious diseases

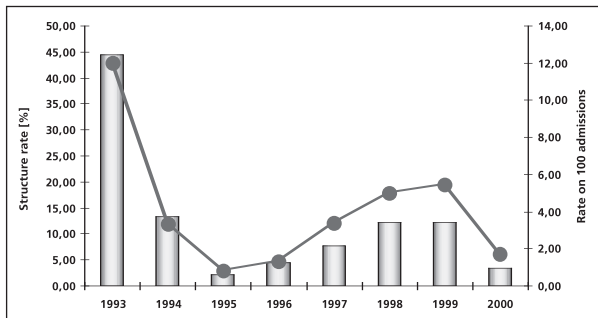
Contagious diseases accounted for 5.8% of all hospitalizations (139 patients) from 1993 to 2000. The highest rate of morbidity structure within the analyzed period was registered in 1996 and it was estimated at 36.7%. The highest rate of morbidity on 10.000 soldiers in the studied population was also noted in 1996 and it was estimated at 16.5 (Figure 3). The analysis of the rate of transmission dynamics on constant basis demonstrated that prevalence of contagious diseases decreased by 68.1% in relation to 1993. The highest growth in morbidity occurred in 1996 (rate of transmission dynamics on inconstant basis 408.0). Prevalence of contagious diseases within the analyzed period had been decreasing, on average, by 15.1% annually (Table 3).

The morbidity of contagious diseases is illustrated in Table 4. Cases of salmonellosis, staphylococcal food poisoning and viral hepatitis A and B were the most frequent causes of hospitalizations. Other contagious diseases treated within the



Source: UNIFIL. Own studies.

Figure 3. Morbidity of contagious diseases in the population of soldiers treated in UNIFIL Hospital from 1993 to 2000 (N = 139).



Source: UNIFIL. Own studies.

Figure 4. Morbidity of parasitic diseases in the population of soldiers treated in UNIFIL Hospital from 1993 to 2000 (N = 90).

studied period were, among other things, tuberculosis (6 cases), angina (8 cases), shigellosis (5 cases), herpes varicella (5 cases), and mononucleosis (5 cases).

The growth in incidence of contagious diseases which was observed in the population of the UNIFIL soldiers in 1996 and 1998 resulted from mass food poisoning. An outbreak of salmonellosis was reported in the Irish contingent in 1996. The etiological factor was Salmonella enteritidis. While in 1998 mass staphylococcal food poisoning was reported in the Polish contingent. The etiological factor was staphylococcal enterotoxin. As a result of an efficient and proper application of anti-epidemic procedures by health services of particular contingents (level 1) and UNIFIL Hospital (level 2) individual elements of the epidemiological chain were quickly eliminated.

### Parasitic diseases

Parasitic diseases accounted for 3.8% of all hospitalizations (90 people) within the therapeutic district of the United Nations Interim Force in Lebanon from 1993 to 2000. The highest rate of morbidity structure within the studied period was registered in 1993 and it was estimated at 44.4%. The highest rate of morbidity on 10.000 soldiers in the studied population was noted in 1993 and it was estimated at 76.2. The highest rate of morbidity on 100 hospitalized patients was also registered in 1993 and it was estimated at 12.0 (Figure 4). The analysis of the rate of transmission dynamics on constant basis indicated that prevalence of parasitic diseases within the analyzed period decreased by 85.65% in relation to 1993. The highest growth in morbidity occurred in 1997 (the rate of

Year of examination	Number of all admissions	Number of contagious cases	Structure rate [%]	Rate on 10.000 soldiers	Rate on 100 admissions	Rate of dynamics on the basics	
						constant [%]	inconstant [%]
1993	333	18	12.9	34.3	5.4	100.0	-
1994	359	21	15.1	41.1	5.8	108.2	108.2
1995	248	10	7.2	20.4	4.0	74.6	68.9
1996	310	51	36.7	109.6	16.5	304.6	408.0
1997	208	7	5.0	15.6	3.4	62.6	20.6
1998	220	24	17.3	53.6	10.9	201.8	324.2
1999	202	5	3.6	11.1	2.5	45.8	22.7
2000	174	3	2.2	5.6	1.7	31.9	69.7
<b>Total</b>	<b>2054</b>	<b>139</b>	<b>100.0</b>	<b>35.9</b>	<b>6.8</b>	<b>Geometrical mean g=84.9%</b>	

Source: UNIFIL. Own studies.

