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Emergency Medicine

Battered child syndrome in paramedic practice

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Summary:

Medical emergency team often has contact with an abused child as the first one among medical services. Their task is to provide first aid as well as recognize various symptoms associated with possible child abuse.

In this study we presented forms of child abuse comprising the battered child syndrome and signs of child's behavior associated with this syndrome.

Key words: disaster, disaster medicine, rescue, rescuer, prophylaxis, disaster classification.

Domestic violence occurs in a variety of forms — one of them is child abuse. In 1961 American Academy of Pediatrics introduced the term 'battered child syndrome' for defining health and psychophysical disorders occurring in abused children.
To this day there are alternative terms used in literature, such as 'parent-infant syndrome', 'child maltreatment', 'child abuse', 'child neglect' or 'household violence'.

In 1985 on World Health Organization (WHO) board meeting a definition of Child Abuse was established.

Child abuse or maltreatment is defined as every intended or unintended action of an adult, society or state, which has a negative impact on child's health and physical or mental development.

Child abuse consists of [1]:
1) physical abuse, maltreatment,
2) sexual abuse,
3) emotional abuse,
4) nutritional, physical and emotional neglect,
5) neglect of medical care.

Numerous studies show that the victims of child abuse are most often infants and babies under three years (36,4% and 35,3%, respectively) [2].

Boys experience violence from parents more often (66%) than girls; apart from that, they experience more violence: they are kicked, punched with fists and hit with various objects [2,3,4].

Physical abuse — symptoms and consequences

Physical abuse is usually associated with severe corporal punishment with use of great strength, usually during emotional agitation; it is inflicted either under influence of alcohol or drugs,

or with full awareness, or even sadism. Physical abuse includes also forcing a child to exertion beyond their capabilities, confining them in closed rooms, immersing in hot water, burning with cigarettes or hot objects, and attempts of poisoning.

Several symptoms indicate physical violence [4,5] :

- hematomas, bruises and swelling located on the face, chest, back, shoulders, buttocks and legs,
- handmarks caused by violent shaking and grabbing a child,
- pulled hair, knocked-out teeth,
- burn marks, most often spots after putting out cigarettes, "sock" burns on the legs, crotch (weaning off diapers), chin, nose (burning with lighter), strangle or bond marks,
- bruises - very often numerous, in different stages of healing,
- cut or puncture wounds,
- abdomen injuries and associated symptoms from digestive system,
- difficulties in walking and sitting,
- frequent fractures, especially spiral and multiple (usually rib and upper and lower limbs fractures),
- head injuries caused by hitting hard surface with child's head.

Head injuries are the result of physical abuse in mostly small babies, especially infants. It was showed that 95% of severe intracranial injuries in children under 1 year and 64% of all skull injuries was caused by maltreatment [3].

These types of injuries result in paresis, epilepsy, blindness and developmental delay.

In case of abdomen injuries (kicking, punching with fists) high mortality is noted. They include abdominal organs damage and bleeding due to liver, pancreas and spleen damage.

Physical abuse affects child's further life. The results of physical abuse include anxiety reactions, problems with learning, low self-esteem, lack of faith in one's abilities, lack of self-acceptance, excessive maturity for one's age, problems with making new connections, child's disability or death.

Shaken baby syndrome

In 1972 a radiologist John Caffey introduced the term 'shaken baby syndrome' and described the following set of symptoms present in violently shaken infants: bleeding to retina, retinal detachment, subdural and subarachnoid bleeding with no cranial injuries present. During shaking a baby the brain moves in the skull forward and backward, which leads to vein injuries and extravasation to the brain tissue, as well as hitting the brain. Symptoms can indicate meningitis.

Most common symptoms of shaken baby syndrome are seizures, drowsiness and vomiting. Shaking a child can result in irreversible neurologic changes, vision and hearing defects, permanent brain damage, death, spastic paresis, psychomotor developmental delay, epilepsy, blindness and brain atrophy.

Shaking is rarely accompanied by external injuries, therefore it is difficult to assess at first glance whether a child is a victim of maltreatment. The symptoms are affected by the frequency and force of shaking [6].

Münchhausen syndrome by Proxy-MSBP

The term **Münchhausen syndrome by Proxy** was introduced in 1977 by English pediatrician Roy Meadow, who named psychiatric disorder of two mothers, who thought up and induced disease symptoms in their children [7].

Term Münchhausen syndrome by Proxy was first used in 1951 by English doctor hematologist and endocrinologist Richard Asher in his publication: Münchhausen's syndrome [8]. He named psychiatric disorder in adult patients, who deliberately inflicted disease symptoms in themselves or pretended they are sick in order to enter the role of a patient and draw medical staff's attention to themselves. In order to define this syndrome Asher used the name of Karl von Münchhausen, a German officer working for Russian navy, living in 18th century, who was famous for telling fantastic and imaginary stories about himself.

Münchhausen syndrome by Proxy is a psychiatric disorder and potentially lethal form of abusing

children or other people, including adults being in the care of the abuser [9,10].

This disorder includes reporting by mother allegedly present symptoms in her child. Sometimes mothers themselves inflict a disease or its symptoms in a child.

Most common symptoms reported in a child are related to digestive, circulatory and neurologic systems: stomachache, vomiting, weight loss, seizures, dyspnea, infections, fever, bleeding, poisoning and drowsiness. The most dangerous cases are associated with great aggression: in such cases **symptoms are induced by administration of poisonous substances, unnecessary drugs or by strangling the child**. Child's hospitalization not always terminates this sequence of events. Usually, mother continues her behavior in a hospital. If an abused child has siblings, there is a high probability they are also victims of Munchhausen syndrome by proxy. This syndrome should be suspected when a child is admitted to a hospital but etiology of their disease is unknown, or when the same family member - usually mother - is present during subsequent, sudden health deteriorations. The incidence of MSBP is unknown. Epidemiological reports include usually only the most severe cases of the syndrome. In USA around 1200 cases are reported annually. In Poland several cases of MSBP victims are reported annually, but the real incidence of this type of maltreatment is unknown. The following symptoms or parent's behavior indicates the possibility of Munchhausen syndrome by proxy presence:

