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MILITARY PHYSICIAN

Scientific Journal of the Military Institute of Medicine
Published since 3 January 1920



**Carriage rate analysis of alert pathogens
imported to Poland by soldiers deployed in
Afghanistan and Kuwait**

Diving fitness health assessment

**Principles of safety, hygiene and good diving
practice**

**Press Articles about Military Hospitals in
Warsaw during the Polish-Soviet War of 1920**

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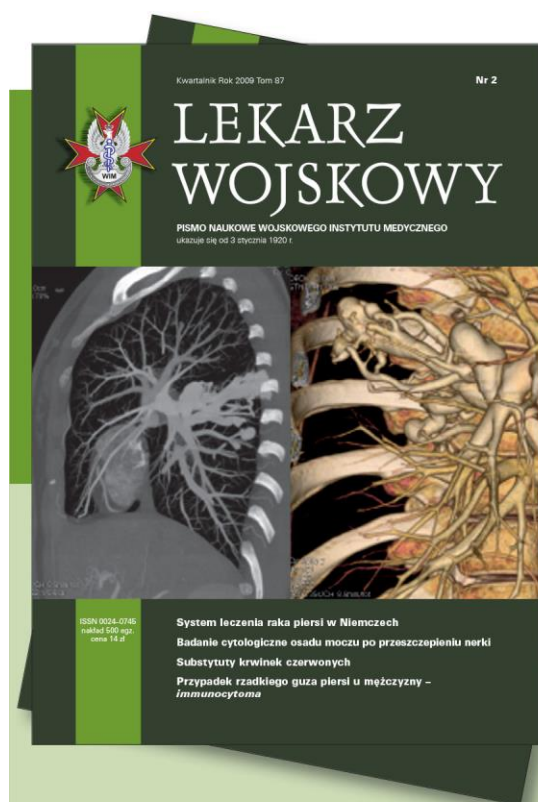
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Carriage rate analysis of alert pathogens transported to Poland by soldiers deployed in Afghanistan and Kuwait

Analiza nosicielstwa patogenów alarmowych zawlekanych do Polski przez żołnierzy stacjonujących w Afganistanie i Kuwejcie

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Department of Epidemiology and Tropical Medicine in Gdynia, Military Institute of Medicine in Warsaw; head: Col. Prof. Krzysztof Korzeniewski MD, PhD

Abstract The article discusses carriage rates of alert pathogens transmitted via the faecal-oral route and transported from other countries to Poland by soldiers deployed in Central Asia and the Middle East. The biological material (i.e. stool samples preserved in a transport medium) was collected from 441 soldiers serving in PMC Afghanistan and 76 soldiers serving in PMC Kuwait in 2018, and then tested in Poland for the presence of intestinal bacilli of the *Enterobacteriaceae* genus, non-fermenting intestinal bacilli, MRSA cocci and VRE. Among the soldiers serving in PMC Afghanistan, ESBL *Escherichia coli* presence was identified in as many as 308 individuals, ESBL *Klebsiella pneumoniae* in 2, ESBL *Enterobacter cloacae* in 1, KPC *Enterobacter cloacae* in 2 and *Citrobacter brakii* in 1. Among soldiers serving in PMC Kuwait, ESBL *Escherichia coli* presence was detected in 30 individuals, ESBL *Klebsiella pneumoniae* in 3 and KPC *Enterobacter cloacae* in 2. The high carriage rates of alert pathogens transmitted via the faecal-oral route in soldiers deployed on military operations to Afghanistan and Kuwait justify the necessity to extend the range of screening tests conducted on military personnel returning from an overseas mission.

Keywords: alert pathogens, carriage, Polish Military Contingents, soldiers

Streszczenie Cel. W pracy dokonano charakterystyki nosicielstwa patogenów alarmowych przenoszonych drogą pokarmową, zawlekanych do kraju przez polskich żołnierzy stacjonujących w Azji Centralnej i na Bliskim Wschodzie. Materiał i metody. Materiał biologiczny (kał na podłożu transportowym) został pobrany w 2018 r. od 441 żołnierzy PKW Afganistan oraz 76 żołnierzy PKW Kuwejt, a następnie zbadany w Polsce w kierunku nosicielstwa pałeczek jelitowych z rodziny *Enterobacteriaceae* i niefermentujących, ziarenkowców MRSA oraz VRE. Wyniki. Wśród żołnierzy PKW Afganistan nosicielstwo *Escherichia coli* z mechanizmem oporności ESBL wykryto aż u 308 osób, nosicielstwo *Klebsiella pneumoniae* z mechanizmem oporności ESBL u 2 osób, nosicielstwo *Enterobacter cloacae* z mechanizmem oporności ESBL u 1 osoby i KPC u 2 osób oraz *Citrobacter brakii* u 1 osoby. Wśród żołnierzy PKW Kuwejt nosicielstwo *Escherichia coli* z mechanizmem oporności ESBL wykryto u 30 osób, *Klebsiella pneumoniae* z mechanizmem ESBL u 3 osób oraz nosicielstwo *Enterobacter cloacae* z mechanizmem oporności KPC u 2 osób. Wnioski. Wysokie wskaźniki nosicielstwa patogenów alarmowych przenoszonych drogą pokarmową występujących u polskich żołnierzy stacjonujących w Afganistanie i Kuwejcie uzasadniają konieczność rozszerzenia panelu badań przesiewowych wykonywanych po powrocie ze służby poza granicami państwa.

Słowa kluczowe: patogeny alarmowe, nosicielstwo, żołnierze, Polskie Kontyngenty Wojskowe

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Introduction

Soldiers form one of the largest professional groups of Poles spending months under difficult conditions in a hot climatic zone. There are Polish Military Contingents located in Afghanistan and Iraq, for example, where studies conducted recently among local populations and newcomers (soldiers of the U.S. Armed Forces) demonstrated the transport of alert pathogens conducted via the faecal-oral route. Faecal-oral infections pose a serious challenge for epidemiologists, microbiologists and specialists in public health, as they are easily spread through the use of public utilities (toilets, canteens, restaurants) in military bases and in the natural environment of the local population in the countries of hot climatic zones, and, moreover, are transported by migrant populations to their home countries. At present, the most dangerous pathogens transmitted through the oral route include intestinal carbapenemase-producing bacilli (infections with these often result in a lack of therapeutic options), primarily of the *Enterobacteriaceae* genus, as well as non-fermenting bacilli producing carbapenemases in the following classes: class A - KPC enzymes (*Klebsiella pneumoniae* carbapenemase), class B - MBL (metallo- β -lactamases), including NDM (New Delhi metallo- β -lactamases), and class D - OXA-48 (oxacillinase). The group of intestinal bacilli classified as alert pathogens also includes bacteria producing extended-spectrum- β -lactamases (ESBL). In the cocci group, classified as alert pathogens, are vancomycin-resistant *Enterococcus* (VRE). The greatest number of alert pathogen carriers live in Asia and Africa, where up to 46% of the population are carriers (in Europe the rate is 3-6%, with an annual upward trend, while in both Americas the percentage is approximately 2%).^{1,2} The epidemiological situation regarding alert pathogens in Poland is monitored by the National Reference Centre for Drug Susceptibility of Microbes. The NDM mechanism poses the greatest problem related to drug resistance in our country, accounting for 53.7% of all the colonisations in patients reported in 2011-2016. The majority of isolated strains come from people travelling to Third World countries, as well as from hospitalised patients.³

The aim of the study was to characterise the carriage of alert pathogens transmitted via the oral route in PMC soldiers stationed in Central Asia (Afghanistan) and in the Middle East (Kuwait) in the context of spreading the infection to the home country.

Material and methods

Study group

Qualified for the study were soldiers of both sexes, aged 23 to 59 years old, stationed in the Polish Military Contingents in Central Asia (Afghanistan) and the Middle East (Kuwait) for 5-6 months, who provided a signed consent and completed documentation containing their personal data. The health status of the subjects was not an inclusion criterion. The biological material (stool in a transport medium) was collected from 441 soldiers serving in Afghanistan (7th and 8th PMC rotations) and 76 soldiers serving in Kuwait (4th PMC rotation) in 2018, and transported after 2-3 weeks on a Polish Armed Forces aeroplane to the Military Institute of Medicine in Warsaw for analysis. The research task "Analysis of the carriage rate of alert pathogens (CPE, ESBL, VRE) imported to Poland by long-term travellers (PMC soldiers) deployed in Afghanistan, Iraq and Kuwait" was approved by the Bioethical Committee of the Military Institute of Medicine (Resolution no. 71/WIM/2017 from 15/11/2017).

Laboratory diagnostics

The study task was based on stool diagnostics for the carriage of alert pathogens: *Enterobacteriaceae* intestinal bacilli and non-fermenting intestinal bacilli, MRSA (methicillin-resistant *Staphylococcus aureus*) cocci and VRE; intestinal colonisation was determined using classical microbiological methods. A stool from a sterile tube was cultured on CARBA, OXA-48, ESBL and VRE media, and incubated for 18-48 hours (following the manufacturer's recommendations) at $35 \pm 1^\circ\text{C}$. The bacterial colonies grown on CARBA, OXA-48 and ESBL media were isolated on MacConkey agar. The colonies from the VRE plate were isolated on blood agar with 5% of sheep blood, and incubated at $35 \pm 1^\circ\text{C}$ for 18 ± 2 hours. All phenotypical tests for the detection of resistance mechanisms were performed in accordance with the guidelines of the National Reference Centre for Drug Susceptibility of Microbes (KORDL).

Treatment of the strains suspected of carbapenemase production

Phenotypical tests with the use of antibiotic discs for carbapenemase production, following the KORDL algorithm (www.kordl.edu.pl) were conducted for the bacteria grown on CARBA medium. Each test was performed using Mueller-Hinton medium with a bacterial suspension of 0.5 McFarland in 0.9% NaCl. Determination of MBL carbapenemase was based on a test using discs saturated with EDTA (10 μg), ceftazidime (30 μg) and imipenem (10 μg). The EDTA disc was placed on a prepared plate with the bacterial suspension. The

antibiotic discs were placed on both sides of the EDTA disc, 2 cm apart. The incubation temperature was $35 \pm 1^\circ\text{C}$. The test was considered positive when a zone occurred and grew around the ceftazidime disc and/or the carbapenem disc on the side adjacent to the EDTA disc. Determination of KPC carbapenemase was based on a test using a disc with meropenem (10 µg) infused with 300 µg of phenyl boronic acid and incubated for 30 minutes at room temperature, as well as a disc with 10 µg of meropenem. The discs were placed at least 3 cm apart. The plates were incubated at $35 \pm 1^\circ\text{C}$ for 18 ± 2 hours. For the *Enterobacteriaceae* bacilli the test was considered positive if the diameter difference (increase) of the inhibition zone around the meropenem disc compared to the meropenem + phenyl boronic acid disc was at least 4 mm.

Detection of OXA-48 was performed using a disc with temocillin (30 µg) on Mueller-Hinton agar with bacterial suspension. The incubation conditions were similar to the previous tests. The test was considered positive and OXA-48 production was suspected if the diameter of the growth inhibition zone was ≤ 10 mm.

Treatment of the strains suspected of ESBL production

To detect extended-spectrum β -lactamases (ESBL) a double-disc synergy test (DDST) was used, following the guidelines of the National Reference Centre for Drug Susceptibility of Microbes (www.korid.edu.pl). Discs with ceftazidime (30 µg) and cefotaxime (30 µg) were placed on both sides of the disc with amoxicillin and clavulanic acid (20/10 µg), 2 cm apart. For strains characterised by a high expression of β -lactamase AmpC, a disc with cefepime (30 µg/g) was used, placed 2 cm over the disc with amoxicillin and clavulanic acid (20/10 µg) and/or a double-disc DDST test on Mueller-Hinton agar with cloxacillin (250 µg/ml) was performed. The incubation was conducted in the same manner as during the detection of carbapenemases. The test was considered positive (suggesting the presence of ESBL) when a clear, asymmetrical increase in the growth inhibition zone around the ceftazidime disc, cefotaxime disc or cefepime disc was visible from the side of the amoxicillin/clavulanic acid disc.

Treatment of the enterococci strains suspected of the VRE phenotype

The mechanism of *Enterococcus* spp. resistance to glycopeptides (VRE) was detected using E-tests with vancomycin and teicoplanin. The E-test plates were incubated for a full 24 hours at $35 \pm 1^\circ\text{C}$. Resistance to vancomycin following the EUCAST guidelines was considered to indicate the presence of a VRE mechanism. All the strains with a confirmed presence of

carbapenemase, ESBL or VRE phenotype were identified on the basis of biochemical properties, via an automated method with the use of Vitek system.

Statistical analysis

The statistical analysis was conducted using STATISTICA statistical package version 10.0 and Excel spreadsheet. The quantitative variables were characterised using arithmetic mean, minimal and maximal values (range). Quantitative variables were presented as numbers and percentage (rates). The significance level for all calculations was set at $p = 0.05$.

Results

The study involved 517 PMC soldiers serving on the 7th and 8th rotation in Afghanistan ($n = 441$), and on the 4th rotation in Kuwait ($n = 76$) for 5-6 months.

Among the 441 PMC Afghanistan soldiers, ESBL-producing *Escherichia coli* was found in as many as 308 soldiers, ESBL-producing *Klebsiella pneumoniae* in 2, ESBL-producing *Enterobacter cloacae* in 1, KPC-producing *Enterobacter cloacae* in 2, and *Citrobacter brakii* in 1. In 9 subjects two different phenotypes of ESBL-producing *E. coli* were found; strains of ESBL-producing *E. coli* and ESBL-producing *K. pneumoniae* were detected in one subject; ESBL-producing *E. coli* and ESBL-producing *C. brakii* were observed in one subject, and ESBL-producing *E. coli* ESBL and KPC-producing *E. cloacae* were found in 1 subject (Tab. 1).

Among the 76 soldiers serving in the PMC Kuwait, 30 soldiers were carriers of ESBL-producing *Escherichia coli*, (two phenotypically different strains of ESBL-producing *E. coli* in 3), 3 carried ESBL-producing *Klebsiella pneumoniae*, and 2 were carriers of KPC-producing *Enterobacter* (Tab. 2).

Discussion

At present, there are no reports on carriers of alert pathogens among Polish soldiers deployed abroad to regions characterised by increased risk of drug resistance, where sanitary conditions are poor, and the local population has limited access to healthcare institutions. In Kuwait, over 34% of all the carbapenem-resistant bacilli isolated from the local population were NDM-1 strains [4]. In 2011, in the U.S. Forces Hospital in Afghanistan, NDM-1 infection was observed in an Afghan patient with burn wounds. In 2013, NDM-1-positive *Proteus mirabilis* was found in an Afghan policeman with post-traumatic amputation of the lower limb, who was transported from the Polish Military Contingent in Afghanistan. Screen tests conducted among soldiers of the French contingent stationed in Afghanistan revealed

Table 1. Carriage of alert pathogens in soldiers of the 7th and 8th PMC Afghanistan rotation in 2018 (n=441)**Tabela 1. Nosicielstwo patogenów alarmowych u żołnierzy VII i VIII zmiany PKW Afganistan w 2018 r. (n=441)**

Pathogen	ESBL	KPC	MBL	OXA-48
<i>Escherichia coli</i>	308	-	-	-
<i>Klebsiella pneumoniae</i>	2	-	-	-
<i>Enterobacter cloacae</i>	1	2	-	-
<i>Citrobacter brakii</i>	1	-	-	-

Table 2. Carriage of alert pathogens in soldiers of the 4th PMC Kuwait rotation in 2018 (n=76)**Tabela 2. Nosicielstwo patogenów alarmowych u żołnierzy IV zmiany PKW Kuwejt w 2018 r. (n=76)**

Pathogen	ESBL	KPC	MBL	OXA-48
<i>Escherichia coli</i>	28	-	-	-
<i>Klebsiella pneumoniae</i>	3	-	-	-
<i>Enterobacter cloacae</i>	-	2	-	-

increased carriage rates of ESBL-producing pathogens [5, 6]. Complex diagnostics conducted in German Armed Forces, involving detection of multi-drug-resistant strains, revealed ESBL-producing bacteria and VRE in soldiers [7]. Similar screening was conducted in Danish soldiers; however, they were not tested for alert pathogens producing carbapenemases, which is becoming the dominant problem in the civilian environment [8]. Considering the specificity of service abroad, it appears that monitoring of infections with alert pathogens is fully justified. According to epidemiologists from the European Union, screening tests are the only effective instrument of control of pathogens brought from regions with high carriage rates of multi-drug-resistant strains [9-11].

Conclusions

In 71.2% (PMC Afghanistan) and 43.4% (PMC Kuwait) of subjects multi-drug-resistant strains transmitted via the oral route were found, which indicates very high carriage rates in the military environment. The results support the arguments for the need to extend the screening tests for soldiers returning from foreign missions. The presence of alert pathogens demonstrating resistance mechanisms (ESBL, KPC) does not result in clinical symptoms, but poses an epidemiological threat, as the infection may spread in closed environments.

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100th anniversary of military psychiatric therapy

100-lecie wojskowego lecznictwa psychiatrycznego

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Abstract The 100 year history of psychiatric treatment in the Polish Army can be divided into several periods. During the first (1918-1939) an efficiently functioning military psychiatric service was created, almost from the bottom up. The second one (1940-1945) involved the years of German occupation and the establishment of the Polish Armed Forces in France and then in Great Britain, where the Polish Faculty of Medicine at the University of Edinburgh played an important role in educating future military physicians. For the third period (1946-1963) the psychiatric protection of soldiers was provided by civilian psychiatrists.

The fourth period (1964-1989) was characterized by dynamic institutional, personnel, scientific and educational development of military psychiatry. We owe this to Professor Rydzyński, the creator of post-war psychiatric military treatment. The fifth period (1990-2002) related to the socio-political changes in Poland and the need to restructure and reduce the armed forces, as well as a closure of the Military University of Medicine (2002). The sixth period (2003-2018) involved with creation of the Military Medical Department at the Medical University of Lodz, from the merger of the Medical University of Lodz with the Military University of Medicine (2002). This allowed the education of cadets, Ministry of Defence scholarship holders, to become military physicians.

Key words: centenary, jubilee, military psychiatric treatment

Streszczenie Historię 100-lecia lecznictwa psychiatrycznego w wojsku polskim można podzielić na kilka okresów: pierwszy (1918-1939), w którym niemal od podstaw stworzono sprawnie jak na tamte czasy funkcjonującą wojskową służbę psychiatryczną; drugi (1940-1945) - lata okupacji i powołanie polskich sił zbrojnych we Francji, a następnie w Wielkiej Brytanii, gdzie istotną rolę w kształceniu przyszłych lekarzy wojskowych odegrał Polski Wydział Lekarski na Uniwersytecie w Edynburgu; trzeci (1946-1963) - w którym zabezpieczenie psychiatryczne żołnierzy zapewniali psychiatry cywilni; czwarty (1964-1989) - charakteryzujący się dynamicznym rozwojem instytucjonalnym, kadrowym, naukowym i dydaktycznym wojskowej psychiatrii, który zawdzięczamy prof. Z. Rydzyńskiemu, twórcy powojennego wojskowego lecznictwa psychiatrycznego; piąty (1990-2002) - związany ze zmianami społeczno-ustrojowymi w Polsce i koniecznością restrukturyzacji oraz redukcji sił zbrojnych, a także rozwiązaniem Wojskowej Akademii Medycznej (2002), oraz szósty (2003-2018) - z utworzeniem Wydziału Wojskowo-Lekarskiego Uniwersytetu Medycznego w Łodzi powstałego z połączenia AM i WAM (2002), który rozpoczął kształcenie podchorążych, stypendystów MON, na lekarzy wojskowych.

Słowa kluczowe: jubileusz, stulecie, wojskowe lecznictwo psychiatryczne

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Introduction

The aim of this study is to familiarise the current generation of military physicians with the problems of military psychiatry over the past 100 years, and to present the profiles of military psychiatrists who co-created this field of medicine and continued its development.