Year of examination	Contagious diseases	Salmonellosis	Staphylococcal food poisoning	Viral hepatitis	Others
1993	18	4	4	0	10
1994	21	3	8	4 (type A, B)	6
1995	10	2	1	3 (type A, B)	4
1996	51	45	0	4 (type A)	2
1997	7	1	0	1 (type A)	5
1998	24	0	17	2 (type A)	5
1999	5	0	1	1 (type A)	3
2000	3	0	0	2 (type B)	1
<b>Total</b>	<b>139</b>	<b>55</b>	<b>31</b>	<b>17</b>	<b>36</b>

Source: UNIFIL. Own studies.

**TABLE 5 - Morbidity of parasitic diseases in the population of soldiers treated in UNIFIL Hospital from 1993 to 2000 (N = 90)**

Year of examination	Number of all admissions	Number of parasitic cases	Structure rate [%]	Rate on 10.000 soldiers	Rate on 100 admissions	Rate of dynamics on the basics	
						constant [%]	inconstant [%]
1993	333	40	44.5	76.2	12.0	100.0	-
1994	359	12	13.3	23.5	3.3	27.8	27.8
1995	248	2	2.2	4.1	0.8	6.7	24.1
1996	310	4	4.5	8.6	1.3	10.7	160.0
1997	208	7	7.8	15.6	3.4	28.0	260.8
1998	220	11	12.2	24.6	5.0	41.6	148.9
1999	202	11	12.2	24.4	5.4	45.3	108.9
2000	174	3	3.3	5.6	1.7	14.4	31.7
<b>Total</b>	<b>2054</b>	<b>90</b>	<b>100.0</b>	<b>23.2</b>	<b>4.4</b>	<b>Geometrical mean g=75.8%</b>	

Source: UNIFIL. Own studies.

**TABLE 6 - Structure of contagious diseases in the population of soldiers treated in UNIFIL Hospital from 1993 to 2000 (N = 139)**

Year of examination	Parasitic diseases	Trichuriasis	Ancylostomiasis	Giardiasis	Ascariasis	Strongyloidosis
1993	40	7	10	8	1	0
1994	12	2	4	2	0	1
1995	2	0	0	0	0	0
1996	4	0	0	1	0	0
1997	7	0	0	4	0	0
1998	11	0	0	0	1	7
1999	11	2	0	0	1	2
2000	3	0	0	0	1	0
<b>Number of patients</b>	<b>90</b>	<b>11</b>	<b>14</b>	<b>15</b>	<b>4</b>	<b>10</b>
<b>Number of infestations (partly multiple)</b>	<b>123</b>	<b>21</b>	<b>20</b>	<b>18</b>	<b>11</b>	<b>10</b>

Source: UNIFIL. Own studies.

**TABLE 7 - Structure of parasitic diseases in the population of soldiers treated in UNIFIL Hospital from 1993 to 2000 (N = 90)**

Year of examination	Parasitic diseases	Trichostrongylosis	Necatorosis	Amebiasis	Malaria	Others
1993	40	2	5	3	2	2
1994	12	0	0	1	0	2
1995	2	0	1	0	0	1
1996	4	0	0	1	1	1
1997	7	0	0	0	1	2
1998	11	1	0	2	0	0
1999	11	3	0	0	0	3
2000	3	0	0	0	0	2
<b>Number of patients</b>	<b>90</b>	<b>6</b>	<b>6</b>	<b>7</b>	<b>4</b>	<b>13</b>
<b>Number of infestations (partly multiple)</b>	<b>123</b>	<b>10</b>	<b>8</b>	<b>7</b>	<b>4</b>	<b>14</b>

Source: UNIFIL. Own studies.

**TABLE 8 - Morbidity of venereal diseases in the population of soldiers treated in UNIFIL Hospital from 1993 to 2000 (N = 24).**

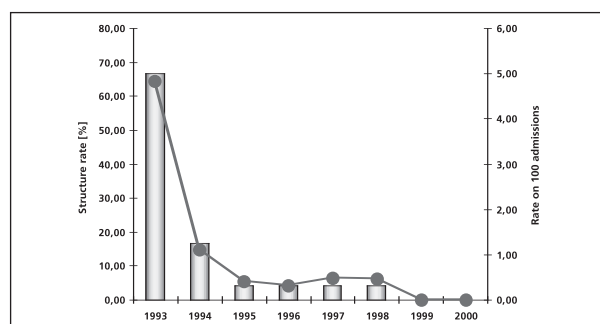
Year of examination	Venereal diseases						
	Number of all admissions	Number of venereal cases	Structure rate [%]	Rate on 10.000 soldiers	Rate on 100 admissions	Rate of dynamics on the basics	
						constant [%]	inconstant [%]
1993	333	16	66.6	30.5	4.8	100.0	-
1994	359	4	16.6	7.8	1.1	23.2	23.2
1995	248	1	4.2	2.0	0.4	8.4	36.2
1996	310	1	4.2	2.1	0.3	6.7	80.0
1997	208	1	4.2	2.2	0.5	10.0	149.0
1998	220	1	4.2	2.3	0.5	9.5	94.5
1999	202	0	0.0	0.0	0.0	0.0	0.0
2000	174	0	0.0	0.0	0.0	0.0	-
<b>Total</b>	<b>2054</b>	<b>24</b>	<b>100.0</b>	<b>6.2</b>	<b>1.2</b>	-----	

Source: UNIFIL. Own studies.