- unexplained chronic or recurring child's disease,
- a victim of MSBP is frequently hospitalized, often due to atypical symptoms,
- child's disease seems to be a multisystemic, chronic, atypical or rare one,
- symptoms do not comprise a known syndrome or do not fit to diagnosis,
- general health status does not correspond to laboratory test results,
- if there is a diagnosis, it was made after visiting several medical centers,
- numerous allergies are suspected or diagnosed,
- intravenous catheter is infected by numerous bacterial strains,
- there is a drug present in child's blood sample, that has not been administered,
- blood group in urine, feces or vomit samples does not match child's group,
- there are traces of chemical substances detected in child's blood, urine or feces,
- common initial diagnoses include: epilepsy, ataxia (movement and balance coordination impairment), limb pareses,
- seizures, which do not react to antiepileptic drugs, and their presence is based only on mother's or child's statement,
- symptoms relieve during the absence of parent or caretaker,
- during hospitalization a child is being visited only by one of their parents,
- there is a family history of unexplained children's diseases or deaths,
- a child does not tolerate the applied treatment, adverse events occur easily during therapy, such as frequent vomiting, rash and so on,
- a parent has considerable medical knowledge,
- a mother has a medical occupation or there is a history of her numerous diseases (she inducts disease symptoms in herself as well),
- mother seems to be extremely affectionate and caring for a child, often reports lack of therapy tolerance,
- there were cases of unexplained neonates' deaths in child's family,
- parent encourages vigorously a doctor to perform multiple tests, which often leads to excessive (without sufficient proof) differential diagnosis.

A MSBP victim

The victims of the syndrome are usually neonates, infants and small babies. The average age of an abused child at diagnosis of MSBR is according to different investigators: 39, 32 or 20 months [9,10].

Mother's actions are intentional and planned, but their forms vary in different age groups, as she does not want to be exposed. The victims of strangling are small babies who cannot talk and judge mother's actions yet, and therefore will not complain. Meadow assessed that mothers begin to strangle their children during their first 3 months of life and continue these actions for 6 – 12 months or to child's death [7]. How-

ever, teenage children can also be abused; they often confirm symptoms described by mother, because of fear or subjecting to her persuasion that they have some mysterious disease that cannot be diagnosed by doctors. A person suffering from MSBP inflicts more in a child often a somatic than psychiatric disease. Mortality incidence of children abused by persons having MSBP is 6-10%. Death can be a result of direct parent's actions or a side effect of commissioned by doctors invasive diagnostic tests. Long-term injuries are reported in 7,3% of children [9].

Psychiatric disorders are frequent in abused children (behavior disorders, attention disorders, mental disorders, anxiety induced by various situations or places, sleep disturbances, PTSD).

Sexual abuse

Sexual abuse consists of forcing a person — a child — to sexual acts against their will and continuing sexual activity with a child who is not aware of the situation. It also includes sexual activity with a person who is afraid to refuse or is not asked for permission. Sexual abuse is often associated with physical and emotional abuse.

Forms of sexual abuse can be divided into 2 groups:

1) without physical contact: a conversation with included sexual content, exhibitionism, fetishism, voyeurism, showing pornographic photos to a child, showing a child to adults in order to satisfy their sexual needs, forcing a child to watch sexual acts;
2) with physical contact-an intercourse with a child or its attempt (vaginal, anal, oral, intercrural), groping.

Children can be abused by people from their neighbourhood, such as acquaintances, neighbours, relatives or close family members — in this case it is called incest.

Sexually abused children most often hide this fact due to shame. As a result it is difficult to recognize this form of abuse; persons from the closest neighbourhood, who can more easily notice worrisome symptoms, play a crucial role - it can also be a pediatrician, nurse, school pedagogue or P.E, teacher [11].

Sexual abuse symptoms: genital injuries, perianal and vaginal injuries; genitourinary organs swelling, grazes and pain; pain during urination or defecation; oral cavity infection, difficulties in walking or sitting, reluctance to changing clothes for P.E. classes, in case of small babies wetting, thumb sucking; sleeping disturbances, parasomnia, decreased appetite, alienation, problems with concentration, learning, making connections with peers [11].

Psychological abuse (emotional)

Psychological abuse is one of the most elusive forms of child abuse.
Typical behaviors of psychological abuse include:

- omission of a child (lack of interest in child's needs),
- isolation - forbidding playing or contact with peers and making connections with people,
- home atmosphere is full of nervousness, fear and anxiety; humiliation, mocking and verbal abuse of a child,
- persuading a child to engage in destructive behaviors and breaking social rules, which often leads to conflicts with law and society.

Psychological abuse is represented by a variety of forms of overprotection, such as: setting of high demands, excessive control, lack of privacy, forcing loyalty. It also includes excessive doing for children their tasks and replacing it with parent's own activity, forcing children to fulfill parents' own unfulfilled dreams.

Psychological abuse can be recognized by noting the following symptoms:

- frequent headaches and stomachaches,
- sucking a thumb, biting one's nails, wetting,
- weepiness, irritability, constant sadness, alienation,
- increased aggression, frequent fights, destructive behaviors,
- difficulties in concentration, learning, speech disturbances,
- lack of self-acceptance, feeling of constant threat, anxiety,
- suicidal attempts[12].

Neglected child

Neglecting a child is associated with not meeting child's basic needs. Parents' and caretakers'

duties include: providing sufficient amount of food for normal child development, appropriate housing, clothes for various weather conditions, protection and supervision of a child, health care access, medical compliance. A neglected child is a form of child maltreatment, which is most easily recognized by neighbourhood, especially teachers and doctors.

Symptoms and consequences of a child neglect

Child neglect can be manifested in a variety of ways and not all its symptoms have to be obvious and visible as a neglect. Mother has an impact on her baby already during pregnancy and her negligence can affect negatively the whole future life of her unborn baby, or even lead to miscarriage. Neglecting an infant can result in poor muscle tone, problems with gaining weight, reluctance to making eye and verbal contact, lack of emotional reactions, e.g. crying.