On 11 November 1918, when Poland regained independence, the hopes of creating a free and sovereign state, shared by many Poles, were realised. Despite 123 years of submission under the rule of the three partitioning empires, applying intense Russification and

Germanisation of the nation, and even following the failed uprisings in 1830 and 186 Poland did not give up, and later returned to the world map as a free and independent country.

Military psychiatry in the interwar period

In order to secure the safety of the Polish borders, and to maintain the independence of our country, it was necessary to form our own military services, including a military health service, which was by no means an easy task after over a century of occupation. Therefore, in 1919

the Minister of Military Affairs created a military officer medical corps.

At that time Poland did not have its own psychiatric military service, and had to rely on the experience of other armies in creating it. Under the difficult geopolitical situation, a relatively efficient military psychiatric service was formed, considering the state's potential at that time, whose fundamental task was to provide psychiatric services regarding the selection of candidates for military service in line units.

Five General Areas were created, where military hospitals were gradually established. They featured neurosis departments, which at that time comprised 400 beds and outpatient mental care. The diagnostic and therapeutic services were provided by several dozen physicians.

During the interwar period, the psychiatric services within the Polish Armed Forces were relatively well developed. The neurosis departments were available in the military hospitals in Warsaw, Krakow, Poznan and Vilnius. Scientific studies regarding military psychiatry written by Polish psychiatrists, such as Jan Piltz, Jan Nelken and Adolf Malinowski, played an important role.

Based on previous experiences and observations from the field of combat, it was demonstrated that many soldiers fighting in the First World War suffered from mental disorders which necessitated their removal from the front line, frequently resulting in a permanent or temporary unfitness for military service. The Battle of the Somme in April 1916 proved to be a turning point in European military psychiatry, as within a few weeks over 1,000 soldiers from the British corps were evacuated due to mental problems.

An important achievement by Jan Piltz in the area of military psychiatry was the description of the symptoms and treatment of "war neuroses", caused directly by the mental and physical shock resulting from an explosion of a missile in the soldier's vicinity, suffering a blast wave or being covered by earth, without perceptible body damage [1]. According to Piltz, all the above were associated with "fear". Due to significant medical losses caused by mental disorders suffered by soldiers during First World War, at that time all major armies in the world started to develop and improve their military psychiatric services, in case of a future conflict, to protect soldiers' mental health more effectively, and to prevent military losses on the battlefield.

The significant achievements of Jan Nelken PhD in the area of military psychiatry included the publication of studies: "Alcohol and crime in the army during the time of war" (1920), "Reactive psychosis during war" (1921), "Faking mental disorders and military service" (1926), "Psychopathy in the army" (1929) and "Suicide in the army" (1933) [1].



Figure 1. Map of 1939 Poland (source: www.pl.wikipedia.org/wiki/II_Rzeczpospolita)

Rycina 1. Mapa Polski z 1939 r. (źródło: www.pl.wikipedia.org/wiki/II_Rzeczpospolita)

The Polish system of education and military and medical training was built from the ground up, resulting in the establishment of the Army Sanitary School in 1922 in Warsaw, followed by the creation of the Centre for Sanitary Education in 1930, whose 466 graduates, military officers-physicians participated actively in the September campaign of 1939, where they passed their professional exam and etched their names in the history of the military health service.

Military psychiatry during the Second World War and occupation

The years of the Second World War and Nazi occupation are among the most tragic in the history of Poland. Immense devastation and losses in human life, including extermination of people with mental problems and those mentally impaired, initiated in September 1939 and continued during the occupation, resulted in the elimination of any institutional treatment of psychiatric patients. The exact number of victims murdered by SS and German police is unknown, but it is estimated that up to several thousand Polish citizens hospitalised in psychiatric institutions were killed.



Figure 2. Col. Jan Nelken MD, PhD (source: www.pl.wikipedia.org)

Rycina 2. Plk dr med. Jan Nelken (źródło: www.pl.wikipedia.org)

Throughout the Nazi occupation the pre-war military hospitals of Ujazdowski and Maltański, established in September 1939 in Warsaw, were the largest centres of conspirational activity, and where medical students gained their education at the underground Warsaw University. A psychological and professional re-education centre was also available for soldiers who had been injured and “mentally damaged” by their participation in military operations, and who required psychiatric support. At that time, many military physicians put their lives at risk to save hundreds of human lives. This group of doctors included Col. Prof. Edward Loth PhD, Col. Leon Strehl PhD, Col. Prof. Teofil Kucharski PhD, Gen. Witold Horodyński PhD, Col. Zygmunt Gilewicz PhD and many others.

In the spring of 1940, the Soviet NKWD committed the atrocious murder of over 15 thousand Polish officers interned in prisoner camps in Kozielsk, Starobielsk and Ostaszków in the Soviet Union, who had been taken prisoner in September 1939. Among the victims were 700 military physicians, sanitary officers and pharmacists, including an outstanding military psychiatrist, Col. Jan Nelken MD, PhD - scientific leader of the Department of Neuroses at the Centre for Sanitary Education, and Witold Mitkus MD, PhD - head of the Department of Neuroses at the Centre for Sanitary Education.



Figure 3. Polish Faculty of Medicine students

(source: www.pl.wikipedia.org)

Rycina 3. Studenci PWL (źródło: www.pl.wikipedia.org)

The medical personnel, including many military doctors, risked their lives by participating in the resistance. Their work, requiring considerable resourcefulness and inventiveness, usually involved providing medical assistance to patients, including soldiers of the Home Army, also in the field of psychiatry. Hundreds of doctors and nurses associated with pre-war military health care, and also with military psychiatry, were held in Nazi and Soviet prisons. Many of them paid with their lives for their involvement in the resistance.

Following the defeat of our armed forces in 1939, many soldiers participating in the September campaign, including military physicians, moved abroad. The Polish Armed Forces, formed in France, required medical services for soldiers. After the surrender of France, the Polish army was evacuated to Great Britain, where its development continued. Among the centres educating medical staff for the Polish Armed Forces, the most prominent one was the Polish Faculty of Medicine at the University of Edinburgh (1941-1949). Maj. Jakub Rostowski, professor of neurology and psychiatry, was a dean of this faculty. He was also the author of a neurology textbook, re-published in 1946 and 1947 [1].

After the Second World War, many graduates of this faculty returned to Poland, contributing to the reconstruction of the military health service and military medical education.

Military psychiatry in Poland after the Second World War

Military operations on all the fronts of the Second World War, and the experience gained there, confirmed the importance of the psychiatrist in the field of combat. In the years 1943-1945, approximately a million soldiers of the American Army were hospitalised due to mental disorders resulting from combat at the front, and nearly two million candidates for military service at the front were deemed unfit for service by the military medical commissions on the account of mental dysfunctions and problems. In the Soviet army the intensification of military operations was associated with development of military psychiatric care, as the number of soldiers in need of psychiatric assistance on the battlefield continued to increase. Despite the considerable role of military psychiatrists during the military operations on all fronts of the Second World War, and the evidence that mental adaptation to the conditions on the battlefield during an armed conflict was of crucial importance, little attention was paid to the organisation of psychiatric healthcare in the military health services created in Poland. The only facilities offering this type of education were the Chair of Military Medicine at the Faculty of Medicine at the University of Lublin, and the Military Medical School of Barber Surgeons in Lodz. In 1950 a Military Medical Faculty was created at the Medical Academy of Lodz. Psychiatric treatment of soldiers was largely left to civilian psychiatric institutions.

Only many years after the Second World War was the plan implemented to create a military medical education system, dating back to the pre-war times, with the Military Medical Academy being established in 1958 in Lodz [2]. Until 1962 there were no mental health facilities available in the Polish Army. The creation and development of the military psychiatric services was due to the dynamic and continuous efforts of Col. Prof. Zdzisław Rydzyński MD, PhD, in the 1960s and 1970s. As the Chief Psychiatrist of the Polish Army, from 1964 he consistently implemented a programme of organising mental healthcare for soldiers and their families. The main scientific interest of Prof. Rydzyński in the field of military psychiatry included mental health in the army and psychopathological traits in individual patients, social problems, studies on the frequency of mental disorders in the army, suicides among soldiers, crimes typical for the military environment, psychosomatic disorders in professional soldiers, acute and chronic disadaptation syndromes in the military context, problems of selection etc. [3].



Figure 4. Brig. Gen. Prof. Marian Garlicki (source: www.pl.wikipedia.org)

Rycina 4. Gen. bryg. prof. Marian Garlicki (źródło: www.pl.wikipedia.org)

In 1967, the Department of Military Psychiatry was created at the Military Medical Academy, as part of the Chair of Civilian Psychiatry at the Medical University of Lodz. Maj. Assoc. Prof. Zdzisław Rydzyński became its first head, while Prof. Stanisław Cwynar remained the Chair. In 1968, Maj. Assoc. Prof. Rydzyński became the Chair and head of the Department of Psychiatry at the Military Medical Academy.

The staff of the department included the following psychiatrists: Maj. Leszek Grzelak MD, Stanisław Dabiński MD, Lt. Apoloniusz Madej MD, Wiesława Nizel-Simińska MD, Capt. Sławomir Duszyk MD, and later also Capt. Henryk Górski MD, Lt. Wojciech Gruszczyński MD, Lt. Aleksander Araszkiewicz MD, Maj. Eugeniusz Żujewski MD, Stefan Tokarz MD, Krystyna Borysewicz-Charzyńska MD, Krystyna Rzepa-Grębowicz MD, Jolanta Rabe-Jabłońska MD, Lt. Col. Józef Kocur MD, PhD and Ewa Kozłowska MD [2]. These physicians received a scientific degree of PhD in medical sciences, under the supervision of Prof. Rydzyński. Out of the 34 doctoral candidates supervised by Prof. Rydzyński, 6 physicians obtained the next scientific degree: Associate Professor of Psychiatry. This group included J. Kocur (1983), A. Florkowski (1987), W. Gruszczyński (1989), J. Rabe-Jabłońska (1991), A. Araszkiewicz (1992) and S. Ilnicki (1999). Four of them received the title of full Professor: Col. Prof. Józef Kocur MD, PhD (1992); Col. Prof. Antoni Florkowski MD, PhD (1997), Prof. Jolanta Rabe-Jabłońska MD, PhD (1999) and Col. Prof. Aleksander Araszkiewicz MD, PhD (2000).



Figure 5. Major AP Zdzisław Rydzyński [3]
Rycina 5. Mjr doc. Zdzisław Rydzyński [3]

The primary academic interests of Prof. Kocur included psychiatry (forensic, clinical, ecological and military), psychotoxicology, dependencies, suicides, psycho-rehabilitation and psychopharmacology [4, 5].

The main academic interests of Prof. Florkowski include social pathology in the military environment, with a particular focus on suicidal behaviours of soldiers, forensic and clinical psychiatry, psychopharmacology and ethical and legal problems in psychiatry [4, 5].

The scientific interests of Prof. Gruszczyński included mental disorders due to cerebral microinjuries, psychiatry of adolescents, psychopharmacology, psychiatric and psychological aspect of disaster medicine and military psychiatry [4, 5].

The following officers were appointed as the first heads of the psychiatry departments created at the military hospitals in 1960s: in the 5th Military District Hospital in Kraków, Maj. Zenon Molski MD; in the 7th Navy Hospital in Gdańsk-Oliwa, Cmdr. 2d Lt. Col. Henryk Nowakowski MD; in the 4th Military Local Hospital in Wrocław, Maj. Stanisław Peż MD; in the 105th Military District Hospital in Żary, Maj. Wiktor Jędrzejkiwicz MD; in the 110th Military Local Hospital in Elbląg, Maj. Ryszard Łochowski MD; and in the 107th Military Local Hospital in Wałcz, Capt. Zbigniew Komerski MD.



Figure 6. Map of Poland with marked cities where branches and psychiatric health centres were located (source: www.polska.lovetotrave.pl/mapa_polski)

Rycina 6. Mapa Polski z zaznaczonymi miastami, w których były oddziały i PZP (poradnie zdrowia psychicznego) (źródło: www.polska.lovetotrave.pl/mapa_polski)

In the 1990s, departments of psychiatry were created also at the military hospitals in Bydgoszcz, Toruń, Przemyśl and Elk, providing a total of 300 beds for general psychiatry patients. These military hospitals also offered outpatient psychiatric health clinics. Moreover, such clinics were established in Warsaw, Szczecin, Olsztyn, Gliwice, Lublin and Opole.

In 1974, the Institute of Mental Hygiene at the Military Medical Academy was created, and its first commandant was Col. Prof. Zdzisław Rydzyński MD, PhD. The institute comprised: 1st Clinical Psychiatry Department with Paediatric Psychiatry Unit, 2nd Clinical Psychiatry Department, Department of Clinical Psychopharmacology, Department of Clinical Psychology, Department of Occupational and Military Psychology, and Central Psychiatric Outpatient Clinic.

In 1975, the efforts of Professor Rydzyński resulted in the integration of the military psychiatric and psychological facilities under the supervision of the Institute of Mental Hygiene, Military Medical Academy, run by the professor. In the years 1974-1991, they supervised the selection of personnel from the psychiatric and psychological perspective, and were responsible for the prevention and treatment of mental disorders in the military environment. The institute implemented a long-term scientific and research programme, based on an interdisciplinary study of the problems of mental health in the army, as well as signs of social psychopathology in



Figure 7. Col. Prof. Zdzisław Rydzyński [3]
Rycina 7. Plk prof. Zdzisław Rydzyński [3]

soldiers. Systematic studies were conducted on the incidence of mental diseases and conditions in the army, suicidal and criminal behaviours in soldiers, psychosomatic disorders in professional soldiers, and the problems related to selection of candidates for military service. The problems regarding mental health in the military environment were described in habilitation and doctoral dissertations, and hundreds of articles published in Polish and international journals. Presented at numerous congresses, conferences and scientific symposiums, they were considered pioneering works, similarly to other studies on the mental health of children and adolescents. Polish and foreign authors dealing with similar problems related to mental health in the armies of other countries referred to these publications.

Professor Rydzyński was the first in Poland to conduct studies on experimental psychoses, which increased our understanding of this area, and proved important not only for military psychiatry, but also for general medicine. Paediatric and adolescent psychiatry was another area in which professor Rydzyński was an expert, recognised both in Poland and abroad. He specialised in the late sequelae of early childhood cerebral damage, and the associated social pathology and various psychopathological problems, as well as in therapy and prevention of these issues [3].



Figure 8. Employees of the Mental Hygiene Institute of the Military University of Medicine, 1990 (source: author's collection)

Rycina 8. Pracownicy Instytutu Higieny Psychicznej Wojskowej Akademii Medycznej, 1990 r. (źródło: archiwum prywatne Autora)

For his outstanding scientific, educational and organisational achievement, Col. Prof. Zdzisław Rydzyński MD, PhD received the Commander's, Officer's and Cavalier's Cross of the Order of Polonia Restituta, as well as many other national and ministry medals. He also five times received the Award of the Minister of National Defence.

In the 1980s the employees of the Institute of Mental Hygiene implementing the above tasks included: Commandant of the Institute and head of the 1st Clinical Psychiatry Department with Paediatric Unit Col. Prof. Zdzisław Rydzyński MD, PhD, head of the Department of Clinical Psychology Col. Prof. Henryk Skłodowski PhD, head of the Department of Clinical Psychopharmacology Col. Prof. Józef Kocur MD, PhD, head of the 2nd Clinical Psychiatry Department Col. Aleksander Araszkiewicz MD, PhD, head of the Department of Occupational and Military Psychology Col. Albin Rosołek PhD (followed by Col. Assoc. Prof. Zdzisław Caban PhD), head of the Central Psychiatric Outpatient Clinic Col. Eugeniusz Żujewski MD, PhD (followed by Col. Henryk Górski MD, PhD); assistant professors: Col. Apoloniusz Madej MD, PhD, Col. Wojciech Gruszczyński MD, PhD, Col. Sławomir Duszyk MD, PhD, Lt. Col. Janisław Paciork PhD, Krystyna Borysewicz-Charzyńska MD, PhD, Krystyna Rzepa-Grębowicz MD, PhD; assistants: Stefan Tokarz MD, PhD, Cmdr. Lt. Col. Edward Bielawski MD, PhD, Janusz Caban MD,

Maj. Krzysztof Zboralski MSc, Capt. Zbigniew Łucki MD, Ewa Czubińska MSc, Anna Kuzitowicz-Pabich MSc, Anna Rybczyńska MSc, Anna Obara-Korzeniewska MSc, Anna Dietrich-Muszalska MD, Wiesława Trendak MSc, Capt. Dariusz Szczepny MSc, Capt. Leonard Szafranec MSc and Renata Tokarz-Czart MD [2].

Apart from its scientific activity, the Institute of Mental Hygiene also conducted courses for sixth year students of the Medical Faculty at the Military Medical Academy,

as well as organised training courses for physicians and psychologists preparing for exams confirming first and second degree specialisation in psychiatry, paediatric psychiatry and clinical psychology; exam sessions took place twice a year. The head of the examination committee was Rydzyński. In the years 1974-1991, over 200 physicians and psychologists passed the first and second degree specialisation exams in psychiatry, paediatric psychiatry and clinical psychology.

Col. Prof. Zdzisław Rydzyński MD, PhD is recognised as the creator of the mental healthcare system in the Polish Army, who trained almost all the military psychiatrists working in the years 1962-1991, as well as integrated psychiatric and psychological care in the military hospital and outpatient health services. In August 1991, after 40 years of military service, Rydzyński retired. He died in January 1996, following a short disease, and was buried at the community cemetery in Głowno.

After the retirement of Prof. Rydzyński in August 1991, his co-worker and former student, Col. Assoc. Prof. Wojciech Gruszczyński MD, PhD, was appointed the acting head of the 1st Clinical Psychiatry Department with Paediatric Unit at the Military Medical Academy. Col. Prof. Jan Goch MD, PhD became the superintendent of the Institute of Mental Hygiene, Military Medical Academy. As would be expected from a former student, Col. Assoc. Prof. Wojciech Gruszczyński MD, PhD continued the work of his teacher. He held this position until 15/06/1992, when Ewa Kozłowska MD, PhD – the first doctor supervised by Gruszczyński – was appointed Assistant Professor and head of the Paediatric Unit.

On 15/06/1992, based on decision no. Pf 127 of the Minister of National Defence from 29/04/1992, Col. Assoc. Prof. Antoni Florkowski MD, PhD, head of the Clinical Psychiatry Department at the 5th Military Clinical Hospital in Krakow, was transferred to the Military Medical Academy in Lodz. He was appointed Associate Professor of the Military Medical Academy in the team of scientific and educational employees, as well as commandant of the Institute of Mental Hygiene at the Military Medical Academy, and head of the 1st Clinical Psychiatry Department [5]. At the same year, the Minister of National Defence entrusted him with the function of Chief Military Healthcare Specialist in psychiatry, which Florkowski held until August 2001, when the Minister of Health appointed him the National Defence Consultant for psychiatry - a position he still holds. Col. Assoc. Prof. Wojciech Gruszczyński MD, PhD became the head of the 2nd Clinical Psychiatry Department in the Institute of Mental Hygiene, Military Medical Academy, and he remained in this role until the closure of the institute. In October 1992, Col. Aleksander Araszkiewicz became an Associate Professor of Medical Sciences in psychiatry.

The social and political changes that started in Poland in the 1990s, associated with the necessity to restructure and reduce the armed forces, including the military psychiatric and psychological services, resulted in a gradual modification of military healthcare, and in the reduction of the personnel of the Institute of Mental Hygiene. The institute closed on 31/12/1994, and the Chair and Department of Military Psychiatry at the Military Medical Academy in Lodz was created. Col. Assoc. Prof. Antoni Florkowski MD, PhD of the Military Medical Academy was appointed the head of this department, a position which he held until 30/09/2002, when the university was closed, despite the continuous development of military psychiatry in the field of research, publications and treatment, as well as the planned admission of Poland to NATO in 1999.

In the second phase of its operation, in the years 1992-1994, the Institute of Mental Hygiene, as well as the Chair of Psychiatry at the Military Medical Academy in the years 1995-2002, continued the research and educational tasks involving further development of the mental healthcare for the soldiers of the Polish Army. They included problems of social pathology in the military environment, with particular focus on suicidal behaviours, clinical psychiatry, forensic psychiatry, mental disorders in children and adolescents, and clinical studies of new psychotropic medications (second and third phase studies). In that period independent scientific workers at the Psychiatry Department supervised several dozen doctoral theses, concentrating primarily on the problems of mental healthcare for soldiers.