**TABLE 9 - Structure of contagious diseases in the population of soldiers treated in UNIFIL Hospital from 1993 to 2000 (N = 139)**

Year of examination	Venereal diseases	Gonorrhea	Lues	Genital warts	AIDS
1993	16	12	2	1	0
1994	4	0	2	1	0
1995	1	0	0	0	1
1996	1	0	0	0	1
1997	1	0	1	1	0
1998	1	0	1	1	0
1999	0	0	0	0	0
2000	0	0	0	0	0
<b>Total</b>	<b>24</b>	<b>12</b>	<b>6</b>	<b>4</b>	<b>2</b>

Source: UNIFIL. Own studies.



Source: UNIFIL. Own studies.

**Figure 5. Morbidity of venereal diseases in the population of soldiers treated in UNIFIL Hospital from 1993 to 2000 (N = 24).**

transmission dynamics on inconstant basis 260.8). The prevalence of parasitic diseases within the analyzed period had been decreasing, on average, by 24.2% annually (Table 5).

The morbidity of parasitic diseases in the studied population is illustrated in Tables 6 and 7. Both simple parasitic invasions (1 patient - 1 parasite) as well as complex parasitic invasions (invasion of 2 or more parasites in 1 patient) were found in the population of the 90 patients hospitalized in the UNIFIL Hospital, in the study period. The latter were mainly diagnosed in soldiers of the Nepalese contingent (95% of all cases). The cases involved predominantly parasites of the digestive tract: *Trichuris trichiura*, *Ancylostoma duodenale*, *Ascaris lumbricoides*, *Necator americanus*, *Giardia intestinalis*.

In total, 123 cases of parasitic invasion were diagnosed. The groups of the most frequently hospitalized patients were those suffering from giardiasis, ancylostomiasis and trichuriasis. Additionally, it is remarkable that medical services of some countries participating in the UNIFIL mission did not undertake any prophylactic action. Soldiers of the Nepalese contingent did not undergo a parasitological examination of faeces in their home country prior to their arrival into the operational zone of the mission in Lebanon and it was precisely the military personnel from Nepal who were the main source of parasitic invasion in the UNIFIL.<sup>3</sup>

### Sexually transmitted diseases

Sexually transmitted diseases (24 people) accounted for 1.2% of all hospitalizations from 1993 to 2000. The highest rate of morbidity structure within the analyzed period was recorded in 1993 and it was estimated at 66.6%; whereas in 1999 and 2000 not a single case of a venereal disease was treated in the UNIFIL Hospital. Thus, the rate of transmission dynamics could not have been determined (Table 8). The highest rate of morbidity on 10.000 soldiers in the studied population (30.5) and the highest rate of morbidity on 100 hospitalized patients (4.8) was recorded in 1993 (Figure 5).

The morbidity of sexually transmitted diseases is illustrated in Table 9. Cases of STD posed a serious epidemiological problem from 1992 to 1994 (over 80% of all cases treated in the

TABLE 10 - Occurrence of infectious diseases in Lebanon in 1998-1999.

Diseases	Country region						Total
	Beirut	Mount Lebanon	North Lebanon	South Lebanon	Bekaa Valley	Nonspecific cases	
Shigellosis	12	74	43	283	97	33	544
Salmonellosis/ staphylococcal food poisoning	20	95	215	26	59	12	421
Viral hepatitis A	51	84	197	93	46	25	519
Viral hepatitis B	126	97	24	253	83	296	879
Viral hepatitis C	11	22	8	43	6	48	138
Typhoid fever/ paratyphoids	61	120	899	231	254	106	1671
Tuberculosis	44	57	29	122	13	44	309
Measles	27	35	771	145	5	23	1006
Pertussis	5	5	7	4	10	0	31
Tetanus	2	3	2	0	0	1	8
Rubeola	0	0	8	7	3	0	18
Mumps	27	37	24	22	3	8	115
Meningitis	10	26	25	25	30	13	129
Brucellosis	20	51	74	51	252	29	477
Rabies	0	0	0	0	1	0	1
Epidemic typhus	5	8	9	1	4	4	31
Malaria	18	25	6	23	7	9	88
Leishmaniasis	0	0	1	0	0	0	1
Bilharziasis	0	0	0	0	0	3	3
HIV/AIDS	0	0	0	0	0	0	No data
Syphilis	24	7	1	10	0	34	76
Gonorrhea	0	1	1	1	0	1	4