Children neglected in early stages of life have problems with speech development and poor motor skills.

Significant problems begin at school age; neglected children are less socialized compared to their peers. Delayed speech development leads to problems with making new connections and isolation. Neglected children feel different, ashamed and harmed, and they respond by decreased self-esteem and lack of self-acceptance.

They often try to "become independent" early. Attempts to do that include most often running away from home, early onset of sexual activity, contacts with criminal groups and conflicts with the law [13].

Diagnosis of battered child syndrome

Battered child syndrome can be most quickly recognized by people who have frequent contact with a child: other family members, teachers, pediatrician, nurse or medical emergency team, which often has contact with abused child as a first among medical services. BCS diagnosis is difficult, as parents often cover up visible injuries and explain them with children's energy. Physical abuse is characterized by the sites of injuries. They are located at sites, where a child alone cannot cause them, even when being very active. Marks after hitting with a hand or a hard object are visible usually on the face, back, buttocks, chest or rear parts of legs.

BCS diagnosis can be supported by distinguishing, deliberate fractures, such as: metaphyses fractures (usually bones of the ankle, knee or shoulder joint), rib fractures (usually in posterior and paraspinal parts), sternum fractures, vertebral fractures, skull fractures (usually numerous). Fractures in children over four years are usually accidental, but in children under four years are most often a result of abuse. BCS should be suspected in every child under one year with a fracture [5,14]. Fractures due to abuse occur in different stages of healing. Time of bruise onset can be described by their colour; in the beginning it is red, then blue (after around 6h), then after 12 – 24 h black or purple. During the next few days a bruise become greenish, then yellowish and finally disappears. It should be kept in mind that strange-looking bruises can appear due to a disease, such as 'mongolian spots'. Bites and hitting with belt buckles result in particular marks on the body. Marks at wrists may suggest that a child was bonded, and marks near mouth — that it was gagged.

There are some characteristic marks for children abuse — after burning with cigarettes (round, most often on the hands, buttocks, soles of the feet) and other, leaving the shape of an object on the body.

Shaken baby syndrome is hard to recognize, as there are no external injuries present; only vomiting and seizures can be observed. The effects of shaking a baby in the form of brain contusion, subdural and subarachnoid hematomas can be confirmed only after performing thorough examination. When examining a child with suspicion of shaken baby syndrome, one should pay attention to bleeding into the eyeball, retina and vitreous humour [6].

The consequences of sexual abuse are sometimes visible, but often remain unrecognized. That is why the most common source of knowledge about sexual abuse is child's complaint.

Psychical abuse is a form of children abuse which is most difficult to diagnose. The reason is that there are no visible external signs of maltreatment. These children usually become alienated, have behavioral problems and symptoms of depression. They avoid verbal and physical contact with others, which is a manifestation of low self-esteem.

A neglected child is often linked with parents' poor domestic and social conditions. A neglect can be identified through child's appearance. One should especially pay attention to children that are malnourished, dressed inappropriately for the weather or not performing hygiene habits.

Detection of child abuse is most difficult when the abusers are close family members. In the closed environment there is often a strong relationship between the abuser and the victim [2,3].

When managing the abused child one cannot count for parents' help - for obvious reasons; however, it is important that the paramedic controls emotions and doesn't show to them anger, disapproval, blaming or aggression. The paramedic should focus all the attention on helping a child and provide a maximal sense of security. One should also remember about the necessity of notification the law enforcement in these situations.

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Physiology

Energy expenditure of candidates for students of the Main School of Fire Service (MFSF) during the "adjust to working together" field exercises

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Summary:

Introduction: Rescue activity is primarily teamwork. Life of rescuers as well as rescued people depends on cooperation of all of them.
Material and methods: The aim of the work was to assess the amount of energy expenditure expended by candidates for students of the Main School of Fire Service during the "adjust to working together" field exercises. Total of 24 men, future students, divided into 3 groups of eight men in the group, took part in the research. Examination of energy expenditure was based on measurements of heart contractions frequency registered by the Polar Sport Tester 810.
Results: The "adjust to working together" exercises are the fundamental exercises when precision, safety and time of performance are assessed.
Value of energy expenditure expended by candidates for students of the MSFS during the "adjust to working together" field exercises allows to classify carried out works as very heavy ones. Value of energy expenditure related with training activities performed by candidates for students of MSFS should be a base to determine time of training activities execution. During these exercises a source of smoke (fire) was located, room full of smoke was opened, fire-fighting activities were carried out and injured were evacuated from the fire zone.
Conclusions: Value of energy expenditure expended by candidates for students of the MSFS during the "adjust to working together" field exercises allows to classify carried out works as very heavy ones. Value of energy expenditure related with training activities performed by candidates for students of MSFS should be a base to determine time of training activities execution.

Key words: energy expenditure, firemen, field exercises, Main School of Fire Service.

Introduction

Occupational hazards of firemen related to their work that are not dependent on the environment conditions but on ways of working resulting from its specificity are:

- huge physical load;
- exposure to stress;
- changeable daily rhythm of work;
- necessity to demonstrate full psychomotor efficiency [1].

Rescue activity is primarily teamwork. Life of rescuers as well as rescued people depends on cooperation of all of them. Candidates for future State Fire Service officers before beginning their studies in the Main School of Fire Service, take part in eight-week field training, where they acquire practical skills related with actions in situations and conditions that will be part of their work and service. The "adjust to working together" exercises are the last stage of candidates training. Such exercises require maximum efforts. Precision and safety of exercises are assessed. The size of energy expenditure associated with carrying out different training activities by candidates for fire fighters is a determinant that determines amount of the daily energy expenditure.

Additional impediment is necessity to carry out the set of exercises wearing specialist clothing that protect rescuers from loss of life and health. Weight of the protective clothing and indispensable rescue equipment for typical action, so-called residential fires, is about 20 kg.