Several hundred original articles, review articles and case studies were published in Polish and international journals, as well as several textbooks and textbook chapters on military and clinical psychiatry. In 1993, still prior to Polish accession to NATO, a scientific collaboration with American military psychiatrist was started, largely due to the efforts of Cmdr. Stanley Raczek MD, PhD from the Navy Medical Center in San Diego. Delegations of American military psychiatrist visited the Department of Psychiatry twice: in 1993 and in 1994.

The Department of Psychiatry at the Military Medical Academy also organised and co-organised several scientific conferences, including three abroad, with the participation of Polish and American psychiatrists: in Krakow (1998), San Diego (1999) and Warsaw (2001).



Figure 9. Employees of the Psychiatry Department of Military University of Medicine, 1996 (source: author's collection)
Rycina 9. Pracownicy Katedry i Kliniki Psychiatrii WAM, 1996 r. (źródło: archiwum prywatne Autora)



Figure 10. Left to right: Col. Prof. A. Araszkiewicz, Col. Prof. A. Florkowski, Captain (N) Raczek, 1993 (source: author's collection)
Rycina 10. Od lewej: płk prof. A. Araszkiewicz, płk prof. A. Florkowski, kmdr Raczek, 1993 r. (źródło: archiwum prywatne Autora)

Despite the ongoing restructuring of the Military Medical Academy, several people were employed as assistants at the Chair and Department of Psychiatry, including Lt. Sławomir Szubert MD, Lt. Tomasz Serejko MD, Lt. Jerzy Pracucik MD, Lt. Mariusz Grądyś MD, Capt. Zbigniew Wawrzyniak MD, Lt. Urszula Grabska MSc and Agnieszka Kotarba MSc. Following the closure of the Institute of Mental Hygiene at the Military University of Medicine, they took other positions in the military and civilian healthcare; Col. Prof. Józef Kocur MD, PhD became the Commandant of the Institute of Military Sciences at the Military Medical Academy, in the years 1998-2001 also playing the role of the Dean of the Medical Faculty at the university; Col. Assoc. Prof. Aleksander Araszkiewicz MD, PhD became the head of the Chair and Department of Psychiatry at the Medical University in Bydgoszcz, and Maj. Zbigniew Łucki became the Director of J. Babiński Psychiatric Hospital in Łódź.

Despite the uncertain future of the Military Medical Academy, three scientific research projects regarding national defence and psychoprophylaxis in the military environment were conducted by the Committee of Scientific Studies at the Chair of Psychiatry in the years 1995-2002. Moreover, 25 international second and third phase studies on new psychotropic medications were conducted. The coordinator was Prof. A. Florkowski.

In the years 1992-1999, the three-month courses for specialisation exams in psychiatry, paediatric psychiatry and clinical psychology were continued, together with the exams organised by a state commission, led by Prof. A. Florkowski. At that time, over 100 physicians and psychologists employed at the military and civilian psychiatric facilities gained the specialisation, and three specialisation exams in sexuology were organised for military physicians before a state commission chaired by Florkowski.



Figure 11. Left to right: Col. Prof. A. Florkowski and S. Golec MD, PhD, 1993 (source: author's collection)
Rycina 11. Od lewej: płk prof. A. Florkowski i dr S. Golec, 1993 r. (źródło: archiwum prywatne Autora)



Figure 12. Left to right: Col. Prof. A. Florkowski and Captain (N) Raczek, (1994) (source: author's collection)
Rycina 12. Od lewej: płk prof. A. Florkowski, kmdr Raczek (1994 r.) (źródło: archiwum prywatne Autora)



Figure 13. Participants of the 1st Conference of Polish and American psychiatrists, Krakow 1998 (source: author's collection)

Rycina 13. Uczestnicy I Konferencji psychiatrów Polski i Stanów Zjednoczonych, Kraków 1998 r. (źródło: archiwum prywatne Autora)



Figure 14. Participants of the 2nd Conference of Polish and American psychiatrists, San Diego 1999 (source: author's collection)

Rycina 14. Uczestnicy II Konferencji psychiatrów St. Zjednoczonych i polskich, San Diego 1999 r. (źródło: archiwum prywatne Autora)

A deep reform of military healthcare, involving the creation of the Healthcare Fund for Uniformed Services at the beginning of 1999, as well as the closure of the Military Medical Academy 3 years later, was associated with a practical shut-down of the school, which proved to be rather reckless considering the upcoming challenges related to medical assistance during the military missions in Iraq and Afghanistan. In 1999, 107 military physicians serving in the Polish Armed Forces, as well as several civilian physicians employed in military psychiatric facilities, had first or second degree specialisation in psychiatry. Due to the reform of the military healthcare system, several military hospitals with psychiatric wards and mental health outpatient clinics were closed. The specialisation training for prospective military psychiatrist was conducted by the Medical Centre of Postgraduate Education.



Figure 15. Participants of the 3rd Conference of Polish and American psychiatrists, Warsaw 2001 (source: author's collection)

Rycina 15. Uczestnicy III Konferencji psychiatrów Polskich i Stanów Zjednoczonych, Warszawa 2001 r. (źródło: archiwum prywatne Autora)



Figure 16. Employees of the Military University of Medicine Psychiatry Department, 2002 (source: author's collection)

Rycina 16. Pracownicy Kliniki Psychiatrii WAM, 2002 r. (źródło: archiwum prywatne Autora)

On 24/01/1997, Col. Antoni Florkowski MD, PhD, Assoc. Prof. of the Military Medical Academy received the title of Professor of Medical Sciences from the President of Poland. Based on the decision of Minister of National Defence, no. Pf 131 from 26/05/1997, he was appointed to the position of Full Professor. In the years 1997-2007, Prof. Florkowski was a member of the Mental Health Promotion Council to the Minister of Health. In the years 1997-1998, he was a member of the Senate Committee for Science at the Military Medical Academy, and in 1995-1998 also a member of the Bioethical Committee of the Military Medical Academy [5].

In the years 1993-2001, Prof. Florkowski and employees of the Department of Psychiatry many times received first and second degree General Szarecki scientific awards from the Rector of the Military Medical Academy for their scientific and educational activity, and Prof. Florkowski received the Officer's and Cavalier's Cross of the Order of Polonia Restituta, Golden and Silver

cross of Merit, Order of the Commission of National Education, and many other state and ministerial decorations for his scientific, educational and organisational accomplishments. A close co-worker of Prof. Florkowski in the years 1992-2008, Col. Wojciech Gruszczyński MD, PhD, Assoc. Prof. of the Military Medical Academy received for his scientific and educational achievement the Cavalier's Cross of the Order of Polonia Restituta and the Order of the Commission of National Education, as well as other state and ministerial decorations.

On 27/09/2002, in the last year of the Military Medical Academy, the 35th anniversary of the creation of the Chair of Psychiatry was celebrated. The celebrations included a scientific conference dedicated to the jubilee. Many military psychiatrists participated in the conference. Speeches were presented by various participants, e.g., Retired Col. Assoc. Prof. Henryk Skłodowski PhD; Retired Col. Apoloniusz Madej MD, PhD; Col. Assoc. Prof. of the Military Institute of Medicine Stanisław Ilnicki MD, PhD; Col. Prof. Józef Kocur MD, PhD; Col. Wojciech Gruszczyński MD, PhD; Assoc. Prof. of the Military Medical Academy; Reserve Col. Prof. Aleksander Araszkiewicz MD, PhD and author of this article, Col. Prof. Antoni Florkowski MD, PhD. The widow of Col. Prof. Zdzisław Rydzyski MD, PhD, Wacława Rydzyska PhD, as well as his numerous former co-workers participated in the conference.

Despite many promises, the Medical University of Lodz with Military Medical Faculty, created on 01/10/2002 on the basis of the Medical University and Military University of Medicine, could not replace the closed Military University of Medicine. The Chair and Department of Psychiatry was replaced by the Department of Adult Psychiatry, part of the Chair of Psychiatry at the Medical University of Lodz, whose head was Prof. Antoni Florkowski MD, PhD. He held this position until 30/09/2014, when he retired. The next head of the Chair was Prof. Jolanta Rabe-Jabłońska MD, PhD.

After two years, the Department of Adult Psychiatry was incorporated into the newly created Chair of Nervous System Diseases, whose head was retired Gen. Brig. Prof. Henryk Chmielewski MD, PhD, rector of the Military Medical Academy in the years 1991-1998. After Chmielewski, in the years 2006-2012, the Chair was run by Prof. Andrzej Klimek MD, PhD, and then, in 2012-2014, by Prof. Antoni Florkowski MD, PhD, until his retirement.

The Chair comprised the following: Department of Neurology, Department of Extrapyramid System Diseases, Clinical Department of Neurological Propedeutics with Stroke Subunit, Department of Adult Psychiatry, Department of Neuroses and Stress-related Disorders, supervised by Prof. W. Gruszczyński, and

Institute of Forensic Psychiatric Adjudication, supervised by S. Szubert MD, PhD.

The rushed decision to close the Military Medical Academy soon proved to be disastrous for military healthcare and psychiatry, as it revealed a lack of personnel and organisational preparedness of the military psychiatry for the missions in Iraq and Afghanistan. As an ally of the NATO armed forces, initially we could not professionally address the mental disorders associated with combat stress (PTSD) occurring in our soldiers. Only in the first decade of the 21st century did the Ministry of National Defence take steps to restore military psychiatry. Due to immense determination and years of efforts of Prof. Stanisław Ilnicki, one of the honourable seniors of Polish military psychiatry, the Department of Psychiatry and Combat Stress was created in Warsaw in 2005. It is a leading centre in the armed forces with regard to the diagnostics and therapy of post-traumatic stress disorder (PTSD), as well as training, and it collaborates with many similar NATO facilities in Europe and United States. The previous absence of proper personnel policy resulted in an outflow of experienced military psychiatrists, who left the army due to the lack of prospects, unfavourable financial conditions or reaching the pensionable age. Only 10 military psychiatrists are working today, compared to 107 in 1999. Therefore, out of necessity, the positions of heads of military psychiatric wards and mental health outpatient clinics are held by civilian physicians.

The agreement signed in 2005 between the Ministry of National defence and the Rector of the Medical University of Lodz regarding the education of cadets receiving grants from the Ministry, offers hope for the improvement of this unfavourable situation. Following the decision of the Rector and Senate of the Medical University of Lodz, the education of students at the Military Medical Faculty began. At the Department of Adult Psychiatry the programme of military psychiatry and psychology was reactivated, with particular focus on the psychiatric and psychological problems associated with combat stress (PTSD). This was possible due to the efforts of many Military Medical Academy graduates employed at that time at the Department of Adult Psychiatry, Medical University of Lodz, with experienced former military psychiatrists and psychologists such as Prof. A. Florkowski and W. Gruszczyński, and doctors of medical sciences: S. Szubert and J. Caban, as well as K. Zboralski PhD, a psychologist. The department offered a scientific research programme comprising diagnostics and psychiatric and psychological treatment of post-traumatic stress disorder (PTSD), as well as the assessment of mental status, psychosomatic disorders, and social functioning of soldiers and veterans. Based on study results, scientific articles were published in Polish and international journals, discussing problems that had

not been previously studied in Polish military psychiatry. A guide with instructions regarding PTSD was also developed for soldiers participating in foreign missions. As part of a scientific grant from the National Science Centre, the Department of Adult Psychiatry, in collaboration with the Military Institute of Aviation Medicine in Warsaw (Col. M. Macander PhD), conducted studies regarding post-traumatic stress disorder (PTSD) in the military aviation personnel participating in the missions in Iraq and Afghanistan.

In 2006, Col. Jan Wilk MD, PhD from the Psychiatry Department of the 10th Military Clinical Hospital in Bydgoszcz organised a scientific educational conference for military psychiatrists and psychologists in Bory Tucholskie, and in 2007 a similar conference was organised in Sopot by Cmdr. Lt. Małgorzata Żychlińska MD, PhD from the Psychiatry Department of the 7th Navy Hospital in Gdańsk-Oliwa. Both conferences featured sessions on PTSD, at which employees of the Department of Adult Psychiatry presented the scientific reports regarding mental disorders associated with combat stress. Scientific reports related to similar problems were also demonstrated during the sessions dedicated to military psychiatry at the Scientific Symposium of the Polish Psychiatric Association in 2004 in Warsaw, and in 2010 in Poznań.

Several dozen doctoral thesis on defence, supervised by Prof. A. Florkowski, W. Gruszczyński and a former employee of the department, Prof. Jan Kocur, were defended at the Military Medical Faculty. These three graduates of the Military medical academy in Lodz supervised a total of 168 doctoral theses, defended in the years 1992-2018 at the Medical Faculty of the Military Medical Academy and at the Military Medical Faculty of the Medical university of Lodz.

Closure of the Military Medical Academy in Lodz - a university that educated over 6,000 graduates - appeared not to be well thought out, and adversely affected not only military psychiatry, but also the entire military healthcare system.

Conclusions

Periods of development and decline can be observed over the last hundred years of Polish military psychiatry. In the interwar period, despite the unfavourable geopolitical situation of a country that had only recently regained independence, relatively effective, and well-functioning military psychiatric services were organised. From the end of the Second World War until the early 1960s, virtually no interest was shown in creating a psychiatric and psychological healthcare system in the armed forces, and soldiers received assistance from civilian psychiatrists. Only in the years 1965-1999 was dynamic development seen with regard to institutions, personnel, scientific research, education and therapeutic services related to psychiatric and psychological healthcare in the army. After the closure of the Military Medical Academy, military psychiatry gradually declined, although the creation of the Department of Psychiatry and Combat stress at the Military Institute of Medicine in 2005 was a great achievement, and today it is a modern clinical centre for the Polish military.

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Health assessments for diving fitness

Kwalifikacje zdrowotne do nurkowania

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Abstract Good physical and mental health is a prerequisite for anyone planning to scuba dive. A fitness to dive certificate for those willing to take a scuba diving course, as well as for amateur or professional divers, can only be issued if there are no medical contraindications to diving. It is usually within the responsibility of the diving instructor, the manager of underwater work or a physician to assess a person's mental and physical health and to grant them permission to remain under hyperbaric conditions. The legal requirements for issuing a fitness to dive certificate differ between those for recreational and professional divers. The article discusses the issues related to the medical assessment of fitness to dive for recreational, professional and military divers.

Key words: contraindications, diving, medical assessment

Streszczenie Uprawianie nurkowania wymaga dobrej kondycji psychofizycznej. Orzeczenie o zdolności do podjęcia nauki nurkowania oraz wykonywania nurkowań amatorskich lub zawodowych wyklucza obecność schorzeń będących przeciwwskazaniem do podjęcia ww. czynności. Instruktor nurkowy, kierownik prac podwodnych lub lekarz stają się najwyższą instancją, która ocenia stan psychiczny i fizyczny nurka oraz zezwala lub nie na jego przebywanie w stanie hiperbarii pod wodą. Przepisy regulujące kwalifikowanie do nurkowania są różne w zależności od tego, czy dana osoba będzie nurkowała amatorsko, czy zawodowo. W pracy przedstawiono zagadnienia związane z kwalifikowaniem do nurkowania amatorskiego, zawodowego oraz w służbach mundurowych, przeciwwskazania zdrowotne do nurkowania, a także kwalifikowanie do nurkowania po przebyciu chorób nurkowych.

Słowa kluczowe: nurkowanie, kwalifikacja, przeciwwskazania zdrowotne

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Introduction

Organised recreational diving in Poland is offered by private diving centres and several clubs or sports societies affiliated with the Committees of Underwater Activity of the Polish Tourist and Sightseeing Society, which conduct training following the CMAS (Confederation Mondiale des Activites Subaquatiques) and National Defence League standards. Diving centres and bases train divers using programmes related to those developed by international organisations specialising in

recreational diving on a large scale, such as PADI (Professional Association of Diving Instructors), SSI (Scuba Schools International) and IDA (International Diving Association). National organisations (Polish Ship Salvage, Polish Register of Shipping, sailing companies, shipyards or ports), private companies offering diving services and Polish Army, Police and National Fire Department units organise dives and, according to their needs, train divers, who usually gain the status of professional divers.

Good physical and mental health is prerequisite for anyone planning to scuba dive. A certificate confirming fitness for diving for those willing to enter a scuba diving course can only be issued if there are no medical contraindications for this activity. Immediately before diving, the diving instructor, manager of underwater work or a physician assesses the diver's mental and physical health, and grants or denies them permission to dive. The legal requirements for issuing a fitness to dive certificate differ, whether they are intended for recreational or professional divers [1].

Qualifications for recreational diving

Most divers are non-professionals. Recreational diving is available to people of all age groups, from children to seniors, as long as they are in good health, as confirmed by a valid medical certificate. To facilitate access to diving, some organisations do not require doctors to qualify divers for recreational diving. The responsibility for potential accidents remains with the divers. Prior to the training, candidates complete a questionnaire to provide a medical history. They are not examined by a physician, and the questionnaire is evaluated by the training instructor, who then grants or denies permission for diving [2].

Unfortunately, no regulations are in place regarding the health requirements for recreational and sport diving, either in Poland or abroad [3]. Enthusiasts of this discipline must rely on self-assessment of their health and ability to dive. The legal shortcomings are partially corrected by diving organisations, which for years have trained physicians in the field of underwater medicine. Such training is offered by the Polish Association of Hyperbaric Medicine and Technology, as well as by the Department of Hyperbaric Medicine and Sea rescue - National Centre for Hyperbaric Medicine, Medical University of Gdańsk. Having completed a training cycle, the physician receives the relevant qualifications, and a certificate of diving physician or club physician. The several hundred qualified physicians allow diving enthusiasts to receive a specialist health assessment in any part of the country.

A medical certificate stating unfitness for diving should always be observed. Anyone who received such a certificate may apply for re-evaluation to the Head of the Qualification Committee for Divers and Frogmen, University Centre of Maritime and Tropical Medicine in Gdynia. Diver examinations are conducted every 12 months, with the exception of people participating in sports competitions, who are tested every three months [2, 4].

Due to the easy access to diving equipment and loosening of the formal restrictions for diving, some people decide to start diving without any training or understanding of the health requirements for this activity. Therefore, it is important to popularise the necessary medical knowledge among the candidates for divers, so that they can properly assess their own health, thus reducing the risk of diving injuries.

Until recently, diving was predominantly popular among people who demonstrated a high level of physical fitness. The candidates for recreational diving were typically young people under 30 years old. At present, there are people in nearly all age groups involved in underwater activities. Diving enthusiasts take their young children under water. Teenagers form a large group of divers. A young person willing to start diving must be healthy and cannot suffer from any conditions that could affect their safety during diving.

Increasingly often, middle-aged people and seniors enter the world of diving. Qualification of elderly people who plan to dive may involve healthy individuals and those with chronic illnesses. As advanced age is associated with reduced physical fitness and changes in all organs, detailed diagnostic tests are required in this population [3, 5]. An initial examination may reveal conditions the patient was unaware of, that might affect the person's safety while diving. Previously undiagnosed diseases, e.g. cardiovascular problems, may produce dangerous symptoms of insufficient blood supply to the organs only after the increased physical effort required during diving. Therefore, the physician qualifying candidates for recreational diving cannot simply declare the person healthy and able to dive, or disqualify any person with a medical condition. When qualifying an elderly person with permanent changes in the organism, age-related or due to a chronic disease, the physician should determine how the disease limits the ability to dive or endangers the diver's safety. The limits of safe diving should also be established for this person [5, 6].

Until recently divers were required to demonstrate excellent physical performance. The activity has become so popular that it is available to a wide range of people, including those with disabilities. Limited physical fitness does not need to exclude recreational diving if the diver is reasonable and avoids difficult conditions that may interfere with diving. People with disabilities and chronic diseases may participate in limited forms of recreational diving that would not endanger their health. For many of them it is an excellent form of active motor rehabilitation.