Source: Ministry of Health. Lebanese Epidemiological Newsletter, Lebanon 2000;7

UNIFIL Hospital). In the following years venereal diseases were a side issue and within the years 1999-2000 not a single patient diagnosed with STD was hospitalized. Most cases of venereal diseases were diagnosed in patients of the Swedish nationality (Swedish contingent terminated its service in the UNIFIL in 1994). The most frequently treated disease in this group within the studied period was gonorrhoea (50.0% of cases). Cases of AIDS, diagnosed and treated in the UNIFIL Hospital, had been imported from home countries of soldiers deployed in Lebanon (Ghana, Ireland).

## DISCUSSION

Expertise in the epidemiological situation in Lebanon is drawn from dissertations of epidemiologists employed in medical academies, especially at the American University of Beirut as well as reports prepared by specialists commissioned by the World Health Organization and the World Bank. The epidemiological research conducted in Lebanon indicates that the prevalence of infectious diseases in this country does not deviate very much from the one registered in economically-developed countries.<sup>8</sup>

Table 10 illustrates cases of the most commonly occurring infectious diseases in the population of the Lebanese people from 1998 to 1999.<sup>9</sup> It is notable that there are no official data on the occurrence of AIDS or HIV infections in this table. This fact does not signify that no cases of the disease occur in

Lebanon but rather it indicates that the disease is deliberately concealed from the family and public opinion, which in a Muslim country such as Lebanon would surely ostracize the diseased and condemn them to strict isolation. This, in turn, results in a fact that doctors willing to protect their patients against public condemnation do not report information of the disease to sanitary services. Thus, the exact number of AIDS and HIV infected is hard to be determined.<sup>10</sup> The number of HIV infections was estimated at 529 (including 147 people suffering from AIDS) in a report issued by the Department of Preventive Medicine at the Lebanese Ministry of Public Health in 2000. The most common cause of the disease or its carrier state was sexual intercourse (71.9% of all cases).<sup>11</sup>

Reports on prevalence of infectious diseases subjected to compulsory vaccination according to the WHO's schedule are also worth mentioning. From 1998 to 1999 the incidence of measles and viral hepatitis B was considerable. Prevalence of tetanus and pertussis did not pose any epidemiological hazards; no cases of diphtheria or poliomyelitis have been reported within the given period.<sup>9</sup> Furthermore, a considerable number of food- and water-borne diseases (typhoid fever/paratyphoids, shigellosis, salmonellosis, staphylococcal food poisoning, viral hepatitis A) need to be pointed out. High incidence of the afore-said diseases was undoubtedly influenced by unsatisfactory sanitary-hygienic living standards of people, neglect of basic personal hygiene principles along with princi-

ples of water and feeding hygiene, and underdeveloped public health service.

Further causes of high incidence of infectious diseases in the Lebanese population are as follows: growth in rural-urban migration, overpopulation in poor districts and refugee camps, disregard of sanitary principles in the process of dumping human and industrial waste.<sup>12</sup> Until recently the Lebanese Ministry of Public Health did not possess any guidelines regarding food and feeding standards. There were no food-testing laboratories supervised by the government. Such negligence resulted in the fact that food-stuffs rejected by countries of fixed sanitary standards were sold in the uncontrolled Lebanese market.<sup>13</sup>

In the 1990s laboratory research into diagnostics of parasitic diseases was conducted in two Lebanese medical centers. Parasitic diseases were observed in 8.5% out of 33,253 people examined at the American University in Beirut. Complex parasitic infections were diagnosed in 8.8% of cases. The most commonly diagnosed invasive diseases were giardiasis (20.7%), amebiasis (19.4%), taeniasis (6.0%) and ascariasis (2.1%). Whereas in the Muslim Hospital in Tripoli parasitic diseases were observed in as much as 45.3% of the examined population. Complex parasitic infections were diagnosed in 3.5% of cases. The most frequently diagnosed parasitoses were ascariasis (46.0%), giardiasis (10.5%), and taeniasis (4.1%).<sup>14</sup>