Energy expenditure is a fundamental parameter describing amount of energy expended by a man during doing the work. To determine amount of energy expenditure many methods are used, in addition in the filed conditions and huge physical activity, measurements of heart contraction frequency are usually used. The base of the method is use of linear relation between heart contractions frequency during physical activity and body energy expenditure [2].

The aim of the work was to assess the amount of energy expenditure expended by candidates for students of the Main School of Fire Service during the "adjust to working together" field exercises.

Material and methods

Total of 24 men, future students, divided into 3 groups of eight men in the group, took part in the research. The average age of examined candidates for students amounted to 19.8±1.2 years, body height and body mass amounted to 180,6±4,6 cm and 75.7±6.6 kg respectively. The BMI value was 23.2 ± 1.6 kg/m^2. The percentage fat content and lean body mass amounted to 12.9±1.8% and 65.9±5.5 kg respectively. Examination of energy expenditure was based on measurements of heart contractions frequency registered by the Polar Sport Tester 810 heart rate meters, in which energy expenditure value is calculated from relation between heart contractions frequency and oxygen usage [3].

Results and discussion

The "adjust to working together" exercises are the fundamental exercises when precision, safety and time of performance are assessed. Examination of energy expenditure was carried out in three groups of 8 men in each. During these exercises a source of smoke (fire) was located, room full of smoke was opened, fire-fighting activities were carried out and injured were evacuated from the fire zone. Obtained results are presented in Table 1.

Table 1: Amount of the energy expenditure during the "adjust to working together" exercises

Group	Duration of the activity [min]	Value of the energy expenditure of the activity [kcal]	Value of the energy expenditure kcal/min
I	58.8	683.7	11.6
II	52.4	583,1	11.1
III	51.8	495.4	9.6
Average:	**54,4**	**587.4**	**10.8**

According to the obligatory Christensen's & co. classification of the work heaviness [4] work of such load should be rated as very heavy work. Amount of expended energy related with carried out work makes that the higher energy expenditure connected with the work the shorter permissible period of its implementation [5] (Table 2).

Table 2: Amount of the energy expenditure that can be sustained for specific time

Amount of the energy expenditure kcal/min	Acceptable time of activity
25	5 minutes
15	1 hour
10	10 hours
5	2-3 days
4	10 days
3	Months
2.5	Unlimited for healthy people
2	Average for population

Average value of the pulse rate in groups of examined men confirms heaviness of the work (Table 3) [6].

Table 3: Average heart contractions frequency among subjects

Examined group	Pulse min. value / min	Pulse max- value / min	Average pulse value / min
I	81.5±13.7	193.3±9.5	128.5±12.8
II	77.1±5.8	187.0±8.9	138.1±15.8
III	76.2±8.9	182.1±12.4	127.5±18.3
Average value:	**78.2±9.4**	**187.4±10.2**	**131.3±15.6**

Results of previous research on energy expenditure of third-year students of MSFS carried out during rescue training on the training ground revealed that the higher energy expenditure (11.47 kcal/min) was expended by firemen rescuing injured from a car crushed by a bus. Huge energy expenditure (10.66 kcal/min) expended students dealing with organization of so-called water position i.e. connecting pumps and rolling up of fire fighting equipment [7].

Research carried out by Pokorski *at al.* [8] including assessment of energy expenditure during fire fighting action showed that firemen's energy expenditure amounted to 46.1-53.2 kJ/min, what allows to classify this work as heavy one.

Results of research carried out by Bugajska *at al.* [9] revealed that amount of energy expenditure of fire fighters during climbing a fire ladder amounted to 54.5±15.2 kJ/min, and during climbing stairs with a fire hose full of water — 55.5±14.9 kJ/min, while energy expenditure during evacuation of injured amounted to 50.0±15.6 kJ/min.

Conclusions

1) Value of energy expenditure expended by candidates for students of the MSFS during the "adjust to working together" field exercises allows to classify carried out works as very heavy ones.

2) Value of energy expenditure related with training activities performed by candidates for students of MSFS shouold be a base to determine time of training activites execution.

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Ophthalmology

Safety of ophthalmic drug therapy: focus on adverse effects

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Summary:
In spite of high quality requirements concerning ophthalmic preparations (sterility, isotonicity, a pH close to the lacrimal fluid, lack of insoluble contaminations) they are not devoid of side effects. Their application to the conjunctival sac, onto the surface of the eye or under the eyelid may cause local adverse effects such as redness, eye irritation, transient increases in intraocular pressure, blurred vision as well as systemic adverse effects due to drug penetration into the lacrimal system. The latter effects are frequently forgotten by physicians, even though they may be sometimes more dangerous for the patient than local ones. Therapeutic efficacy of ophthalmic drugs within a specific group (e.g. ophthalmic NSAIDs) is generally similar and the question whether a particular drug is suitable for the individual patient is determined by the side effects. Sometimes the side effects (local or systemic) can be the reason for discontinuation of treatment by the patient, which can have a negative influence on treatment efficiency. This article provides a critical review of local and systemic adverse effects of ophthalmic drugs. The information on side effects of ophthalmic drugs and contraindications for their administration are presented in a comprehensive table, which can be very helpful for the reader to see which ocular drugs induce characteristic side effects and therefore are not recommended in a specific disease.

Key words: ocular drugs, eye drops, adverse effects, absorption, preservatives, benzalkonium chloride.

Drugs used in the treatment of eye diseases are a special group of preparations, which have to face the growing demands for their high quality since the eye — the organ to which they are directly applied — is one of the most sensitive sites of drug administration to external agents. Ophthalmic drugs introduced into the conjunctival sac, on the surface of the eye or the eyelid may, besides to the desired pharmacological effect, cause numerous adverse reactions, which considerably reduce the therapeutic efficacy of the drug. Thus, preparations used in ophthalmology should be sterile, isotonic, have a pH close to the pH of the tear fluid and should not contain insoluble impurities [1,2].

Ophthalmic drugs are primarily used topically in the form of drops or ointments as well as fluids injected via subconjunctival, retrobulbar or peribulbar and intravitreal routes. The topical administration of the ophthalmic drugs allows to obtain a higher concentration of active substances at the action site, i.e. in the eyeball, and to reduce the risk of systemic side effects of used drugs. The oral administration is used rarely, as in the case of immunosuppressive agents applied in uveitis, retinitis or optic neuritis, or antiglaucoma (diuretic) agent acetazolamide [3].