Respiratory system diseases

In qualifying for diving, a detailed evaluation of the respiratory system efficacy and the condition of the chest is necessary. The greatest risk of diving injuries and death, also during the first dive with the use of compressed air, is associated with lung distension due to respiratory arrest or pathological entrapment of the breathing mixture during resurfacing, even from a depth of 1-2 metres. Diving should be prohibited for all people suffering from conditions that increase the risk of local "air trap" during resurfacing, and impair changes in the pulmonary volume during diving. A thoracic X-ray is absolutely necessary in anyone who intends to dive. Recreational diving is contraindicated in people whose thoracic X-ray images reveal signs of airway obstruction or emphysema spaces, who are susceptible to spontaneous pneumothorax, have a history of thoracic surgery, suffer from active bronchial asthma, bronchitis or pneumonia. The above conditions reduce the pulmonary mechanical capacity and modify the mechanics of breathing, so with fast pressure changes in the airways, the diver becomes prone to pulmonary barotrauma [3, 7, 8].

Cardiovascular diseases

Examinations and qualification for diving may reveal cardiovascular abnormalities that require detailed diagnostics. A physical examination can demonstrate cardiac murmurs and irregular heart rhythm, and the results of the electrocardiographic examination (ECG) may be abnormal. In such situations, the candidate should receive an additional echocardiographic test, a Holter ECG test (i.e. 24-hour ECG monitoring), or even an exercise ECG test. The candidate should present the test results to a cardiologist, and receive a thorough cardiac exam. Cardiovascular problems, poor exercise tolerance, positive results of the exercise test and abnormal results of cardiological tests are disqualifying factors for this type of underwater activity.

In divers, patent foramen ovale (PFO) may affect their safety during diving. This is observed in approximately 20-34% of the population. Qualification tests for candidates for diving do not include an examination for PFO, and its presence is not a contraindication for diving. Several years ago, people with cardiovascular diseases could not be qualified for scuba diving. Today a physician may qualify a middle-aged diver who developed cardiovascular conditions after years of diving. A competent doctor should determine the limits of safe

diving for those who start their adventure with diving late. Neophytes are often over 40 or even 60 years old, and are familiar with cardiac problems or arterial hypertension.

If individuals over 50 years old wish to scuba dive, and do not suffer from cardiovascular conditions, they cannot be disqualified merely on the basis of their age. The cardiovascular system of older people is more sensitive to thermal stress than in the case of younger individuals. Both dehydration during diving expeditions to tropical regions, and cooling of the organism while diving in seemingly warm waters, considerably affect the cardiovascular system and increase the cardiac burden. Stress under water results in a sudden increase of blood pressure and heart rate (tachycardia), which may cause heart rhythm disorders, myocardial infarction or sudden death in people with existing cardiac conditions. In medical statistics cardiovascular diseases account for 12% of deaths among divers [3, 8-10].

Diseases of the ears and paranasal sinuses

Chronic inflammation of the ears and paranasal sinuses, significant stenosis of Eustachian tube and meatuses, permanently ruptured tympanic membrane and status post ear surgery are absolute contraindications for scuba diving. These conditions prevent free pressure regulation in the air spaces of these organs. In the case of a diver with a ruptured tympanic membrane, submersion in a wet suit may cause serious symptoms of labyrinth irritation and disturbed orientation under water.

Eustachian tube dysfunction and oedema in the nasopharyngeal cavity usually result from frequent upper respiratory and ear infections. They contribute to barotrauma of the ear and paranasal sinuses. Other factors include allergies, tobacco smoking, excessive use of nasal aerosols and drops, polyps and deformations in the nasal cavity. All the above abnormalities may also adversely affect ventilation of the paranasal sinuses. An X-ray examination of the paranasal sinuses and a laryngological examination may help to determine whether a candidate who previously suffered from a disease of the ear, nose or sinuses can be qualified for diving. The final decision will be taken by the candidate. If during the first submersions problems with regulating the pressure in the inner ear and sinuses occur, or if headache and earache occur during shallow diving, the diver will be unlikely to pursue this activity further [3, 5].

Diseases of the eyes

Normal visual acuity and field of vision are important for safe diving and underwater orientation. Good sight is necessary to decipher the readings on the dive computer, depth gauge, watch, compass or decompression tables. In many water reservoirs underwater visibility is limited by impurities and insufficient light. Disturbed colour recognition is not a contraindication for qualification for recreational diving, as it does not affect the safety under water. Any acute inflammations of the eye and eyelids with pain, disturbed visual acuity, double vision or photophobia constitute absolute contraindications for diving. If the symptoms subside, the patient recovers fully and receives the approval of an ophthalmologist, diving may be resumed.

Visual acuity disorders are common problems. Many of the young candidates for divers use glasses or contact lenses, and in people over 50 years old vision correction is widespread. Therefore, increasingly many recreational divers have sight defects. In qualifying candidates with impaired visual acuity, one must assess their ability to function with the defect in underwater conditions, and determine what type of diving they want to pursue. There are several methods of improving visual acuity during diving. The options include soft contact lenses or diving masks with a special visor or with integrated correction lenses.

As eye is an incompressible organ, pressure changes during diving do not affect it. Eye injury and corneal rupture during diving may occur only as a result of facial barotrauma injury – face squeeze – when the diver does not breathe the air into the mask while going under water. Considering the above, eye surgery does not disqualify one from recreational diving. In most cases a break of 2-3 months after the procedure is required for healing of the cornea. After surgery to the eyelids, conjunctiva and oculomotor muscles diving can be undertaken after 2-3 weeks following the procedure. Middle-aged and senior candidates may suffer from cataract and glaucoma. Diving with this conditions is contraindicated only in people with significant sight loss, interfering with their safety while under water. Regarding the procedures correcting these conditions, diving may be resumed 3 months after such surgery. Divers who suffer from any visual impairment after an episode of decompression illness or arterial gas embolism should cease diving [3, 5].

Neurological and psychiatric diseases

Neurological disorders that absolutely disqualify from diving include a history of seizures and loss of consciousness, and status post cerebral stroke. Diving with these conditions cannot be safe, and may cause problems for the affected divers, as well as for their partners. Mental disorders that absolutely disqualify from diving include a history of severe neurosis, psychosis, addiction to medicines, alcohol and drugs, personality disorders and mental retardation. Since medical certification is not required, the candidates for diving may include individuals with mental disorders or diseases. In such a case, the diving instructor is the one responsible for the assessment of the psychophysical status of the candidate [3, 5, 11-12].

While under water, only the instructor can observe the behaviour and personality traits of the diver that may support the progress in learning, or pose a threat to the diver, his partner and the whole team. A careful observation of course members during first dives can provide ample information, e.g., how they treat themselves and their equipment, how they react to the challenges of the training or unexpected situations. An experienced instructor can usually aptly assess the mental predispositions of the candidate already at the beginning of the course. They should discourage emotionally unstable course members from continuing underwater activities. Candidates showing signs of anxiety and depression should be carefully monitored. If repeated exercises do not eliminate the symptoms, and the candidate cannot move to the next, more difficult stage of training, it may suggest a potential for panic in underwater situations. Such people often have phobias, such as claustrophobia, i.e. a fear of closed spaces; but most likely they are afraid of diving itself. A fear of water, depths, open spaces, water fauna and flora may also occur. A fear triggered by a new situation results in loss of self-confidence, loss of self-control, and panic. The latter is the primary cause of death of divers under water.

On the other end of the spectrum are people demonstrating excessive self-confidence, egocentric, obstinate and driven to risk-taking. They neglect danger and easily break the rules of diving, so they often suffer from diving accidents. Under water they tend to ignore the problems of their partners, which may have tragic consequences. Recognising this type of personality is not difficult. One can easily learn about previous risky behaviours, accidents and injuries from these divers. However, it is not easy to disqualify such a candidate. If they decide to dive, no-one can dissuade them. The

instructor must keep a close eye on these “unpredictable” candidates, and, using authority, enforce compliance with the rules of safe diving.

Many candidates for divers use medications, including long-term therapies. The most common ones are anxiolytics and sedatives, taken for stress control.

People addicted to psychotropic drugs and abusing alcohol should be disqualified from diving. Diving under the influence of alcohol is dangerous, as it impairs recognition of threats and reduces reaction time under water, as well as disturbing motor coordination. Alcohol affects various functions of the organism. Its effects predispose for decompression illness and diving accidents. It is important not to drink alcohol prior to diving, between dives or at integration parties before diving. Drug dependency also disqualifies from diving, as the associated symptoms and behavioural abnormalities pose a threat to the safety of divers [1].

Other contraindications

Pregnancy and significant obesity are relative contraindications for diving. As pregnancy is a temporary condition, women are recommended not to dive during that period. Diving may be resumed after 4 weeks following a natural birth. In the case of Caesarean section, an 8-12 week convalescence period should be observed. Obesity reduces physical fitness and performance of the organism, and due to high solubility of nitrogen in the fat tissue, also predisposes to decompression illness. In the case of divers suffering from any illness, they should always receive approval for diving from their physician. Positive qualification for recreational diving depends on the advancement of the disease and its potential control with suitable drugs [3].

In many countries, including Poland, the number of people who begin diving in their 40s has increased. This is primarily due to the dynamic development of underwater tourism and recreational diving. Qualification of these candidates for diving should be based on a detailed medical history and physical examination. It is crucial to make the candidates for recreational diving aware that they are responsible for their own lives and safety, so they should not hide any health-related information, previous diseases or injuries. They should also be informed by a physician familiar with the problems of underwater medicine about the possibility of diving regardless of various conditions, as well as about the potential dangers associated with diving. Many environmental factors, such as thermal stress, exposure to cold, water resistance during swimming, consequences

of submersions, increased pressure and increased density of breathing gases affect the functioning of organs and systems, which may result in the development or exacerbation of diseases [3, 8-10, 13-14].

Qualification for professional diving and diving in the uniformed services

Due to the specific conditions of work under water and in hyperbaric conditions, professional divers must demonstrate excellent physical and mental fitness. They should undergo regular testing to ensure a proper level of fitness and performance of the organism for underwater works. In 2003, the efforts by many European specialists resulted in the development of fitness to dive standards for working divers, and their ratification by the European Diving Technology Committee (EDTC) [6]. Following the EU regulatory standards, the standards were adopted in Poland by the Regulation of the Ministry of Health from 2007 [4].

Candidates for divers undergo preliminary tests, and professional divers receive periodic and control tests. The examinations are conducted by certified physicians, trained by the Polish Association of Hyperbaric Medicine and Technology, and the National Centre for Hyperbaric Medicine. Based on the preliminary test results, candidates for divers receive a certificate stating their fitness for working as a diver, or lack thereof. The periodic or control tests of professional divers form the basis for certificates confirming the lack of contraindications for work as a diver, or temporary or permanent incapacity to work in this profession.

The strictest rules regulating qualification for diving can be found in the military. This is associated with the specificity of the tasks performed by military divers, who may conduct underwater work during wars, in difficult and dangerous situations such as rescue missions in the open sea, installing explosives, diversion operations or rescuing the crews of sunken submarines. Military divers can dive in highly specialised equipment, rarely used by other divers, i.e. semi-closed circuit rebreathers or closed circuit rebreathers, or breathing apparatuses using oxygen of gas mixtures [1].

Recent regulations regarding suitability for military use are specified in the Regulation of the Ministry of National Defence from 2015 [15]. They determine the procedures for qualification of divers or candidates for divers. Following these provisions, candidates for divers should demonstrate excellent health and good physical fitness. Any medical abnormalities or pathological conditions are unacceptable. Therefore, candidates for divers must undergo medical examinations performed by a medical

commission. The candidate's suitability for the role of military diver is finally determined during tests in a hyperbaric chamber.

Many tasks previously performed by military divers or frogmen clubs have been taken over by the Police and Fire Department. Policemen and firemen are qualified for diving based on the Regulation of the Ministry of Health of 2007 [4] and the Regulation of the Ministry of Internal Affairs of 2014 regarding qualification of policemen and firemen to diving [16]. According to these regulations, similarly to the army, diving policemen and firemen must demonstrate high standards of health and physical and mental performance. They usually perform tasks in difficult conditions and in dangerous water reservoirs.

The qualifying physician must exclude any candidates who have contraindications for diving, based on their own experience in underwater medicine, as well as on the current medical standards determining fitness to dive. The preliminary qualification examination of candidates to be professional divers should be very detailed. Periodic and control tests, apart from confirming a person's fitness to dive, also ensure early detection of adverse effects of diving that could affect diver's health in the future. After all the specialist tests are completed, a medical board determines the candidate's suitability for diving.

Future divers are selected on a voluntary basis. All recreational and professional divers should have a diver's or frogman's booklet with the current information about examinations and decisions regarding fitness to dive. Promising candidates for professional divers feel safe under water, like diving and feel comfortable with the equipment [1].

Qualification for diving following diving sickness

The return to diving after diving accidents or sickness depends on the type of injury and potential for deterioration of health or recurrence of the sickness. The criteria of fitness to dive differ between institutions. After any diving injury, the diver's health must be checked in detail, and potential damage needs to be determined. It is also important when considering insurance or pension claims. In declaring a diver fit to dive, one should take into account whether they will continue professional diving in industrial situations or the uniformed services, or only for recreational purposes [1].

Decompression illness

When a diver suffers from decompression illness, a close analysis is required to determine whether the disease resulted from improper decompression, or from the presence of predisposing factors. Reduction in the planned duration of decompression is a sufficient explanation of the cause of decompression illness. If the disease develops regardless of following proper decompression procedures, then cerebral and dermatological symptoms of decompression illness typically occur. Seeking the causes of decompression illness, one should consider the presence of right-to-left shunt in the heart or lungs. During long-term follow-up after recompression treatment of decompression illness, recreational divers received a psychometric test and ENG (electronystagmography - a test recording spontaneous or induced nystagmus, to evaluate balance dysfunction). Abnormalities in the above tests were found in approximately 50% of divers after a week, and in 10% of divers after three weeks of recompression treatment. Regression of the changes in the central nervous system caused by the decompression illness takes over a month, so the patient should not dive for at least a month after a successful recompression treatment [3, 5-6, 13, 17].

A mild form of decompression illness does not raise many doubts. Some claim that if recompression treatment results in a complete alleviation of joint pain, the next dive can take place after at least 24 hours following the treatment completion. However, this approach is too daring. According to the U.S. Navy recommendations, divers who suffered from mild decompression illness and met the criteria of Table 5 U.S. Navy, and whose treatment resulted in complete recovery, can return to diving after a week. If divers met the treatment criteria in table 6 U.S. Navy and the therapy was successful, they can dive after a month. Divers with severe decompression illness, with neurological and cardiopulmonary symptoms, treated according to table 4 or 7 U.S. Navy, can return to diving after a detailed examination by diving medicine specialists, not sooner than after 3 months. If residue neurological symptoms are observed due to severe decompression illness, the diver should be permanently disqualified from professional diving. Qualification for diving requires detailed neurological and psychological examination, a CT or MRI of the brain and spinal cord, and other potential tests [3, 5].

Professional divers may hide and dissimulate disease symptoms to keep their job. Diving with residue neurological symptoms may result in the accumulation of new injuries, and exacerbation of permanent neurological dysfunction. If after recompression treatment all the disease symptoms subside, the patient should be

disqualified from diving for 1-4 weeks. However, this is a controversial issue among diving physicians, as detailed specialist examinations of divers who suffered from severe decompression illness demonstrated that the damage to the central nervous system was much greater than the presence or absence of residue symptoms might suggest. Some physicians believe that every episode of decompression illness associated with neurological symptoms should permanently disqualify patients from professional diving.

Following an episode of decompression illness, all patients with patent foramen ovale, interatrial septum defects or other endocardial or intrapulmonary blood leaks must be excluded from diving. However a recreational diver might want to continue diving after decompression illness with neurological symptoms, but this should not be allowed in those with interatrial septum defect. Divers with radiological signs of avascular necrosis detected during periodic tests are allowed to continue professional diving [3, 5, 13].

Pulmonary barotrauma and gas embolus

The return to diving after a gas embolus as a complication of pulmonary barotrauma or after pulmonary barotrauma with or without neurological symptoms is a more complex problem than in the case of decompression illness. An unambiguous decision is difficult, and opinions regarding qualification for further diving are frequently inconsistent.

The damaged site in the lungs is considered to be prone to further injuries, so specialist lung tests should be performed before giving permission to dive again. In the case of divers who suffered pulmonary barotrauma, then any objective errors during diving and potential pathologies in the lungs predisposing to injuries of the pulmonary parenchyma should be analysed. If respiratory arrest and fast, uncontrolled resurfacing did not occur during diving, causes of potential "air traps" should be sought. Pulmonary trauma during diving may be caused by a recent respiratory infection, bubbles in the pulmonary apices or intraparenchymal scarring.

Small lesions in the lungs are often invisible on a standard radiological image, so more precise diagnostics using CT is required. Abnormalities in the structure of the lungs make a diver unfit for diving. Residual neurological symptoms after treatment of gas emboli are observed much less frequently than after decompression illness. However, if they are found, these divers should be qualified as if they had decompression illness. In all cases of gas emboli then the presence of patent foramen ovale or other endocardial or intrapulmonary blood leaks should be verified. According to the British Diving Medical Advisory Council, all divers with symptoms of gas emboli (with or without symptoms of pulmonary damage) and with symptoms of pulmonary damage should be deemed permanently unfit for diving. In special cases, if the diver recovers completely from pulmonary barotrauma or gas emboli, diving may be allowed after a break of at least 3 months [3, 5, 8, 13].

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Principles of safety, hygiene and good diving practice

Zasady bezpieczeństwa, higieny i dobrej praktyki nurkowej

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Abstract Scuba diving is associated with a number of health risks which pose a potential threat to life or health of a diver; the common health risk factors include exposure to high hydrostatic pressure, hypothermia and increased partial pressure of the compressed air or breathing mixtures. For this reason, it is crucial for any divers to be in good health and to be well prepared physically and mentally to scuba dive. The article discusses the issues relating to scuba diving safety regulations stipulated by the law, planning dive sessions, marking dive sites, organizing dive groups, depths limits, breathing mixtures, emergency procedures, the limits of effort and occupational safety for underwater work, the limits of effort and nutritional recommendations for divers.

Key words: diving, safety, hygiene, practice

Streszczenie Na organizm nurka w środowisku wodnym działa szereg czynników, takich jak wysokie ciśnienie hydrostatyczne, wychłodzenie, zwiększone ciśnienia cząstkowe gazów wchodzących w skład stosowanego powietrza lub innych mieszanin oddechowych, które mogą stanowić realne zagrożenie dla zdrowia i życia. W związku z powyższym od nurkujących wymaga się nie tylko dobrego stanu zdrowia i odpowiedniego przygotowania psychofizycznego, ale również ścisłego przestrzegania zasad bezpieczeństwa, higieny i dobrej praktyki nurkowej. W pracy przedstawiono zagadnienia związane z obowiązującymi zasadami bezpieczeństwa nurków zawartymi w aktach prawnych, z planowaniem nurkowań, oznaczaniem miejsc nurkowania, formowaniem grup nurkowych, głębokością zanurzenia, stosowanymi czynnikami oddechowymi, procedurami awaryjnymi, higieną wysiłku i prac pod wodą oraz higieną osobistą i zasadami żywienia nurkujących.

Słowa kluczowe: nurkowanie, bezpieczeństwo, higiena, praktyka

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General safety regulations for scuba divers

The current safety regulations for scuba divers are presented in three legal acts: The Underwater Works Act of 17 October 2003 (Polish Official Journal of Laws of 2003, no. 199, item 1936), Regulation of the Ministry of Sports of 17 August 2006 on the principles for safe scuba diving (Polish Official Journal of Laws of 2006, no. 154, item 1103) and Regulation of the Ministry of Health of 17 September 2007, on the health conditions of performing underwater tasks (Polish Official Journal of Laws of 2007, no. 199, item 1440). The above regulations determine the

principles of organising and conducting commercial and amateur underwater activities [1-4].