It is remarkable that only several decades ago malaria posed a considerable health hazard for the Lebanese people. At present, following liquidation of the disease's endemic focus in the 1960s, only a few imported cases of malaria have been registered. They mainly occur in people arriving into Lebanon from areas where malaria is endemic, especially from West Africa.<sup>3</sup> Low sanitary-hygienic and epidemiological standards in the region where the United Nations Interim Force in Lebanon have been deployed are decidedly the most important factors influencing the prevalence and morbidity of infectious diseases. Major problems relate to difficulty in maintaining high hygienic standards of food-processing sections and sanitary facilities. Technical condition of buildings intended for kitchens and canteens is poor. Rodents and insects (especially cockroaches) can be found in kitchens and warehouses. All these issues determine the occurrence of food poisoning and parasitic invasions. Faulty construction or damages in sewage and plumbing systems lead to environmental pollution. Despite strict regulations which prohibit breeding animals, UNIFIL soldiers keep cats and dogs at military posts, which due to contact with wild or domesticated animals, remain a serious source of animal-borne diseases.<sup>13</sup>

Admittedly, sanitary requirements are the same for contingents of all nationalities, however, some cultural and national

differences can be observed. The concept of high-standard hygiene is not only interpreted differently, but also put into practice by means of different methods, especially in the population of soldiers coming from Asia and Oceania. Their daily routines, accommodation, methods of food storage and food processing or use of sanitary facilities are all culturally determined and they differ significantly from commonly accepted European standards. These are the reasons why the execution of obligatory sanitary regulations by supervising sanitary inspectors meets with obstacles.<sup>3</sup>

## ACKNOWLEDGEMENTS

The author of the article thanks the Force Medical Officer of UNIFIL Headquarters and the Commanding Officer of UNIFIL Hospital for the providing the used data and for giving the permission to publish the results of the study.

## REFERENCES

1. Korzeniewski K. *Soldier's Handbook. Lebanon.* Warszawa: PPH Zapol, 2005.
2. Korzeniewski K. *The Middle East. UNIFIL UNDOF. UN Peacekeeper's Handbook.* Bydgoszcz: STUDIO PLUS, 2006.
3. Korzeniewski K. *Epidemiological analysis of diseases and traumas among people treated in the United Nations Interim Force in Lebanon Hospital from 1993 to 2000.* Łódź, Doctoral dissertation, 2002.
4. Buczyński A, Kocur J, Kierznikowicz B. *Sanitary and mental protection of soldiers in UN peace missions.* In: Kierznikowicz B, Knap J (ed). *Health Service of the Polish Armed Forces in Peace Missions.* Warszawa: Eurostar Ltd, 2001.
5. Korzeniewski K, Olszański R. *Problems Concerning Preventive Medicine Among Representatives of Temperate Climate in the Tropics.* *Polish Journal of Environmental Studies* 2006;15(4b):87-90.
6. Korzeniewski K, Olszański R, Nowicki R. *Environmental Health Risk Factors Occurring in the Hot Climate, in Warfare Zone.* *Polish Journal of Environmental Studies* 2006;15(4b):81-86
7. Korzeniewski K. *Epidemiological analysis of stationary area of Polish soldiers serving in UN peace missions in the Middle East.* *Military Doctor* 2005;81(1):11-15.
8. Korzeniewski K. *Lebanon.* Warszawa: DIALOG, 2004.
9. Ministry of Health. *Lebanese Epidemiological Newsletter, Lebanon* 2000;7.
10. Zabielski S, Korzeniewski K. *Morbidity on venereal diseases in the population of people from catchment area of the Hospital of the United Nations Interim Force in Lebanon from 1993 to 2000.* *Military Doctor* 2003;79(1):39-43.
11. Kalaajieh WK. *Epidemiology of human immunodeficiency virus and acquired immunodeficiency syndrome in Lebanon from 1984 through 1998.* *International Journal of Infectious Diseases* 2000;4:209-213.
12. Buczyński A, Korzeniewski K, Dziedziczak-Buczyńska M. *Infectious diseases among persons from catchment area of the Hospital of the United Nations Interim Force in Lebanon from 1993 to 2000.* *Epidemiological Review* 2004;58:313-323.
13. Buczyński A, Korzeniewski K, Bzdega I, Jerominko A. *Epidemiological analysis of parasitic diseases in persons treated in the Hospital of the United Nations Interim Force in Lebanon from 1993 to 2000.* *Epidemiological Review* 2004;58:303-312.
14. Araj GF, Abdul-Baki NY, Hamze MM, Alami SY, Nassif RE, Naboulsi MS. *Prevalence and etiology of intestinal parasites in Lebanon.* *Le Journal Medical Libanais* 1996; 44(3):129-33.