The drug is absorbed after its application to the conjunctival sac. The possible routes of drug absorption after ocular delivery are schematically shown in Figure 1. Transcorneal and transconjunctival/scleral absorptions are the desired routes for localized ocular drug effects. If the topically used ophthalmic drug is not supposed to penetrate (or to a very small extent) into the eyeball, it must be hydrophilic, or have only slight lipophilic properties.

In these cases, only water-soluble compounds should be chosen from a particular group of drugs. On the other hand, drugs which are to act in the eyeball should have amphiphilic properties to be able to penetrate both the hydrophilic and lipophilic compartments (such as the cornea and the anterior chamber of the eye) [3,4].

The drug applied to the conjunctival sac may also penetrate the systemic circulation, primarily through the absorption from the nasal mucosa (nasolacrimal drainage contributes to the systemic absorption of ophthalmic drugs applied to the conjunctival sac), and may locally penetrate the cornea and conjunctiva. Following transcorneal absorption, the aqueous humor accumulates the drug, which is then distributed to intraocular structures, as well as potentially to the systemic circulation by the trabecular meshwork pathway. Absorption from the nasal mucosa avoids hepatic and intestinal first-pass metabolism and may lead to significant systemic side effects after the conjunctival application, especially in the case of chronic use [2-4].

The potential toxicity of most drugs used in ophthalmology, which are administered topically to the eye, is associated with hypersensitivity or direct toxic effect on the cornea, conjunctiva, periocular skin and nasal mucosa.

Moreover, all ophthalmic drugs are potentially absorbed into the systemic circulation, so they can cause systemic side effects. Therefore, it should be kept in mind that the prescribed ophthalmic drug, which the patient has to use topically, may exert systemic side effects. For example, in many cases the administration of eye drops containing β-adrenergic receptor antagonists (β-blockers) may cause systemic side effects typical for this group of drugs, including even death of the patient (see Table 1).

Although the eye-drops used in short-term treatment are well tolerated, they may give temporary side effects, such as redness, eye irritation, transient increase in intraocular pressure, blurred vision, burning sensation and dry eye, which however do not require discontinuation of therapy. In the case of long-term treatment, the risk of side effects increases and has influence on the course of treatment. Sometimes it can be the reason for discontinuation of treatment, e.g. while taking preparations for the treatment of glaucoma (see Table 1).

Toxicity of these preparations results from the contraction of the ciliary body, or through the action on the cholinergic receptors. This may induce myopia and refraction fluctuations caused by shrinkage of the pupil and the ciliary body in accordance with the increasing and decreasing action of the drugs between their applications. Headaches that occur after the drug application are associated with the shrinkage of the iris and the ciliary body. Derivatives of epinephrine can cause the so-called rebound effect - contraction and dilation of the vessels, leading to redness. Ocular and skin allergies are also frequently found after applying epinephrine in eye-drops and its prodrugs: apraclonidine and brimonidine. Systemic absorption of epinephrine derivatives and β-blockers, as was mentioned above, carries the risk of inducing any side effects that occur after direct systemic administration. Regular use of carbonic anhydrase inhibitors may cause malaise, fatigue, depression, paresthesia, and kidney stones. Administration of antiglaucoma agents in eye-drops minimizes the relatively high frequency of side effects.

To sum up, the available pharmacological strategies of e.g. glaucoma treatment allow to slow down the progression of the disease[1)], however

[1)] Practically all currently used antiglaucoma drugs tend to lower intraocular pressure (IOP). They operate according to the accepted therapeutic strategy, which assumes that any reduction of elevated IOP — one of the risk factors, will delay the development of pathology. However, elevated IOP is a relative matter, for in many patients diagnosed with glaucoma there is no evidence of elevated IOP. The main cause of the disease is neurodegeneration of retinal ganglion cells and their axons, or nerve fibers, of unknown etiology. Currently, we do not know how to oppose the progressive process of neurodegeneration — so the symptomatic treatment is used in the form of IOP-lowering drugs.

the effect of this treatment on quality of patient's life must be always taken into consideration in relation to the existing potential risk of adverse reactions induced by therapy [4-7].

In order to avoid the systemic side effects of ophthalmic drugs the patient should respect the fundamental principles of their usage. During the drug application, the patient's head should be tilted back, and then after pulling away the lower lid 1 drop or ointment (corresponding to the head of one match) should be instilled into the conjunctival sac. During the delivery, the patient must not touch the eyelashes or lids with a drug container to prevent contamination of the bottle or tube. It is important to press the inside corner of closed eyelids for about 2 minutes immediately after the application of the drug. The eye closure and the pressure on the lacrimal sac are extremely important in order to minimize the systemic absorption of the administered drug. Moreover, a single dose of eye drops should be included in the one-drop volume (about 50 µl) because the volume of the tear fluid in the eye is only about 10 µl (up to 30 µl). Therefore, the application of a greater volume of one drop will lead to its flowing out on the skin or to the nasolacrimal system, which in the latter case is associated with an increased risk of systemic side effects [8].

In some eye preparations, side effects may also be due in part to the presence of preservatives, whose main task is to maintain sterility of an ophthalmic drug during storage and use, despite the non-sterile usage by the patient. According to the current Polish Pharmacopoeia IX, a preservative should have a broad spectrum of antimicrobial activity, be chemically and thermally stable, compatible with the other ingredients of the formulation and should not cause any side effects [9].