According to the current regulations, only individuals with a current medical certificate confirming a lack of medical contraindications for diving, and reporting no health problems immediately before the event, can participate in scuba diving organised by approved institutions and organisations. Immediately before going under water to >50 m, each diver should undergo a control medical examination. Scuba diving is forbidden in the case of individuals with medical certificates disqualifying them from diving, showing signs of fatigue

following extensive physical effort or a sleepless night, exhausted, under the influence of alcohol or showing signs of recent alcohol consumption, or reporting any health symptoms.

Recreational scuba diving without the assistance of licensed diving agencies is another problem. Commercial availability of diving equipment and easy access to specialist literature enable scuba diving without prior training. For their own safety, these divers should undergo medical examination to confirm their fitness for diving. If they suffer from any disqualifying conditions, they should be aware of the potential consequences of scuba diving [1].

Planning for scuba diving

There are a number of principles intended to prevent diving accidents and diseases that should be observed when scuba diving. The person in charge of water entry must plan this step considering the safety rules, and perform the task according to their best knowledge and the principles of best diving practice. A preliminary assessment of potential hazards at the diving site is necessary. The development and implementation of safe procedures for underwater works is also important.

Planning for scuba diving comprises the determination of a safe technique of water entry and return to the surface after the dive. A diver working under water should have a diving partner ready to provide assistance, should it be needed. Emergency and evacuation procedures in case of danger, illness or diving accident should always be established in advance. In the case of a sudden medical emergency, the diver should receive medical assistance, as well as prompt transportation to a place where specialist medical care could be provided, if necessary.

Any necessary rescue, medical, assurance and communication equipment should be provided during every diving event. An oxygen inhalator with a minimum oxygen supply of 1500 litres should be available at the site of recreational diving. For underwater works, an adequate supply of breathing mixture should be provided for divers and for the decompression chamber. The quantity depends on the depth at which the works are conducted. During long-term deep-sea works, a minimum supply of compressed oxygen (at least 6 m³) should be secured for each diver undergoing decompression. To conduct such works, the diving base must have a double-lock decompression chamber that can hold at least 3 people at once [4-6].

Diving site

The diving site should be clearly marked with "2xB" flags, and a red flag with a white horizontal stripe, or the International maritime Alpha signal flag. At night or when visibility is limited, diving is acceptable only if signalled by a white flashing light. While diving from motor vessels, the propeller and other overboard devices should be immobilised. Prior to diving in difficult conditions, i.e. at night, during atmospheric precipitation, at an ambient or water temperature of <4°C, at an ambient temperature of >25°C, at a water temperature of >35°C, at underwater visibility of <1 m, at a water current speed of >0.5 m/s, in reservoirs under ice, in caves and shipwrecks, all safety precautions should be determined, and necessary measures should be undertaken to ensure proper diving procedure.

Particularly dangerous underwater works performed while diving include: cutting and welding metals, use of explosives, the presence of contamination with hazardous substances or chemicals, underwater search, moving and disarming mines or munitions, as well as testing new diving equipment or new technologies for underwater works. Special procedures must be applied during performance of these works. They can be conducted only by divers with the proper qualifications and experience [4-6].

Diving group

For safety reasons, the number of divers under the supervision of an instructor cannot exceed 15 people, when the class takes place on the water surface, 4 people while diving at a visibility of >0 m, 2 people at a visibility of 2-10 m, and 1 person at a visibility of up to 2 m. When diving to over 30 m, the diving group may comprise no more than 3 people. Depending on the type and conditions of diving, the instructor may designate a securing diver, a signalling diver and timekeeper. Each diver expresses consent to diving by signing the proper box in the daily diving chart, if they believe that their health status allows such activity. They should also check the equipment, and perform a control submersion up to 3 metres. Diving may start upon the approval of the instructor. While diving, the diver must dive according to the programme, follow all the commands of the instructor, maintain contact with the signalling diver, and ensure the safety and work of the other diver, when diving with a partner. If visual contact underwater is lost, the entire group must return to the surface [2, 3, 5, 7].

Dive training

Diver training should take place in reservoirs with calm waters (wind force up to 3 on the Beaufort scale), with water current of <0.5 m/s, at water temperature of $>+15^{\circ}\text{C}$ when diving without protection suits, and with water clarity of at least 2 m, as measured using a Secchi disc of diameter 30 cm. If the natural water clarity is absent or reduced, the person being trained should be attached to the instructor with a distance line. It is important that learning to dive in a certain environment, using a given methodology, does not qualify the diver to practice this sport under any other conditions. Diver training typically takes place at swimming pools and in safe water reservoirs. Diving organisations use different training methods and have different requirements for the assignment of diver grades. The skills and diver qualifications obtained during short courses in many bases along the Red Sea may be unfavourably verified when diving in the cold and dark of a Polish lake. Divers should not overestimate their skills, and all attempts at water exploration in a new environment and in unknown conditions require caution [3, 5, 8].

Diving equipment

Every diver must have a buoyancy compensator, a diving knife, depth gauge, watch and a scuba tank pressure gauge. A spare diving regulator, mandatory for the instructor supervising a group of divers, is becoming an increasingly popular safety precaution for divers. Instructors must have a safety buoy to mark the resurfacing site, and enable decompression. A diver remaining under water should be connected to a movable buoy at the surface, marked with the International signalling "Alpha" code flag, or the word "DIVER". The quality of the diving equipment, and its installation affect the safety of the diver underwater. Diving with untested or defective equipment is dangerous. Using many lines to attach various elements of the equipment increases the risk of entanglement in the water. It is unacceptable to secure the weight belt with a line. In an emergency, no element of a diver's equipment may impede fast resurfacing. If any of the elements prevents quick resurfacing, it must be disposed of, regardless of the financial losses. Life is more precious than a lead weight belt [2, 3, 5, 7].

Diving depth

The depth limit for scuba diving is 50 m. Divers cannot dive in apparatuses with a breathing mixture other than air without documented specialist training in that area. Using breathing mixtures other than air, the diver cannot exceed the depth at which the partial pressure of oxygen (PO_2) is 1.6 atm (0.16 MPa). According to Polish regulations, the acceptable diving depth with the use of air significantly exceeds those recommended in other countries. The common consensus (Professional Association of Diving Instructors - PADI, National Association of Underwater Instructors - NAUI, British Sub Aqua Club - BSAC and others) is that the depth of recreational and sports diving should not exceed >30 m, or 40 m after special training. Professional diving with the use of air is forbidden at >50 m. Shallow underwater works performed by professional divers are conducted at 20 m, and the medium-depths works comprise the range of 20-50 m. Deep underwater works are conducted at >50 m [2, 3, 5, 7].

Respiratory mixture

Planning the use of the breathing mixture is of the utmost importance for safe diving. The diver must realise that various situations underwater may impede or prevent fast resurfacing. Diving time cannot be prolonged in an uncontrolled manner, as there may not be enough breathing mixture left for proper finishing of the dive or decompression. A properly planned dive should end without reaching for the reserve. This is especially important during technical diving. A properly planned technical dive should end with $1/3$ of the gas in the tank left.

The ability to calculate the use of breathing mixture in different diving conditions is a valuable skill. The calculations should be based on the surface air consumption index (SAC), expressed in litres per minute. The index is individual and changeable for every diver (it changes with diving experience). It also depends on the water temperature during the dive, drag of the equipment while moving under water, effort and decompression. To determine one's individual SAC index, a model dive should be performed, to obtain the data for the calculations. The diver should put on the entire diving equipment and swim in it, at a moderate speed and stable depth, for at least 10 minutes. The pressure in the tanks at the beginning and end of the dive will also be used for the calculations. The SAC index is determined using the following formula [1]:

$$\text{SAC} = V(P_1 - P_2) / [T (D/10 + 1)] \text{ [l/min]}$$

where: P1 - initial gas pressure in the tanks, P2 - final gas pressure in the tanks, V - tank volume, T - diving time [minutes], D - diving depth [metres].

Practical example

While swimming at a depth of 10 m for 10 minutes, a diver used 40 atm of air from a double-tank set with a total volume of 16 litres. What is his SAC index?

$$\text{SAC} = 16 \times 40 / [10 \times (10/10 + 1)] = 640 : 20 = 32 \text{ l/min.}$$

Emergency procedures

Diving is a dangerous activity, during which health and life-threatening situations may occur. Most emergencies that a diver may experience are known. During the diver training it is necessary to learn the emergency procedures, and to practice them in pre-arranged scenarios. The emergency procedures should be simple and clear. A choice between procedures delays the reaction to a threat, as the diver loses precious time on making the right decision [4,6-9]. The time to react to a threat is aptly described by Hick's Law: "The more options you have in an emergency, the more time it will take to act. The decision time increases considerably with each new choice available".

The principles of safe diving require from divers reasonable thinking, discipline, effectiveness and engagement in the difficult training. In practice, a diver cannot [2, 3, 7, 8]:

- dive alone without proper safety measures,
- go under water or leave the diving site without the permission of the instructor;
- exceed the maximum diving depth corresponding to the diver's qualifications and technical properties of the breathing apparatus;
- disregard the time intervals determined in the decompression tables;
- dive without a pre-dive equipment safety check or control submersion.

Poor organisation of the diving and disregard for the safety principles may easily result in panic, accident, diving sickness or drowning, especially in the case of divers with little experience. Many years of underwater experience dictated the guidelines that increase the safety of divers.

DAN (Divers Alert Network) guidelines

1. Learn diving from experienced instructors.
2. Have annual check-ups by a specialist familiar with diving medicine.
3. Always dive with a partner and surface assurance.
4. Always use a buoyancy compensator, buoy, pressure gauge, depth gauge, watch and decompression tables, even if you are using a dive computer.
5. Never go below the depth you are qualified and prepared for.
6. At 4-5 m, always have a 5-minute safety stop.
7. Do not resurface faster than at 9-10 m/min and, if possible, slow down for the last few meters.
8. Take courses to improve your skills.
9. Take first aid courses and oxygen first aid courses.
10. Never ignore symptoms you are experiencing after diving, even if they occur later. Contact the nearest DAN office to clarify any doubts [10].

The following recommendations complete the above guidelines.

- While diving, take currents and the present state of the sea into account; never yo-yo dive and never hold your breath while resurfacing.
- Avoid physical effort after a dive, and have a one-day break after three days of diving.
- If you experience the symptoms of decompression illness, never try therapeutic decompression in water.
- Always have a working oxygen first aid kit at hand.
- Eat and drink in moderation, and avoid alcoholic beverages [10, 11].

Hygiene of underwater effort and work

A diver should have a balanced lifestyle, following a reasonable schedule of activities, rest, meals and sleep. A hygienic lifestyle determines good health and physical fitness for divers. Pulmonary ventilation and oxygen use depend on the effort exerted by the diver during diving and performing different activities. In organising diving for underwater works or sport training, one should develop a schedule that factors in periods of rest before and after diving, as well as time for meals. Table 1 presents the minimum resting time before and after diving.

The time a diver can remain under water while performing shallow or medium-depth works depends on the water and air temperature, as well as the technical potential of the diving equipment. A single underwater stay at $>4^{\circ}\text{C}$ cannot exceed 3 hours, whereas at $<4^{\circ}\text{C}$ it cannot exceed 2 hours. If the protection suit and the breathing mixture can be heated, the underwater stay may be extended to 6 hours. Also diving in water warmer than 18°C should not exceed 6 hours. The total diving time within 24 hours, with repeated dives, cannot exceed 6 hours. After each resurfacing, the diver should rest for 2 hours. A diver can conduct deep underwater works only once a day, and a 24-hour interval is required after each dive. The duration of an underwater stay during deep underwater works cannot exceed 1.5 hours, or 4 hours if the suit, breathing mixture and diving bell can be heated.

The technology that allows saturation diving enables long underwater stays and work at increased pressure. A single continuous stay of a diver at hyperbaric conditions while performing long-term underwater work cannot exceed 672 hours (28 days). The diver's work time under such conditions cannot be more than 8 hour per day. When conducting 24-hour underwater works, divers should be divided into groups, so that each of them can sleep for at least 8 hours before a dive. The best time for sleep is the period between 22:00 (23:00) and 06:00 (07:00). It is recommended to observe the hours of sleep and waking hours. Shortly before sleep one should not eat supper or drink strong tea or coffee. Insufficient rest and sleep time reduces the efficiency of diver's reactions to various stimuli under water, and predisposes them to decompression illness [4, 6, 7, 12].

Dietary recommendations for divers

A balanced diet is very important for divers. During time spent under water, metabolism increases, as the energy losses are higher than on the surface. If they are not covered by adequate foods, body weight loss will occur. The recommended daily calorie intake for people aged 18-35 years old, performing light work, is approximately 2800 kcal for men and 2000 kcal for women. During extensive physical effort, such as diving, an additional 300-600 kcal/h are required. Therefore, in the case of divers, the daily calorie requirement is almost 1000-2000 kcal higher compared to that of people working on the surface.

According to military regulations, a diver receives a daily field ration of approximately 5000 kcal. The foods must be rich in proteins (approx. 13-17%) and fats (approx. 35-40%), carbohydrates (approx. 45-55%), vitamins, mineral salts and water. Protein, the principal building material for cells, is found in large quantities in meat, eggs, milk and certain plants (peas and beans). Fats are the main source of energy. Humans should consume both animal and plant fats. Carbohydrates are also used to compensate for energy losses. They are found in large quantities in sugar, bread and groats. The daily nutrition plan should take into account the effect of the hyperbaric conditions of the gastrointestinal system. A diver should not eat a rich meal within 2 hours before diving. The pressure of water on the full stomach may result in painful cramps or vomiting. Divers should avoid foods such as peas, beans, broad beans, cabbage etc., as they create intestinal gases that may lead to serious disorders, especially during resurfacing. A light meal within an hour before diving is acceptable. Divers should not eat directly after diving. They can drink warm, sweet drinks instead. The main meal should be consumed 1.5 - 2 hours after diving. Intervals between meals should not be longer than 4 to 5 hours.

Divers, like other people, sometimes drink alcohol. Even small amounts of alcohol can have temporary adverse effects on cognitive processes, motor coordination, physical performance and tolerance to cold. Alcohol can also intensify the symptoms of fatigue, sea sickness and nitrogen narcosis. Diving after consumption of even small quantities of alcohol is absolutely prohibited, similarly to driving vehicles. Going under water is acceptable no sooner than 4 hours after the consumption of 50 ml of 40% alcohol. Following the consumption of 100 ml of 40% alcohol, one should not dive for 24-72 hours [6, 7, 12].

Table 1. Required rest intervals prior to and after a dive (as stipulated by the regulations of 2012 applicable in the Polish Armed Forces)
Tabela 1. Wymagany czas odpoczynku nurka przed nurkowaniem i po nurkowaniu (wg przepisów obowiązujących w wojsku z 2012 r.)

Diving depth [m]	Rest [h]		Duration of diver's stay in the vicinity of decompression chamber after diving [h]
	Before diving	After diving	
up to 20	1.0	1.0	2
up to 50	1.5	1.5	6
>50	2.0	2.0	12

Personal hygiene and diving

Strict adherence to the basic principles of personal hygiene are necessary to maintain the good physical and mental condition of the diver. Diving in soft, dry suits impairs proper ventilation of the skin, increases local secretion of sweat and causes mechanical epidermal injuries, contributing to formation of purulent skin lesions. Diving in soft, wet suits also results in epidermal injuries, which may lead to skin diseases caused by the impurities in the water. After diving, one should always wash in warm water with soap, and use clean diving undergarments when diving in dry suits.

In the army, police, fire departments and diving agencies many people may use the same equipment. In order to prevent infectious dermatoses, the equipment is disinfected. Disinfection is performed periodically, depending on the type of equipment or its exploitation. Disinfection of the equipment should be performed prior to each dive, if several divers use it one after another. A physician may recommend comprehensive disinfection of diving gear after finding an infectious disease or purulent skin lesions in divers.

The equipment, previously washed with warm water and dried, is disinfected with 70% ethyl alcohol. The disinfected gear is washed with distilled or boiled water, and blow-dried.

It is important that divers exercise regularly, to improve their fitness and physical performance (regular swimming practice, diving in pre-arranged emergency situations, training in pressure chambers during long intervals between dives). As a result, divers are well-trained, their organisms better tolerate stays in different environments, they know how to react in case of emergencies, and are less exposed and susceptible to disease.

Divers should not use stimulants (tobacco, alcohol, coffee), as they reduce general performance of the organism. Especially smoking affects the cardiovascular and respiratory systems, e.g. by reducing respiratory lung capacity and the degree of tissue oxygenation, which is particularly important for divers exerting significant effort [7, 9, 11].

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Professor Andrzej Witold Danysz - Soldier, Scientist, Teacher

Profesor Andrzej Witold Danysz - żołnierz, uczony, nauczyciel

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Abstract The subject of this paper is the life and achievements of Prof. Andrzej Witold Danysz (born 1924), Doctor Honoris Causa of the Medical University of Białystok, lieutenant-colonel of the Armed Forces of Poland, a meritorious pharmacologist, a pioneer of pharmacoradiobiology and a university lecturer, from whose handbooks a fourth generation of students, physicians and pharmacists have been learning. The paper presents the professor's lineage, the course of his education and the first years of his clandestine medical studies during the German occupation (1942–1944), his underground activities and his participation in the Warsaw Uprising of 1944. Moreover, his Krakow, Jagiellonian University (UJ) medical studies (1945–1948) and scientific work for the UJ's Pharmacology Department, crowned by the awarding of a doctor's degree (1949), are all described. The circumstances of his call to arms and his lecturer's job at the Military Centre of Medical Education in Łódź (1950–1957), which initiated the professor's activity as a lecturer, author and co-author of over a dozen handbooks on pharmacology and related sciences, published and updated many times, are also discussed. The memories of a student attending the unforgettable, masterly lectures of the professor from a period of his brief work (1963/1964) at the Military Academy of Medicine in Łódź are recalled.

Key words: Andrzej Danysz, history of Polish pharmacology, medical education system in the Armed Forces of Poland, pharmacoradiobiology, physicians in the Warsaw Uprising

Streszczenie Tematem artykułu są życie i dokonania Andrzeja Witolda Danysza (ur. 1924 r.) prof. dr. med., dr. h.c. Uniwersytetu Medycznego w Białymstoku, ppłk. WP, zasłużonego farmakologa, pioniera farmakoradiobiologii i nauczyciela akademickiego, z którego podręczników uczy się już czwarte pokolenie studentów, lekarzy i farmaceutów. W pracy przedstawiono rodowód profesora, przebieg nauki szkolnej i pierwsze lata tajnych studiów medycznych podczas okupacji (1942–1944), działalność konspiracyjną oraz udział w Powstaniu Warszawskim. Opisano również studia medyczne na Uniwersytecie Jagiellońskim (UJ) w Krakowie (1945–1948) oraz pracę naukową w Zakładzie Farmakologii UJ, uwieńczoną doktoratem (1949). Omówiono okoliczności powołania do zawodowej służby wojskowej oraz pracę dydaktyczną w Wojskowym Centrum Wyszczolenia Medycznego w Łodzi (1950–1957), która zapoczątkowała działalność profesora jako wykładowcy, autora i współautora kilkunastu podręczników farmakologii i dziedzin pokrewnych, wielokrotnie wznawianych i uaktualnianych. Przytoczono wspomnienie słuchacza niezapomnianych, mistrzowskich wykładów profesora z okresu jego epizodycznej (1963/1964) pracy w Wojskowej Akademii Medycznej w Łodzi.

Słowa kluczowe: Andrzej Danysz, historia farmakologii polskiej, farmakoradiobiologia, lekarze w Powstaniu Warszawskim, szkolnictwo medyczne w Wojsku Polskim

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While I was a student at the Military Medical Academy (WAM) in Łódź, Assoc. Prof. Andrzej Danysz MD, PhD, was one of few heads of departments who wrote textbooks for their subjects. Although in my fourth year (1963/1964), we were still using his book *Pharmacology and Formulation: Textbook for Medical Secondary Schools* [1], but in preparing for the exams we already

used the notes from lectures based on the academic textbook *in statu nascendi: Pharmacology: Review for Students of Medicine and Pharmacy*. Published in 1967, the book, commonly referred to as "Danysz's pharmacology", received awards and became a model for other authors [2]. Both textbooks, revised and complemented, achieved a total of 18 editions. Published

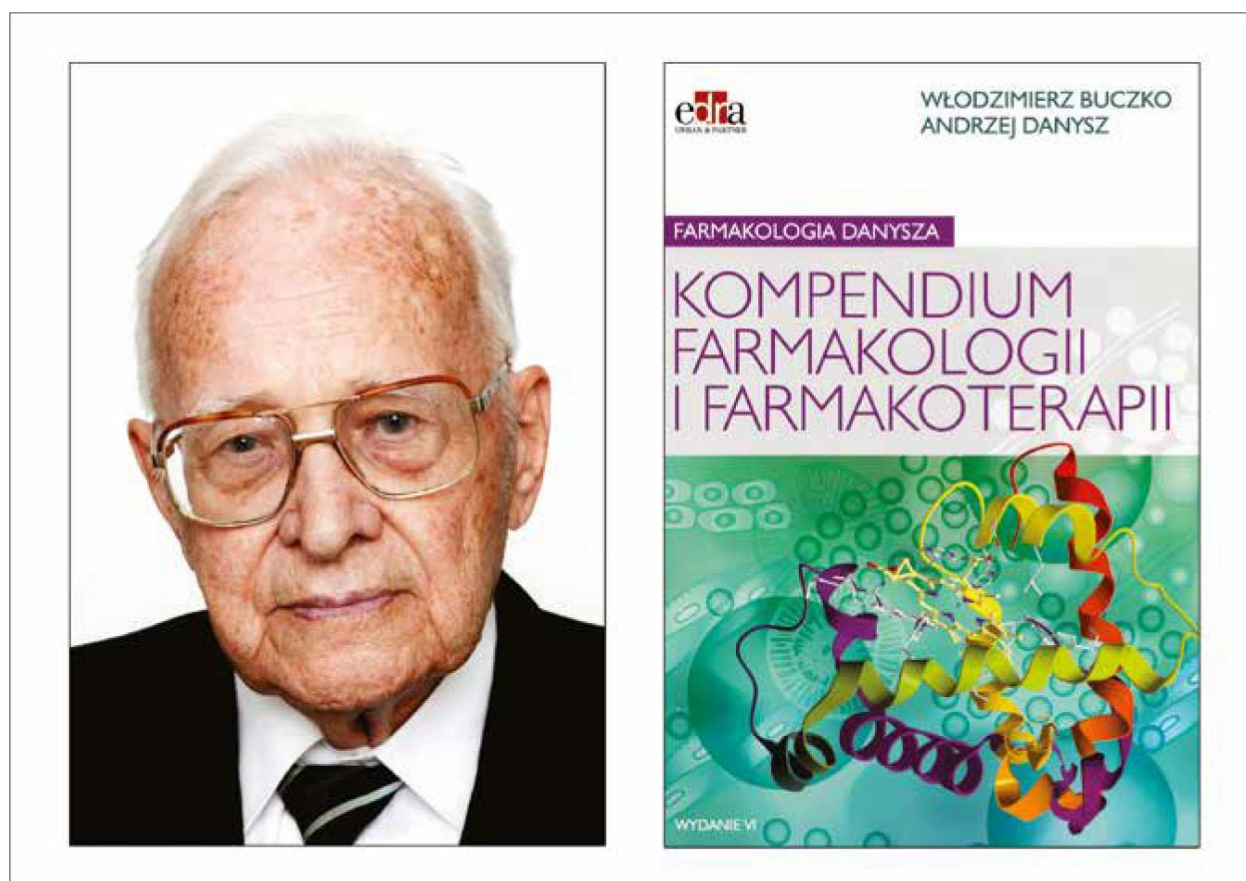


Figure 1. Professor Andrzej Danysz, photo taken in 2014 [6], and a cover of the "Danysz's Pharmacology" published in 2016 [3]

Rycina 1. Profesor Andrzej Danysz, fot. z 2014 r. [6], oraz okładka „Farmakologii Danysza” wyd. 2016 r. [3]

in 2016, *Danysz's Pharmacology. Compendium of Pharmacology and Pharmacotherapy*, updated by Prof. Włodzimierz Buczek, a student and long colleague of the textbook's author, was released half a century after the first edition of its original (Fig. 1) [3].

Working on the *Memory Book of Graduates of the 3rd Course at the Medical University of Lodz, 1960-1966*, I asked Prof. Danysz to explain to his former students the origin of the book and the circumstances under which it was published at the Military Centre for Medical Education (WCWMed) in Lodz. As a result, I conducted a number of interviews with the professor, where I learned not only about the history of the textbook, but also discovered the biography of its author, with which we were not previously familiar.

Andrzej Witold Danysz was born on 22 February 1924 in Warsaw, into a family with excellent scientific and social work traditions. Information about Jan Danysz, a microbiologist (1860-1928) and the physicists: Jan Kazimierz Danysz (1884-1914) and Marian Danysz (1909-1983) are available in all encyclopaedias, and the

history of the Danysz family has been beautifully presented in the book *From Brusów to the World* [4].

The future professor's father, Michał, who fought in the First World War and in the Polish-Soviet war of 1920, was a Polish Army officer with the rank of major, as well as a lawyer, an investigating magistrate of Military District Courts (WSO) in Warsaw and Brześć near the Bug, and from 1935 to August 1939 a presiding judge of the WSO in Przemyśl. His mother, Jadwiga nee Strzałkowska, studied psychology at the Free Polish University in Warsaw, but followed her husband from garrison to garrison, devoting her life to bringing up her sons: Andrzej and his 4 year younger brother, Witold (Fig. 2) [5].

Before the outbreak of the Second World War, Andrzej Danysz completed three years at the Kazimierz Morawski 2nd State Classical Gymnasium for Boys in Przemyśl. Since a very young age he was interested in literary fiction and in science books, two of which made a particular impression on him: *Man, the Unknown* by Alexis Carrel and *Microbe Hunters* by Paul de Kruiff. His third treasure box of knowledge was the four-volume encyclopaedia *Knowledge and Life*.



Figure 2. Michał and Jadwiga Danysz with their sons: Andrzej (second from the left) and Witold, photo taken in 1934 [5]

Rycina 2. Michał i Jadwiga Danyszowie z synami Andrzejem (drugi z lewej) i Witoldem, fot. z 1934 r. [5]

On 5 September 1939, a 15-year-old Andrzej Danysz, with permission from his mother, voluntarily reported to the regiment stationed in Żurawica near Przemyśl, commanded by his father's friend. He was enrolled as a runner. On 17 September, the regiment, moving east under the pressure of the German army, was surrounded and disarmed by the Soviet army. Private soldiers were released after interrogations, whereas Andrzej Danysz, "dangling about" in his scout's uniform among the officers, was transported with them to the prison in Kołomyja. He spent 7 days there, hiding the fact that his father was a military judge. Thanks to this, he was considered a fugitive, released, and when the military operations ended, after many adventures, he returned to Przemyśl. The arrested officers shared the tragic fate of thousands of Polish prisoners in the East.

Following the German-Soviet agreement regarding the exchange of populations from the annexed parts of Poland, the mother and her sons were allowed to move to Sosnowiec, to her parents. The father, who had avoided imprisonment after the capitulation of the Polish Army and

was in hiding from the NKVD, joined the family, having secretly crossed the San River. In Autumn 1940, with the help of relatives, they all arrived in Warsaw.

Andrzej Danysz started attending the secret Władysław Giżycki Gymnasium in Wierzbno. In 1942 he passed the final secondary school exams and the entry exam to Jan Zaorski's PhD school, officially named "Private Fachschule für Sanitäres Hilfspersonal in Warschau", where a programme of university medical studies was taught. In the first year, Danysz learned the material corresponding to two years of studies. As he recalls: "The school had great lecturers: Professor Władysław Kapuściński (physics), Stanisław Przyłęcki (chemistry), Stefan Różycki (anatomy) and others, who were not only masters of language but also high-profile scientists, recognised in Poland and abroad. First and foremost, they had brilliant personalities, and I hold them in my memory to this day".

After passing the exam in anatomy, Professor Stefan Różycki offered Andrzej Danysz the position of "anatomy demonstrator". It would not only provide Danysz with an



Figure 3. Cadet Corporal Andrzej Danysz during the Warsaw Uprising in 1944 (with armband) [7]

Rycina 3. Kpr. pchor. Andrzej Danysz w Powstaniu Warszawskim 1944 (z opaską na ramieniu) [7]

employee "Ausweis", but also with a small salary. As a demonstrator, from 1 September 1943 until the Uprising, he ran seminars with small groups of students, and was present at anatomy exams. Previously, due to the difficult financial situation of the family, after classes he did temporary jobs, such as distributing coal and potatoes on a rented cart, made soap, signed it with "AD" and sold it in Kercelli Square (Kercelak).

In 1942, Andrzej Danysz started working for the counter-intelligence section of the underground Home Army. Due to his critical assessment of the chances of winning in military combat, his nom de guerre was "Philosopher". After his unmasking, preventing further counter-intelligence operations, in May 1944 he graduated from the Reserve Cadets' School with the rank of corporal cadet. In the Warsaw Uprising he fought in the "Grażyna" company, in the group of Lt. "Harnaś", near the Chief Post Office in Napoleon Square and near the Holy Cross Church (Fig. 3). Later, he assisted in treating the wounded, and organised provisions for the insurgents' Polish Red Cross hospital at 15 Koszykowa Street. During one of his expeditions to get barley from the storage of the Habermusch and Schiele brewery on Żelazna Street, he was seriously wounded. The wound then became infected. He believes that he survived only thanks to the *Prontosil rubrum* sulfonamide miraculously procured by his mother. After the fall of the Uprising on 2 October 1944, having spent some time in a camp for the displaced population of Warsaw, Danysz and his mother stayed in Piastów. From there they went by train to Krakow. After a while, Witold, seriously wounded in the Uprising, joined them [5-8].

In Krakow Andrzej Danysz reported to the St. Lazarus hospital at 7 Kopernika Street, and was employed as a paramedic. At the same time, he attended the secret



Figure 4. Michał Danysz with his sons: Andrzej (first from the left) and Witold in 1949. [5].

Rycina 4. Michał Danysz z synami Andrzejem (pierwszy z lewej) i Witoldem w 1949 r. [5]

classes conducted by the professors of the Medical Faculty of the Poznań University, evacuated to Krakow during the occupation. When the city was freed in January 1945, Danysz signed up for the third year studies at the Medical Faculty of the Jagiellonian University (UJ), and was employed as a junior assistant in the Institute of Normal Anatomy. He also engaged in social work at the Board of the Medical Science Club of Fraternal Student Assistance at the Jagiellonian University, co-organising a free-of-charge outpatient procedure clinic and emergency injection department [7].

After the war his father rejoined the family, as during the Uprising he was outside Warsaw and then joined the Polish Army. Appointed the commandant of the 1st Białostocki Provisions Regiment, he led it to Berlin. He completed his military service in 1947, with the rank of lieutenant colonel and the position of commandant of the Krakow garrison. After retiring, he passed the time completing documents for the family chronicle (Fig. 4) [4, 5, 8].

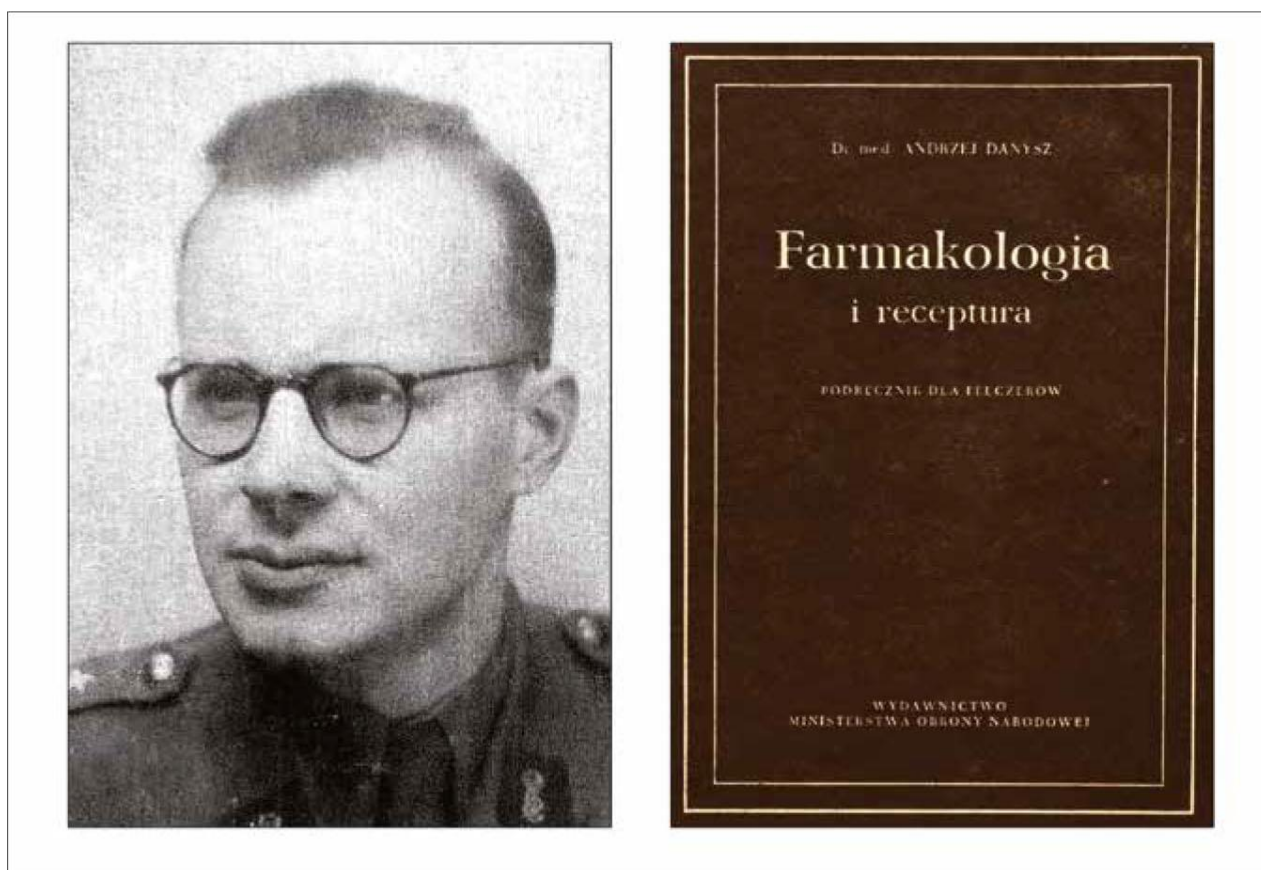


Figure 5. Lt. Andrzej Danysz, MD, PhD - photo taken in 1950 [11] and the cover of the Pharmacology and Dispensing Handbook for Medical Assistants published in 1954

Rycina 5. Por. dr med. Andrzej Danysz fot. z 1950 r. [11] i okładka „Podręcznika farmakologii i receptury dla felczerów” z 1954 r.

In 1947, Andrzej Danysz completed his studies and started to look for a job. Initially, he worked at the Psychiatry Clinic at the Jagiellonian University, run by Prof. Eugeniusz Brzezicki. There he wrote his first scientific study “A case of skriptotymic psychopathy” - which, as he says, fortunately remained unpublished. The therapeutic nihilism prevalent at that time, and the use of electric shock treatment for nearly all diagnoses, discouraged him from psychiatry. The next choice, this time more successful, was the Institute of Pharmacology at the Jagiellonian University, supervised by Prof. Janusz Supniewski. Danysz started working as a junior assistant, and then after receiving a medical diploma in June 1948 as a senior assistant. Only one year later, in May 1949, he received a PhD in medicine for a technically complicated experimental study on animals “Effect of nitrogen yperite on the gonads” [10]. In the same year he began collaboration with an afternoon newspaper, *Echo Krakowa*, where in the *Mały Uniwersytet* (Little University) supplement he published a number of popular science articles.

Further development of his academic career was arrested in 1950, when Danysz was called for compulsory 15-month military service. He completed a three-month Training Course for Healthcare Officers in Lodz with third best results (out of 181 participants), which theoretically gave him the right to choose his place of service. Danysz hoped to carry out his service in a city where he could continue research, but he was sent to a tank regiment in Nysa. After dramatic discussions at the Human Resources Department of the Ministry of National Defence, he was appointed a physician at the outpatient clinic of the Military Holiday Resort in Zakopane-Kościelisko.

The disappointment due to the lack of scientific research was alleviated by the presence of a 20-year-old student of the Physical Education Department of the Jagiellonian University, Wiesława Dec, who was working as a hygienist doing a summer internship at the resort. In 1950, they had a church wedding, at that time not recognised by the military authorities, followed by a civil ceremony in 1951. They had a happy marriage for over

half a century, becoming parents to a daughter, Beata Anna (a Polish literature major), and a son, Wojciech (professor of pharmacology), and then grandparents to four granddaughters [8].

In October 1950, Lt. Andrzej Danysz MD, PhD, with the support of Prof. Janusz Supniewski and Assistant Professor Józef Hano, took part in a competition for the position of the newly organised Chair of Pharmacology at the Medical Academy in Szczecin. After the approval of his candidacy by the academy authorities, he requested a release from the army, or a transfer to Szczecin. In response, he was called to the Human Resources Department at the Ministry of National Defence, where he was told: "If you are such a good pharmacologist, we are moving you to the Military Centre for Medical Education in Lodz as a senior lecturer of pharmacology of the Officer School for Medical Assistants". Danysz had to follow this order, as - similarly to almost all physicians doing compulsory temporary service at that time - he was enrolled into professional military service for an unlimited period [8].

At the Military centre for Medical Education Lt. Andrzej Danysz MD, PhD (in 1952 promoted to captain) revealed his outstanding personal and professional qualities. In employee assessments, signed by the colonel physicians Bogumił Kołaczkowski, Władysław Płoszko, Tadeusz Mockało, Zbigniew Zapędowski and Tadeusz Obara, we read: "(...) Thorough preparedness and understanding of the subject allow him to conduct lectures and classes with ease, in a comprehensible and interesting manner, yet maintaining high scientific and methodological qualities. (...) He demonstrates significant organisational skills, creativity and initiative. He organised a model lecture hall, a museum of therapeutic plants. He introduced a number of ingenious teaching materials, and his lectures and classes are enriched, as well as made easier, due to the introduction of impressive and educating presentations. He takes continuous care of the cadets, learns about their individual problems with the subject, and offers assistance. He is very demanding, but fair in his assessment of one's knowledge. (...) Friendly, fair, honest and truthful, with marked personal dignity. (...) He demonstrates high levels of courage. (...) Exceptionally tactful, disciplined and polite. (...) Cheerful and optimistically predisposed to people. (...) Despite his active work and achievements, he does not want to join the Party" (Fig. 5) [11].

Professor Danysz reminisces: "One day, Colonel Płoszko, deputy head of the Military Centre for Medical Education, called me and showed me a letter: 'A blooming civilian from Lublin wrote to the Command of the Military Centre for Medical Education demanding synopses of pharmacology lectures. So I'm telling you, Captain Danysz, sit on your a.., get down to work, and in three

months bring me a ready manuscript for a pharmacology textbook for medical assistants. It was an order. But clearly, if it was outside my area of interest and preparation, it would probably not be followed. So I "sat down to work", and in 3 months the manuscript for the textbook was ready. It was quickly published by the Ministry of National Defence, and proved so popular that a second edition followed six months later. Further editions, always updated and corrected, were published by PZWL [12]. The pharmacology textbook for secondary medical schools was very popular, and went through 12 editions (the last one in 1985) [1]. I also wrote a chapter on pharmacology in a collective textbook for nursing schools - it had two editions [13]. Together with the pathology teacher at that time at the Officer School for Medical Assistants, Lt. Andrzej Głuszczyński MD, PhD, we prepared a pathology textbook for schools for medical assistants, and it also had as many as 9 editions" [14-16].