Unfortunately, until now no preservative has been discovered, which would be in line with the above requirements. Eye drops and lotions for contact lenses may contain preservatives, such as benzalkonium chloride (BAK), chlorobutanol, thimerosal, chelating agents and lots of others. Both in vitro and in vivo studies on animals have shown cytotoxic effect of preservatives on the external (conjunctiva, cornea) and internal (lens, trabecular mesh, retina) structures of the eye [4, 10, 11]. Particularly, BAK may cause a punctate keratopathy or toxic ulcerative keratopathy. Thimerosal is nowadays rather rarely used because of the development of frequent allergic reactions. Some preservatives, such as merfen and beta-phenylethyl alcohol, show non-compliance with poly-(2-hydroxyethyl methacrylate) (PHEMA), a component of soft lenses, and they should not be present in solutions used for storing and cleaning contact lenses, which can be preserved with acetate or chlorhexidine gluconate.

A certain rule can be noticed while observing the studies on an ideal preservative which have been performed until now that the better the conservative safety profile for the eye is, in comparison to the most widely used preservative, BAK, the weaker the required criteria for preservatives it meets [12]. Therefore, the best solution would be to eliminate preservatives in eye drops, which would reduce the incidence of adverse events and decrease the necessity of treatment discontinuation. As a result, a more efficient treatment would be achieved and the patients' quality of life would be improved, especially of those suffering from chronic diseases, who are sometimes forced to use ophthalmic preparations for their whole life.

This possibility is provided by new forms of ophthalmic drugs such as one-dose packages, the so-called minims, or special structures - drug dispensing systems in the form of membrane filter papers with a very small pore size (of about 0.22 µm) or silver-plated items, which frequently guarantee sterility without the addition of preservatives. This type of eye preparations should become in the nearest future the gold standard treatment for many eye diseases such as glaucoma. However, now, they are far more expensive than conventional dosage forms such as eye drops or ointments, and therefore, they are not being chosen by patients, particularly in the case of long-term treatment.

The table below (Table 1) shows the potentially important local and systemic side effects of various drugs used in ophthalmic therapy [5-7].

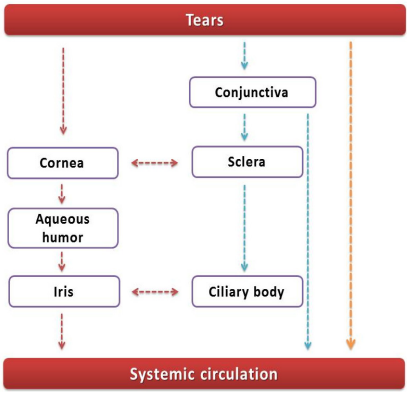

Figure 1: Possible absorption pathways of an ophthalmic drug following topical application to the eye (diagram according to [4], modified)

Legend:

-->the corneal; -->according conjunctival/scleral; --> nasolacrimal absorption pathway

The institution involved in the collection and exchange of information concerning the toxic effects of drugs in ophthalmology, the National Registry of Drug-Induced Ocular Side Effects, is worth mentioning. The principal goal of this organization is to collect the knowledge of the possible side effects of ophthalmic drugs. To report an adverse drug reaction one should contact the Casey Eye Institute at Oregon Health and Science University, 3375 SW Terwilliger Blvd., Portland, OR 97201, fax: 503-494-4286 or e-mail: www.eyedrugregistry.com[8].

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Table 1: The most important local and systemic side effects of drugs used in ophthalmology therapy

Drugs		The most important local and systemic side effects	Contraindications
	Mydriatic agents		
1) Non-cycloplegic sympathomimetics	**Phenylephrine**	conjunctival hyperemia and burning eye pain, glaucoma attack, cycloplegia, conjunctival epithelial keratosis with lacrimal point closure and epiphora stimulation of the sympathetic nervous system*	Hypersensitivity, pregnancy and breast-feeding, glaucoma with narrow angle glaucoma, hypertension, pheochromocytoma, advanced atherosclerosis
2) Paralysing accommodation (cycloplegics)** muscarinic antagonists	**Atropine** **Tropicamide**	increased intraocular pressure, blurred vision, conjunctivitis irritation, photophobia facial flushing, nasal dryness, dry mouth, visual hallucinations, restlessness, psychosis, hyperthermia, tachycardia	glaucoma with narrow angle glaucoma, hypersensitivity to the drug, rhinitis sicca
	Miotic agents		
Cholinergic agonists	**Pilocarpine** **Carbachol**	↑ tension during accommodation — drug-induced myopia, photophobia, miosis impairing vision, ocular hyperemia, tearing, epithelial corneal dystrophy, retinal detachment, vasodilatation of conjunctiva and episclera — increased bleeding during surgery bradycardia, ↓ pressure, ↑ secretion of urine, saliva, sweat, tears, gastric juice; bronchospasm, intestinal spasms, ↑ bladder pressures, psychomotor agitation	inflammation of the iris and ciliary body, corneal damage, cataracts, heart failure, asthma, hyperthyroidism, peptic ulcers, intestinal obstruction, abnormal urination, breast-feeding
	Drugs lowering intraocular pressure		
1) Cholinergic agonists	**Pilocarpine** **Carbachol**	see above	see above

Drugs		The most important local and systemic side effects	Contraindications
2) β-Adrenolytics	**Timolol** **Metipranolol** **Carteolol** **Betaksolo** **Pindolol**[!]	burning, conjunctivitis, keratitis, blepharitis, blurred vision, drooping eyelids, symptom of "dry eye" bradycardia, arrhythmia, hypotension, hypoxia of the brain and limbs, impaired atrioventricular conduction, congestive heart failure, cardiac arrest, bronchospasm, respiratory failure, dyspnea-especially non-selective, ↑ triglycerides, headache, dizziness, weakness, depression, alopecia	hypersensitivity to drug constituents (e.g., benzalkonium chloride), bronchial asthma, severe chronic obstructive pulmonary disease, sinus bradycardia, atrioventricular block II and III, heart failure, used cautiously in patients with diabetes mellitus and hypothyroidism
3) Adrenomimetics	**Brimonidine**	ocular dryness, ocular burning, blurred vision, a sensation of a foreign body in the eyes dry mouth, fatigue, headache, hypotension, orthostatic hypotension, insomnia	hypersensitivity, children under 2 years of age, patients taking antidepressants: monoamine oxidase inhibitors (MAOIs), tricyclic antidepressants
4) Carbonic anhydrase inhibitors	**Dorzolamide** **Brinzolamide** **Acetazolamide**	burning, stabbing, itchy eyes, blurred vision, tearing, conjunctivitis, blepharitis, iritis and cyclitis; after absorption systemic side effects: paresthesia, ↑ urination, facial flushing, polydipsia, bitter taste, headache, dizziness, hearing loss, tinnitus, drowsiness, fatigue, metabolic acidosis	hypersensitivity to drug constituents (e.g., benzalkonium chloride), intolerance to sulfonamides, liver failure, kidney disease, pregnancy and breast-feeding, hyperchloremic acidosis
5) Prostaglandin analogs	**Latanoprost** **Bimatoprost** **Trawoprost** **Tafluprost** **Unoproston!**	eye pain, foreign body sensation, ↑ pigmentation of the iris, burning, blurred vision, redness and swelling of the conjunctiva, inflammation, corneal erosion, punctate keratitis, eyelid dermatitis, cystoid macular edema	hypersensitivity to drug constituents (e.g. propylene glycol)
6) Osmotic diuretics	**Mannitol**	bleeding into the subdural space, exacerbation of heart failure, acidosis, electrolyte loss	renal failure, congestive heart failure, pulmonary edema, intracranial bleeding, severe dehydration, metabolic edema
Drugs used to treat microbial diseases in the eye			
Antibacterial agents	**Aminoglycosides** Amikacin Gentamicin Neomycin Tobramycin	swelling and itching of the eyelids, conjunctival erythema, punctate keratitis, erythema, tearing, secondary superinfection, long-term treatment with gentamicin may cause thrombocytopenic purpura, hallucinations	hypersensitivity to ingredients
	Macrolides Erythromycin Azithromycin	hypersensitivity reactions, secondary superinfection, increasing resistance (to erythromycin)	sensitivity
	Tetracyclines Oxytetracycline - ingredient of Atecortin	transient burning sensation around the eyes, tearing, conjunctival redness, blurred vision, secondary infections caused by refractory bacteria and fungi	hypersensitivity, tuberculous infection, viral and fungal infections, glaucoma

Drugs		The most important local and systemic side effects	Contraindications
Antibacterial agents	**Polimyxins** Polimyxin B – ingredient of Atecortin drops	as above	sensitivity
	Gramicidin – ingredient of Dicortineff drops	itching and burning of conjunctiva, secondary superinfection, cataract	sensitivity
Sulfonamides	**Sulfacetamide**	temporary irritation of the eye, blurred vision, superinfection with resistant organisms, bitter taste in the mouth, severe allergic reactions such as aplastic anemia	hypersensitivity, infants under 2 months of age
Fluoroquinolones	**Ciprofloxacin Levofloxacin Moxifloxacin Norfloxacin Ofloxacin**	mild eye irritation: burning, itching	hypersensitivity to ingredients such as benzalkonium chloride
Antiviral agents	**Acyclovir Ganciclovir Denotivir**	transient burning and itching, keratopathy	hypersensitivity to ingredients such as benzalkonium chloride
Antiseptic and astringent agents Zink compounds	**Zinc sulphate** – ingredient of Oculosan, Cincol	dryness of eye mucous membranes	hypersensitivity, dry eye syndrome, children under two years of age
Argentum compounds	**Argentum nitricum**	conjunctival irritation, argyria	sensitivity
Drugs used to treat ocular inflammatory diseases			
Glucocorticosteroids	**Hydrocortisone Dexamethasone Fludrocortisone Fluorometolone Prednizolone Loteprednole**	burning, eye irritation, impaired visual acuity, steroid glaucoma, cataracts, corneal ulcers after long-term use (especially in children) impaired water and electrolyte balance, hypertension, edema, obesity, myopathy, osteopenia, osteoporosis, stomach ulcers, bowel perforation, impaired wound healing, metabolic disturbances, steroid-induced diabetes, reduced immunity, inhibition of the hypothalamic-pituitary-adrenal axis	hypersensitivity to drug components, cases of undiagnosed red eye, tuberculosis infections, viral and fungal infections, purulent conditions, corneal injuries and ulcers, glaucoma unhealed wounds
Nonsteroidal antiinflammatory drugs	**Indomethacin Diclofenac**	burning sensation, ↑ intraocular pressure, sensitivity, bleeding into the eye tissues contact dermatitis, gastric and duodenal ulcers, bronchial asthma attack and anaphylactic reactions in allergic people	hypersensitivity to the drug, blood clotting disorders, asthma, active peptic ulcer disease, severe liver and kidney failure, pregnancy (after 5 months)

Drugs		The most important local and systemic side effects	Contraindications
Drugs used to treat allergic inflammation			
Antihistamines • H_1 antihistamines	I generation **Ketotifen** **Epinastine** II generation **Emedastine** **Azelastine**	local irritation of the eye, dry eye and foreign body sensation, blurred vision and disturbance of eye function, mydriasis, ↑ intraocular pressure systemic side effects (mostly the first generation drugs): headache, drowsiness, rash, dry mucous membranes	hypersensitivity to the drug, glaucoma with narrow angle glaucoma, hypertension, hyperthyroidism, cardiac arrhythmias, pregnancy
• Cromolyn sodium • Olopatadine		local eye irritation	hypersensitivity, soft lenses (caused by benzalkonium chloride)
Lodoxamide		local eye irritation, systemic side effects as above	hypersensitivity
Decongestants			
α - adrenergic agonists	**Naphazoline** **Tetrahydrozoline**	xerophthalmia, mydriasis, ↑ intraocular pressure CNS disorders, high blood pressure, abnormal heart rate, breathing difficulties, headaches	hypersensitivity to the drug, glaucoma with narrow angle glaucoma, dry eye syndrome, hypertension, hyperthyroidism, children under 2 years of age
Anesthetics used in ophtalmic procedures			
	Proxymetacaine	mucous membrane irritation, cornea damage, loss of eye effects on the cardiovascular system and the central nervous system ***, allergic reactions	epithelial damage, hypersensitivity, soft lenses (caused by benzalkonium chloride)
Drugs which are supposed to improve tissue metabolism and regeneration			
	Pirenoxinum **Potassium iodide** **Natrium iodide** **Solcoseryl** **Dexpanthenol** **Vitamin A**	transient blurred vision, local allergic symptoms enlarged thyroid gland, acne (iodide preparations)	hypersensitivity to iodine preparations (e.g. Vitreolent) thyroid dysfunction, pregnancy and lactation, children
Agents used to treat dry eye			
	Polyvinyl alcohol **Hyaluronan** **Hypromellose** **Dextran 70** **Polyacrylic acid** **Carbomer** **Polyvidone**	allergic reactions to preservatives in preparations such as cetrimide, polidronium chloride	hypersensitivity to constituents of the preparation
Agents used to assist in ocular diagnosis			
Dyes	**Fluorescein**	blurred vision, glaucoma with damage to the optic nerve, cataract, secondary ocular infection, perforation of the eye-ball, allergic reactions	hypersensitivity to constituents of the preparation, tuberculosis, viral and fungal infections of the eye