Apart from his basic educational work at the Officer School for Medical Assistants, Doctor Danysz also worked (1951 - 1957) as a senior assistant at the Institute of General Pathology at Medical Academy in Lodz. He often conducted lectures instead of the professor, and developed a set of slides illustrating his booklet on the effects of tobacco smoking on the human organism. Danysz was also the head (1953-1956) of the Pathophysiology Laboratory at the Department of Field Internal Medicine, Military Centre for Medical Education in Lodz, supervised by Prof. Andrzej Himmel [8].

As he "enjoyed teaching", and had the time and energy required, he was also involved in the activities of the Popular Science Society, presenting lectures (mainly regarding the harmful effects of smoking), even in distant villages in the Łódzkie province. As a spectacular proof of the toxicity of nicotine, he placed one drop of nicotine solution into the eye of a pigeon. The animal would fly 5-10 metres away, then fall to the ground dead. It made a strong impression on the audience. "Today," says the professor, "I would not do it, for ethical reasons".

Since he was a student, the professor showed great enthusiasm for the declamation of poems and other literary works. It satisfied his need for artistic expression, as well as helping him to develop his skills as a lecturer. Already as a student at the Jagiellonian University, Danysz wanted to master this art, taking lessons from a well-known teacher of speech, Jerzy Ronard Bujański, then later in Lodz he continued exploring his oratory skills with Jerzy Klimaszewski. At the Military Centre for Medical Education he organised an artistic group of cadets who gained awards in military competitions. Danysz himself also took part in declamation competitions, collecting many awards and prizes (Fig. 6).

When in 1956 Capt. Andrzej Danysz MD, PhD was offered the position of the head of the Institute of



Figure 6. The award won by Maj. Andrzej Danysz, MD, PhD in a declamation contest in 1957

Rycina 6. Plakietka nagrody uzyskanej przez mjr. dr. med. Andrzeja Danysza w konkursie recytatorskim w 1957 r.

Pharmacology at the Medical Academy of Białystok, the military authorities, with some hesitation, decided to release him from military service on 11 August 1957, promoting him to the rank of major. The opinion of the deputy Commandant for Science of the Military Centre for Medical Education, Col. Władysław Płoszko: "Military service interrupted Andrzej Danysz's scientific work. (...) At present, due to the lack of a Military Medical Academy, he has no perspectives for scientific development in the army. To enable such development and full engagement in scientific and research work, Captain Danysz should be released from professional military service, especially considering that lectures for middle-tier medical personnel do not require a teacher with such high scientific qualifications" [11].

When in 1957, at the age of 33, Dr Danysz became acting head of the Chair and Institute of Pharmacology at the Medical Academy of Białystok, he started organising research work from the beginning, gathering a group of young enthusiasts. For the first time in his life he went abroad, to Bern in Switzerland, for a month-long scientific internship. In February 1961, he completed his habilitation procedure, and received a title of Associate Professor, based on the study "Reactions of adrenergic and cholinergic receptors in acute radiation sickness" [17], and as a result he was appointed the head of his department. In 1964, following the decision of the Military Department of the Ministry of Health and Social Services, he created the Research Centre for Radiobiology on the basis of the Institute of Pharmacology, where he was to develop new agents for pharmacological radioprotection. The results of the centre's research were summarised in

a monograph co-authored with Danuta Koćmierska-Grodzka, *Radiopharmacology – Effects of Drugs on an Irradiated Organism*, the first work of this type in international literature [18]. For his achievements in this field, Danysz received a golden medal of Academie Internationale de Lutece in Paris. At the same time, Hans Selye received the same award for his commonly known work on stress [19].

In Białystok Assoc. Prof. Andrzej Danysz continued the work started at the Military Centre for Medical Education on the pharmacology textbook for students and physicians: *Pharmacology – Revision for Students of Medicine and Pharmacy*. The book was published in 1967, although the Society of Polish Students had already published twice a manuscript under the same title, based on the notes from professor's lectures [20]. Some claimed that "the book was a daring attempt to explain the complex mechanisms behind the actions of drugs using concise and brief description where possible, accompanied by numerous conceptual formulas and pictograms. In search for new educational methods, the introduction of a symbolic presentation system was certainly a novel approach. (...) It could be considered a transitional stage to CAT (Computer Assisted Teaching)" [21].

Despite these achievements, in 1963 Assist. Prof. Andrzej Danysz considered returning to Łódź, to accept the position of head of the Chair of Pharmacology at the Military Medical Academy. His report regarding this idea was approved by Commandant Rector of the Military Medical Academy, Gen. Prof. Marian Garlicki [11], but eventually the plans were not implemented. Fortunately,

WOJSKOWA AKADEMIA MEDYCZNA
 Fakultet Lekarski
 Imię i nazwisko słuchacza: Andrzej Danysz Nr albumu: 588/L
 Rok akad. 1963/64 Semestr VIII

EGZAMINY			Egzaminy poprawcze			
Nazwa przedmiotu	Data	Ocena	Podpis egzaminującego	Data	Ocena	Podpis egzamin.
Farmakologia	27.05.64	Dobry	[Signature]			

Figure 7. Entry made by Prof. Andrzej Danysz in the author's student's book on May 27, 1964

Rycina 7. Wpis prof. Andrzeja Danysza w indeksie autora artykułu z 27.05.1964 r.

our third year course in the year 1963/1964 had the pleasure to hear the master lectures and take exams with Professor Danysz. 50 years after graduating, Col. Andrzej Gładysz MD, graduate of the third course at the Military Medical Academy, reminisced: "In the fourth year, we had a new pharmacology teacher, Assist. Prof. Andrzej Danysz from the Medical Academy of Białystok. His arrival was preceded by woeful news that he was extremely demanding, meticulous, and failed most of his students in the exams. (...) Pharmacology lectures took place at the Polesie cinema in Retkinia, and were presented from the stage. The inauguration lecture started with an unexpected question: 'Do you know Mr Jowialski's stories?' In response to the silence that met his question, he continued. 'So listen'. Then he presented an exquisitely prepared lecture, in which he detailed his expectations, their scope, and other similar issues. He appeared to be a kind and straightforward person, with an excellent understanding of the subject he taught. One could say that he described precisely the meaning of pharmacology for future physicians. (...) Personally, I was terrified of the pharmacology exam, and I studied the subject regularly. The professor's favourite topic in pharmacology was psychotropic drugs, so he paid a lot of attention to them. Apart from his own textbook, Professor Danysz recommended the book by Professor Józef Hano, Jan Venulet's monograph, and other publications. (...) During the exam, the professor first asked questions regarding general pharmacology, followed by detailed pharmacology and formulations. I managed to pass the exam, but this was not always the case. One of my colleagues asked about the origin of penicillin, starting in a flamboyant style, mentioned two preparations, and finished by saying "And you know the rest." "Yes, I do know, indeed. The question is, do you," the professor said. Some students, after a passing the exam in pharmacology, had a ritual bath in a fire pool near our building. One day Professor Danysz, who was supervising an exam in the nearby dean's office, heard the noise and went outside, "catching" a happy cadet running with a towel around his waist to the building after

a bath. The professor commented: "Virtue witnessed." Learning about the tradition brightened Danysz's mood, and all the students taking the exam on that day passed" [22].

In 1969, the Ministry of Health and Social Services appointed Assist. Prof. Andrzej Danysz the head of the Pharmacology Department at the Institute of Medicines in Warsaw. In 1970 he received the title of Associate Professor, and in 1980 of a full Professor. In 1982 he became the Chief Director of the Institute of Medicines. He held this position for 9 years. On 1 December 1992 Danysz became the head of the Pharmacology Department of the Institute of Pharmacy in Warsaw [8].

His research interests focused on chemical radioprotection, he also created the concept of targeted organ pharmacotherapy, which involved the distribution of drugs using so-called membrane activators, which allowed the selective accumulation of the drug in the affected organ [19, 23]. After he retired in 1994, Danysz continued publishing books, e.g. in 1997 he published the monumental *History of Pharmacology* [24] and *Doctors in the Warsaw Uprising* [25].

For his life achievements, Prof. Danysz received numerous medals and honours: "For outstanding merit in scientific and educational work" he received the Golden Cross of Merit (1976), Cavalier's Cross (1982), Officer's Cross (1994), and for "outstanding merit in work for Polish independence, and achievement in social work in veteran organisations" he was decorated with the Commander's Cross of the Order of Polonia Restituta (2004). In 2010 Danysz received the title and ring *Medicus Nobilis* from the Polish Medical Association "for 50 years of active work for the improvement of health in Polish society" [23].

In 1989, the Senate of the Medical Academy of Białystok awarded Prof. Andrzej Danysz with the *honoris causa* title and the following comment: "Working at our Academy as the head of the Institute of Pharmacology, he was an example for young assistants not only with regard to his love for work, but also respect for oneself and others. Granting this title will be the most precious stone in the crown of our academy." [26].

The most important achievements of Prof. Danysz, in his own opinion, include over 500 scientific publications, several pharmacology textbooks with numerous editions and updates, 3 monographs, 41 conferred doctors, 7 of whom completed habilitation procedures, and 4 became professors [1-3, 12-14, 18, 20, 24-25, 27-31]. He emphasises that not even half of his success would be possible without the efforts and love of his parents, and especially his mother, in his childhood and youth, as well as the support of his wife, who was his best friend, colleague, pal and co-worker in adulthood [8].

The outstanding achievements of Professor Andrzej Danysz give him the right to repeat after Horace: *Exegi*

monumentum aere perennius. We, his students, owe him the expression of gratitude: Tibi, Professor, gratias agimus.

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Press Articles about Military Hospitals in Warsaw during the Polish-Soviet War of 1920

Prasa o szpitalach wojskowych w Warszawie w okresie wojny polsko-bolszewickiej 1920 r.

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Abstract On the occasion of the centenary of the Battle of Warsaw in 1920 it was examined whether and what the press in the capital discussed about the functioning of the military hospitals in Warsaw during the fighting on its outskirts. Digitalised issues of journals for the years published 100 years ago were reviewed for this purpose. Articles on the subject were found in "Gazeta Warszawska", "Kurier Warszawski" and "Tygodnik Ilustrowany". They referred to the Ujazdowski Hospital (Main Military Hospital), the Red Cross Hospital and the Military Hospital of Mołodeczno, evacuated to Warsaw. The paper presents parts of those articles with added biographical notes on the people mentioned in them. Photos illustrating the medical support rendered within the area of war operations and in military hospitals were digitally restored, and archival pictures of the hospitals described were added. The press information described here has not previously been mentioned in the literature on the subject, but constitutes a valuable supplement to the source base for research into the history of military hospitals during the Polish-Soviet War of 1920.

Key words: Polish-Soviet war of 1920, history of military healthcare, Ujazdowski Hospital

Streszczenie Z okazji obchodów setnej rocznicy Bitwy Warszawskiej 1920 r. zbadano, czy i co prasa stołeczna pisała o funkcjonowaniu szpitali wojskowych w Warszawie w okresie walk na jej przedpolach. W tym celu przejrano zdigitalizowane roczniki czasopism sprzed 100 lat. Artykuły na ten temat znaleziono w „Gazecie Warszawskiej”, „Kurierze Warszawskim” oraz „Tygodniku Ilustrowanym”. Dotyczyły one Szpitala Ujazdowskiego (Głównego Szpitala Wojskowego), Szpitala Czerwonego Krzyża oraz ewakuowanego do Warszawy szpitala wojskowego z Mołodeczna. W pracy przedstawiono fragmenty tych publikacji, opatrując przypisaniami biograficznymi wymienione w nich osoby. Odświeżono elektronicznie fotografie ilustrujące pomoc medyczną na polu walki i w szpitalach wojskowych. Dołączono archiwalne fotografie opisywanych szpitali. Uzyskane informacje prasowe, nieprzywoływane dotychczas w literaturze przedmiotu, stanowią wartościowe uzupełnienie bazy źródłowej do badań szpitalnictwa wojskowego w okresie wojny polsko-bolszewickiej 1920 r.

Słowa kluczowe: wojna polsko-bolszewicka 1920, historia wojskowej służby zdrowia, Szpital Ujazdowski

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Introduction

Studies on Polish Army healthcare during the Polish-Soviet war of 1920 have shown little interest in recognising problems outside the main military operations [1-8]. Therefore, by searching for information about the

daily functioning of the Ujazdowski Hospital and other military hospitals in Warsaw during the period of combat on the outskirts of the city, the presence and focus of press reports on this subject available at that time could be verified.

Digitalised annals of Warsaw magazines from 100 years ago were analysed, to seek information about the assistance provided to the wounded and ill soldiers by the assigned 21 hospital departments (number of beds in brackets): Ujazdowski – Main Military Hospital (1500), Mokotowski District Hospital, 27 Nowowiejska St. (1210), Military Epidemiological Hospital, 12 Pokorna St. (500), Czerniakowski Military Epidemiological Hospital, 167 Czerniakowska St. (1000), Military Hospital No. 5, Długa St. (175), Military Hospital No. 6, Jagiellońska St. (167), Military Hospital No. 9, 24 Górczewska St. (174), Military Hospital No. 10, Wielka St. (150), Polish Red Cross Hospital No. 1, 6 Smolna St. (460), Polish Red Cross Hospital No. 2, Dobra St. (260), Polish Red Cross Hospital No. 3, 6 Koszykowa St. or 6 Mokotowska St. (250), Polish Red Cross Hospital No. 4 in Grochów (410), Helena Paderewska Polish White Cross Hospital, 67 Dzielna St. (95), Military Investigation Prison Hospital (50), Recovery House in Colosseum (138), Military Department at the Clinic of Baby Jesus, Nowogrodzka St. (100), Officer Department at the Evangelic Hospital, 10 Karmelicka St. (78), Military Department at the Holy Spirit Hospital, Elektoralna St. (146), Military Department at the St. Stanislaus Hospital, 37 Wolska St. (40), Polish Red Cross Department at St. Roch's Hospital, 24 Krakowskie Przedmieście St. (30) and Military Department at the St. Joseph Institution (5) [7].

Articles on the subject were found in *Gazeta Warszawska*, *Kurier Warszawski* and *Tygodnik Ilustrowany*. They mentioned the Ujazdowski Hospital (Main Military Hospital), the Red Cross Hospital at 6 Smolna St., and the Military Hospital in Mołodeczno, evacuated to Warsaw during the Soviet counter-offensive. Most of these articles were written by Stanisław Miłaszewski (1886-1944), a playwright and publicist [8,9], a close co-worker of Gen. Józef Haller, the General Inspector of the Voluntary Army at that time and the commandant of the forces defending the pre-frontiers of the capital city [10]. The identity of the author with the signature "V-T" has not been established, but it is possible it was also S. Miłaszewski. This study presents the above articles, excluding the information that is repeated. The spelling has been updated, and short biographical notes regarding the names mentioned in the text have been added. The electronically enhanced photographs used here (with original captions) were selected from those published in *Tygodnik Ilustrowany* [11].

Ujazdowski Hospital and the Military Sanitary Institute [12]

The Ujazdowski Hospital, which I am visiting these days (Fig. 1) [13], is known as not only the biggest, but also the best organised hospital in Poland. I was here briefly at the beginning of last year, a few months after the invaders were banished. Poverty and signs of devastation following the German management were visible everywhere [14]. Today, (...) the Ujazdowski Hospital is a model for any institution of this type. (...) A model of organisation, management and order, that is, as the structure and type of buildings are rather outdated and do not meet the current standards. Nevertheless, due to the immense work, the hospital has become a flagship of military hospital care. This is largely due to the organisational talent and perseverance of Col. Zieliński PhD,¹ the hospital's commandant who, sparing no effort, with the help of his deputy, formerly Capt. Latinik PhD,² and for the past few months Maj. Jakubowski PhD,³ has improved the condition of the hospital [15].

Maj. Jakubowski PhD, currently the acting commandant following the recent promotion of the previous commandant, Col. Zieliński, showed me around the numerous hospital buildings. We visit the wards, a large roentgen laboratory equipped in the European style, the kitchen – a veritable manufacturer of food, putting Americans in awe; we take a peek into the huge warehouses filled with food, the bakery, laundry room, lice treatment room and the disinfection rooms that every patient arriving at the hospital – and in the past year over 78 patients have been treated here – must go through. While we were visiting the bacteriology laboratory of the Military sanitary Council, its head, Capt. Szymanowski PhD,⁴ together with his colleague, Owczarewicz PhD,⁵ were busy studying the toxic effect of various gases on today's most dangerous parasites: lice and bedbugs. I witnessed an episode of the war against the disseminators of typhoid, carried out by our military forces with the use of scientific methods. The whole place was spotlessly clean and shining, from the polished floors to the white walls and furniture.

The ability to satisfy many needs demonstrates the healthy and rational management of the hospital. I have seen electric devices for peeling and cutting potatoes, or making cold meats, created by a local inventor from metal scraps and plates, abandoned even by the practical

¹ Ignacy Zieliński (1871-1955), Brig. Gen., MD, commandant of the 5th District Hospital in Krakow (1918-1920) and the Ujazdowski Hospital (10/1920 – 06/1921), sanitary chief of the 6th Corps District Command in Lviv (1921-1927)

² Jan Latinik (1871-1928), Capt., physician, brother of Gen. Franciszek Latinik, the military governor of Warsaw (1920)

³ Czesław Jakubowski (1882-1932), Lt. Col., physician, otolaryngologist and specialist in the treatment of tuberculosis, organiser and commandant of the military hospital in Rzeszów (1919), deputy

commandant and acting commandant of the Ujazdowski Hospital (12/1919 – 09/1920), head of the Central Sanitary Warehouse (1921-1924)

⁴ Zygmunt Szymanowski (1873-1956), Lt. Col., MD, prof. of bacteriology at the University of Warsaw (1923-1939)

⁵ Leon Owczarewicz (1882-1946), Col. Assist. Prof., MD, head of the bacteriology laboratory at the Hospital of the Centre for Sanitary Education (1918-1939), Assist. Prof. of the University of Warsaw (1928 - 1939)

Germans. The hospital has such a luxury as a pig farm with a hundred animals, enough to provide patients with meat products, at the hospital farm. I also visited the inn, library, laboratories where convalescents pass their time studying and learning new professions.

"It is our ambition," says Maj. Jakubowski, full of energy, "to provide illiterate soldiers who come here for treatment with the ability to read and write." Patients have many entertainments. Apart from an inn, where they can read magazines, play checkers and domino, they can use the winter and summer theatre and a court for games, gymnastics and other play.

When I ask the major about participation of society in provisions for the hospital and patients, he answers: "Naturally, such participation is always welcome, provided it does not go against the goals and regulations of the hospital. Our patients are clean and properly dressed, they are never hungry. Uncontrolled sending of food by philanthropists, without consideration for the specificity of the patient's conditions, is undesirable. Therefore help from society should be targeted and consistent with the guidelines of the hospital's management, so that no privileged groups or individuals occur."

When visiting the ward for patients with neuroses, I asked the head of the department, an outstanding neurologist, Doctor Koelichen,⁶ about his opinion regarding the nervous condition of the army. "Regarding their nervous condition, the soldiers are resilient and completely healthy. Certain fatigue or a propensity for nervous disorders can be seen in officers who took active part in the Great War."

I also talked to the participants of the meeting between the sanitary chiefs of general districts. Such meetings are called periodically, to discuss the needs of hospitals, and they contribute greatly to the standardisation and intensification of the fighting conducted by our army on the health front. I learned that the situation is good everywhere, and that we do not need to worry about the health of our soldiers.



Figure 1. The Ujazdowski Hospital (Main Military Hospital), picture taken in July 1944 [13]

Rycina 1. Szpital Ujazdowski (Szpital Główny Wojskowy), widok z lipca 1944 r. [13]

I take the opportunity to ask General Zapałowicz,⁷ chief of the sanitary service in the Krakow General District, whether he is aware of the ongoing campaign in certain Russian journals published abroad accusing Poland of starving and bullying the prisoners of war in the Krakow District. "Sir," responded General Zapałowicz, "the camps for prisoners of war were visited by ministerial representatives, numerous missions of the Red Cross, both Polish and foreign, as well as journalists, and they all agreed that the accusations were groundless, which has already been explained in the press. If you happen to be in Krakow, you can see for yourself." I ask Professor Dmochowski,⁸ presently a lieutenant colonel and president of the Military Sanitary Council, gathering the greatest representatives of medical science, created to support the army with knowledge in that respect, to provide information. "You are asking if we are going to have a Military Medical Academy? At the moment, no decisions have been made. We need to take into consideration the experience of other countries and armies. The Germans closed their academy before the war. The French are following suit. If establishing an academy is considered unnecessary or undesirable, then after the war all physicians will be required to spend a certain period of time on theoretical and practical work under the supervision of the Council, prior to getting an assignment in the army. This internship will take place in the Ujazdowski Hospital, which is going to be excluded from the district authority and be made available to the

⁶ Jan Koelichen (1871-1952), Col., MD, PhD, scientific head of the Neurology Department at the Ujazdowski Hospital (1918-1928), first editor of *Military Physician* (1920-1921)

⁷ Tadeusz Zapałowicz (1859-1936), Div. Gen., MD, Sanitary Chief of the Krakow General District Command (1919-1921)

⁸ Zdzisław Dmochowski (1864-1924), Brig. Gen. Prof. MD, PhD, President of the Military Sanitary Council (1919-1921), Head of the Department of Pathological Anatomy at the Military Sanitary Council (1921-1923)

Council." The scientific activity of doctors is stimulated by associations of military physicians, created in all hospitals. The Sanitary Council publishes the *Military Physician* journal as the central point of this movement, and considers the most important issues related to providing the highest possible level of military healthcare.

Military hospitals in Warsaw [15]

Following the order of General Haller, the commandant of the defence of Warsaw and the northern front, we visited military hospitals in the capital. (...) The Main Military Hospital – this is the present name of the Ujazdowski Hospital, where we are going first. Its commandant is Colonel Doctor Zieliński, whose deputy is Lieutenant-Colonel Doctor Jakubowski, a man of great energy, excellent organisational skills and a wonderful host. "Our main task at the moment is to ensure that the thousands of wounded and sick soldiers brought to the hospital are quickly made fit for transport further into the country," says Jakubowski. "Out of necessity, our hospital has become a huge transit centre. Every day we need over a thousand free beds, and must be ready to admit wounded soldiers in need of first aid. Due to this traffic, which is decreasing and will be further decreasing together with the moving front, our facility is now a field hospital. We have 18 wards, five of which are presently occupied by patients with dysentery, posing a serious problem. At the moment, we are treating 680 patients." "What is the mortality rate?" "It is minimal. Almost all the patients with dysentery recover, apart from those who are brought here already in agony. We use an excellent serum, whose beneficial effects have already been proven in the Krakow [16]." Department of Surgery. The wounded, mostly from the great battle of Warsaw, (...) are lying on beds in two rows in a spacious, bright room that can hold thirty patients. Those in better condition are reading or smoking cigarettes. Those after serious surgical procedures are easily recognisable due to their pallor. One of them, a young 19-year-old boy named Gont, has had his leg amputated below the knee. "A piece of shrapnel hit me in the trenches near Wyszogród," he says quietly, looking at me serenely. "It was at sunrise." (...) Nearby lies a volunteer, Władysław Zaorski. He was wounded in both thighs a battle near the village of Wrony by the Wkra River. Soon he will recover and return to the 205th Infantry Regiment. A private from the 29th Infantry Regiment, decimated by constant attacks, describes how he "ran away from the battlefield to avoid imprisonment" with gunshot wounds to the hip and arm.

I asked brave Major Walter,⁹ who had been wounded a few hours before him and was taken from the field, much

to the grief of the entire regiment, about his well-being. A soldier named Przybysz from the Mińsk regiment. "They had to amputate his foot," says a nurse. "There was a risk of gangrene." (...) There are several soldiers with head wounds in the room. Some received successful cranial trepanning. Despite the severity of the procedure, they are recovering and regaining strength. (...) The volunteers are particularly positive patients. Without the experience and training of their brothers in arms, they cover their shortcomings with courage and moral standing, following the suit of their officers who, in leading the partially trained young soldiers into combat, provide a model of bravery. Therefore, the percentage of seriously wounded is higher in this group. (...)

Nurses with fine figures and pretty faces tell us about the patients they are looking after. "Our brave boys do not want for anything here," they say. "All of them show courage and good spirits in the face of suffering." Apart from a number of nurses and other personnel, the hospital employs forty-two physicians. The Ujazdowski Hospital is located on a large parcel of land. It comprises two large buildings and a number of smaller ones. Some of them were built from wood, to provide adequate ventilation to patients with lung diseases. The Ujazdowski Hospital buildings are scattered around a large garden, where old, tall trees are abundant, but instead of lawns and flower beds, vegetables grow. The excellent "agricultural" and horticultural management helps to provide food for the patients, and allows to avoid the purchase of essential produce at high prices. The institution, housing several thousand people, has a highly-populated town-garden. Apart from the garden areas, livestock is also kept here, including approximately a hundred and fifty pigs, and the local butchery produces famously delicious meat products. The warehouses are large and constantly well-stocked.

A separate building, erected especially for the visit of the former emperor, Nicholas II, houses a barber's. In the spacious kitchen, the large metre-high cauldrons make a great impression. The whole place is sparkling clean. Eight disinfectors clean the patient's clothes from the bugs and germs brought by them from outside. The chapel can be found in the main pavilion. It is a sizeable room, with space for at least five hundred people. In the dome, images of the four evangelists have been painted with great skill. The altar is decorated with a large crucifix. The hospital chaplain, Father Tyszko,¹⁰ performs a mass service every day, offering religious solace to convalescents, faithful to God and country. In the company of the educational clerk, Mr Rutkowski, we visit the hospital inn. It has two cheerful and well decorated rooms. Magazines and leaflets are available on

⁹ Stefan Walter (1891-1920), infantry major of the Polish Army, decorated with Virtuti Militari medal

¹⁰ Ludwik Tyszko (1874-1937), priest, col., chaplain of Ujazdowski Hospital, dean in the Pastoral Care of the Polish Army

comfortable benches and large tables. Further inside is a canteen, with the most important products. At certain hours one can get here a range of goods, from bread to thread and letter paper. Prices in the tea shop are very affordable: for 50 pfennigs one can have a glass of handsomely sweetened tea, a big mug of milk for 2 marks 50 pfennigs, coffee for 1 mark 50 pfennigs etc. The inn is managed by Cadet Skulski. The grand piano, standing beside the wall in the first room, is a great asset of this cosy and beautifully furnished place. In the past, every ward had its own social room – a reading room with books and magazines. Today some of them must serve as patient rooms. A large court used for playing sports and games, on sunny summer afternoons transforms into a theatre and concert hall. Patients bring folding chairs and, sitting in rows, listen to the sounds of music, songs, declamations or humorous dialogues. Our artists are eager to share their talents with the wounded soldiers. Mrs Frenkiel,¹¹ Osterwa,¹² Kotarbiński,¹³ Roland¹⁴ and Mrs Hellerowa,¹⁵ Comte-Wilgocka,¹⁶ and many others often perform for the excellent hospital audience, comprising defenders of our homeland. Similarly, cheerful, carefree songs and humour were presented on the stage by Mrs Markowska,¹⁷ Horbowska,¹⁸ Filochowska¹⁹ and Mrs Małkowski,²⁰ Tom²¹ and Urstein²² [17]. During the tour, Mr Rutkowski, our kind guide, tells us about the educational project implemented on a large scale in the Ujazdowski Hospital. Its principal goal is to fight illiteracy, as well as to spread anti-Soviet propaganda and inform soldiers about their duties as Polish citizens. Each hospital ward has an “education nurse” appointed for these tasks. Three times a week group lectures are organised on history and general science. The recent titles include: *What is Fatherland?*, *How numerous are we?*, *About Józef Piłsudski, the Chief of State*, *Who rules in Poland?*, *How do Soviets rule?*, *The importance of faith in victory*. (...) Educational nurses have a special task - detecting illiterate patients. This is not easy, as many soldiers are ashamed to reveal that they cannot read or write. One must gain their trust, reach their hearts, and appeal to their reason. After confessing, the uneducated soldier receives a tutor who teaches him for a few hours every day. The learning usually ensures fast progress. Some of the soldiers are exceptionally attentive students. They do not put their textbooks away during the day, and even place them under their pillows at night.

“Sometimes my heart aches when I see how much potential and talent is wasted in our country,” declares a devoted nurse, who shared some interesting facts about patients with us. “We have some men from Upper Silesia here, boys of seventeen and eighteen years old. They ran away from home to join the army when they had found out about the Soviet offensive. They stay closely together. One of them is still bedridden, the other three can walk around the room, limping. The healthier boys usually stay around the ill one. They all read quite well in Polish, although they have trouble with writing. While dictating a letter to his mother, one of them told me: ‘Please tell her not to worry about me, because I am very happy here in Poland!’” (...) In the evenings, a cinematograph is available at the hospital concert hall, where Warsaw companies provide educational films for free. The library offers 5000 volumes, as well as brochures and leaflets. There are also 14 ward libraries. The books are mostly gifts from society. Magazines and journals representing all political options are supplied in ample quantities. The hospital receives them from the city command and directly from the editorial office. Magazines and brochures intended for military readers are particularly popular, especially the newspapers and publications of the 2nd Department of the General Inspectorate of the Volunteer Army. *Letters from a Soldier* by Kornel Makuszyński is also in great demand. The letter plays an important role in the lives of wounded soldiers. They are eager to write them, and love receiving them. The “Godmother Organisation” would have a beautiful task in maintaining live, friendly contact with soldiers through correspondence. The fight for the sacred cause and the blood shed together in battles integrate and unite the children from all the parts of the Fatherland with perpetual bonds. A Polish hospital, offering relief from the bodily suffering, as well as forming the soul of a soldier, accomplishes an honourable and lofty mission. The whole society should appreciate it and participate in it indirectly.

¹¹ Mieczysław Frenkiel (1858-1935), actor, specialising in comedy roles, reciter and monologist

¹² Juliusz Osterwa (1885-1947), actor, director, teacher, director of the “Reduta” theatre-laboratory

¹³ Józef Kotarbiński (1849-1928), writer, critic, theatre and film actor

¹⁴ Witold Roland (1898-1929), vaudeville actor, dancer and singer

¹⁵ Irena Bohus-Hellerowa (1878-1926), opera singer and dramatic actress

¹⁶ Adela Comte-Wilgocka (1875-1960), prominent singer - soprano

¹⁷ Waleria Eugenia Dobosz-Markowska (1887-1982), operetta singer and film actress

¹⁸ Kazimiera Horbowska (1885-1957), singer, actress

¹⁹ Wanda Filochowska, 2^o v. Orlicz-Dreszerowa (1889-1973), singer, actress, wife of Div. Gen. Gustaw Orlicz-Dreszer

²⁰ Henryk Paweł Małkowski (1881-1959), film and theatre actor

²¹ Konrad Tom (1887-1957), scriptwriter, singer, film director, actor in Polish and Jewish films; husband of Zula Pogorzelska

²² Józef Urstein (1884-1923), singer, entertainer, vaudeville and cabaret actor

Wounded defenders of Warsaw. Treatment conditions and hospital equipment [18]

(...) At the surgical ward, in two rows of beds covered with clean linen, lie the wounded soldiers. All of them fought at various stages of the battle of Warsaw. The Warsaw hospitals do not keep these brave guests until the final recovery. They only provide first aid, perform urgent surgery, that is – to use the formal expression – they render patients “fit for transport” “All Warsaw hospitals today are ‘temporary’ ones,” says Lt. Col. Jakubowski PhD, Vice-Commandant of the Ujazdowski Hospital, an excellent organiser and host of this city of combat against suffering, where moans resembling those of Dante’s inferno can be heard, but where the newcomers welcome, not abandon hope. (...) When we are leaving the hospital, with the images of wounded or mutilated bodies in our eyes, I recall the words of Mickiewicz: “The spirit is the building; the body, like a scaffolding, must be removed when the building is raised.”

At the Red Cross Hospital [19]

The Red Cross Hospital on Smolna St. (Fig. 2) [20], whose chief physician is Col. Gródecki PhD²³, and can hold 420 patients. Ten doctors and thirty five nurses work there under his supervision. At present, almost exclusively wounded soldiers are treated in the hospital, except for a handful of soldiers with internal diseases. Physicians and nurses provide them with the best care, as well as offer education. Mrs Nakonieczna, an education clerk, is in charge of a library providing 4000 volumes. Similarly to the Ujazdowski Hospital, each hospital building has an education nurse who provides soldiers with books, magazines and brochures, brings them letter paper, and assists the illiterate ones in writing to their family and friends. (...)



Figure 2. The Red Cross Hospital in Warsaw, at 6 Smolna Street, picture taken before 1924 [20]

Rycina 2. Szpital Czerwonego Krzyża w Warszawie, ul. Smolna 6, widok sprzed 1924 r. [20]



Figure 3. Temporary location of the Military Hospital of Mołodeczno in Warsaw, 1920 [22]

Rycina 3. Tymczasowa siedziba Szpitala Wojskowego Mołodeczno w Warszawie, 1920 [22]

The Mołodeczno Hospital [21]

The Mołodeczno Hospital of the Polish Army (Fig. 3) - at present in Warsaw, at 12 Prosta Street, in the building of the School of Merchants [22], was brought from the northern front during the second Soviet offensive on 10 July, together with the entire medical personnel and livestock and equipment.

²³ Franciszek Gródecki (1863-1944) Col, MD, Chief of Sanitary Provisions at the Department of Healthcare (1918-1920), commandant of

the red cross Hospital (1920), commandant of the Central Depot of the Ministry of Military Affairs (1920-1923), executed in 1944 by the Germans

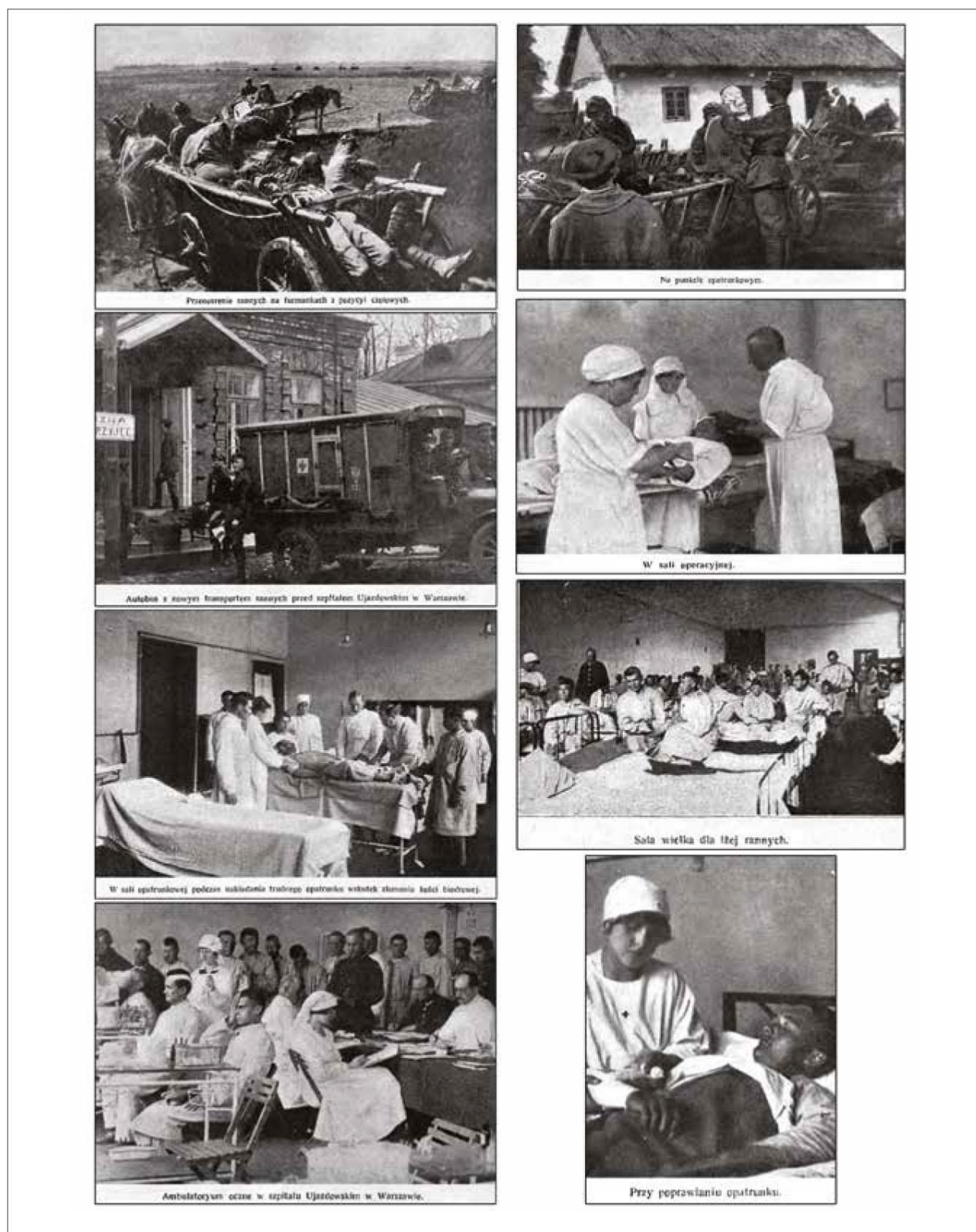


Figure 4. Pictures from the battlefields and military hospitals in Warsaw during the Polish-Soviet War of 1920 [12]

Rycina 4. Sceny z terenu walk oraz szpitali wojskowych w Warszawie w czasie wojny polsko-bolszewickiej 1920 r. [12]

After Mołodeczno had been seized by the 2nd Legions Division in July 1919, this hospital (a former Russian Red Cross hospital), with its physicians, nurses and 200 wounded soldiers of the Polish Army remained in place, only to avoid Soviet oppression, thus becoming the only permanent hospital between Vilnius and Minsk. Until now, the hospital, offering 200 beds, worked at full capacity to provide assistance to the sick and wounded at the front. Unfortunately, last winter many of the employees fell victim to typhoid epidemics, which decimated the personnel: the hospital lost a physician, a nurse and eighteen of the support staff. In February, based on the order from the Chief Command, the hospital was reorganised, increasing its capacity from 300 to 600 beds, and became the basic hospital of the First Army, fighting at the northern section of the Soviet front. Following its arrival in Warsaw, the hospital's capacity in the School of Merchants was expanded to 1,000 beds.

For invalids [23]

Warsaw has bestowed its heart entirely on the soldiers fighting at the front. The city thinks about them, cares about them and supports them. This is how it should be. The time has come, however, to share the heart. In taking care of the soldiers at the front, we cannot forget about those in hospital, about our wounded and sick, who arrive in Warsaw every day at an increasing rate. The soldiers on the battlefield fight and take delight in their victory. Those in hospitals suffer. They suffer twofold: physically, due to their injuries, and morally, as they can no longer fight with their regiments. When their friends move forward, the bedridden soldiers in hospitals feel all the more helpless. In fever, they hallucinate about battles; in fever, they pick up a rifle, only to realise, on awakening, the sad reality that has made them invalids for life. It is a heavy realisation. How much power of spirit, how much moral strength it requires to take one's disability serenely. After the war, many soldiers will leave hospitals on crutches. We need to be aware of the fact and think about it in advance. Society should realise it.

If we do not have sufficient means to provide our ill and wounded with the best care, to offer them relief and make their treatment more tolerable, we need to find the necessary means. More than that. Polish soldiers leaving hospitals cannot feel unhappy or lonely. For the blood spilt for the Fatherland, for the wounds suffered on the battlefield, they deserve grateful care from the state, as well as from the nation. (...) Now the Polish nation must think about a foundation for our invalids, to save them all from hunger and indignity in the future, so that they can always proudly say they used to be Polish soldiers, defending the freedom of their Fatherland, and suffering disability for the cause. (...)

Conclusions

- The press articles presented in this study and describing the daily operations of the Warsaw military hospitals during the Polish-Soviet war of 1920 provide information supplementary to the data available in scientific studies.
- The facts and opinions presented in journalistic reports, actual and anecdotal, expand our knowledge in a way important for our perception of the historic role of the Ujazdowski Hospital as the cradle of the Polish military healthcare service one hundred years after its revival.

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