Drugs		The most important local and systemic side effects	Contraindications
Drugs and biological agents used in ophthalmic surgery			
Viscoelastic substances	**Hyaluronic acid Hyaluronan Hypromellose Poliacrylamides Colagen Chondroiten sulfate**	↑ intraocular pressure, allergic reactions	hypersensitivity
Drugs used to treat age related macular degeneration			
Angiogenesis inhibitors	**Bewacizumab Ranibizumab Pegaptanib**	eye irritation, ↑ intraocular pressure, conjunctival hemorrhage, corneal edema	eye infections, hypersensitivity to the drug
Photodynamic therapy	**Verteporfin**	blurred vision, allergic reactions nausea, weakness, back pain, hypercholesterolemia	porphyria, severe liver damage, hypersensitivity to constituents of the preparation

* Too high doses can cause stimulation of the sympathetic nervous system with such symptoms as: anxiety, tremor, weakness, headache, dizziness, pale skin, respiratory disorders, cardiac arrhythmias, retrosternal pain, palpitations and hypertension. Cardiovascular symptoms may be more pronounced in patients with hyperthyroidism, hypertension, ischemic heart disease.

** Note that the dark irises are more resistant to mydriasis, and therefore the drug can be easily overdosed.

*** Symptoms of poisoning from the central nervous system: a metallic taste in the mouth, feeling light-headed, agitation, anxiety, euphoria, tremor, confusion, headache, dizziness, nausea, tinnitus, blurred vision, vomiting, feeling hot, cold or numbness, loss of consciousness, convulsions, depression; from the cardiovascular system: hypotension, bradycardia, and in extremely severe cases, cardiac arrest.

! preparations not registered in Poland.

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Toxicology

Microbes indicatorts of cosmetic preservation efficiecy. Part III: *Candida albicans*

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Summary:
Candida albicans is an indicator of the official evaluation of the effectiveness of cosmetics maintenance. In the paper *C. albicans* general characteristics, morphology and culture, diagnosis of infections caused by the yeast, the role in the environment, pathogenicity, sensitivity and resistance to antifungal medicaments and the current interest in the microorganism in microbiology cosmetics were discussed.
The paper is to strengthen the belief of producers and users of cosmetics to the validity of the selection of *C. albicans* as an indicator organism to assess the effectiveness of added preservatives.

Key words: *Candida albicans*, cosmetics, contamination, conservation, antifungal medicaments.

Introduction

In cosmetics, as well as in other products made from organic material, in addition to bacterial contamination, there is microscopic fungi contamination as well. The contamination sources can be varied, starting from materials containing hyphae of fungi, through production rooms with excessive humidity, apparatus and non-cleaned and non-disinfected equipment without regular cleaning and disinfection and finally hygienically wrong way of manufacturing, packaging and use of cosmetics. Lytic enzymes, in which fungi are particularly rich, while breaking the products influence on reduction of qualitative values and completely disqualify the utility cosmetic very often.

As it was explained in the previous parts (***MILITARY PHARMACY AND MEDICINE***: Volume V, No. 2, 2012 pp.32-41 and Volume V, No. 3, 2012 pp.17-30), manufacturers are required to determine the minimum, but effective concentrations of preservatives for each cosmetic product in order to prevent spoilage of them. These measures may be the same recipe ingredients (even one component) with both preserving and skin care properties. However, preservatives are often added to products. They need to work effectively

both antibacterial and antifungal, and the assessment of the effectiveness of their actions is performed with the so-called controlled contamination with microbial indicator.

This part of the paper contains information on indicator of fungal contamination, which is officially recognized as *Candida albicans* yeast. It belongs to the *Candida* genus brings together many species, 14 of which exhibits characteristics of pathogenicity. *C. albicans* is recognized as the most important pathogen in this group that causes opportunistic infections in humans called candidosis.

Candida albicans as commensals

C. albicans occurs mainly on the mucosal surface of the oral cavity, urogenital duct, vagina, and some areas of the skin, without causing infections in healthy people. Human mouth is extremely conducive environment for a variety of species of microbes and after birth it is inhabited by the kind of microflora very fast. The development of the microflora in the mouth promotes diverse area, favourable chemical and biological properties of the mucosa, a constant temperature (35-37°C), neutral pH and the presence of nutrients, vitamins and microelements. Yeast (*C. albicans*, *C. glabrata*, *C. tropicalis*) are among the dominant organisms as well. *C. albicans* is also mentioned as commensal of the upper respiratory tract, stomach, colon and large bowel, urogenital system, mainly vagina [1,2].

It was stated that there are differences in species of *Candida* in the production of alcohol (farnesol and tyrosol) being quorum sensing signalling molecules. These differences suggest different levels of invasiveness of the species. On the other hand, the production of the same molecule by different species indicates that they can influence each other and coordinate behaviour within a mixed population [3].

Commensal strains can be detected in about 50% of the human population, except that the *C. albicans* is the predominant (about 70%) representative of the *Candida* genus at various sites on the human body.

The ubiquity of microscopic fungi provide their detection even in a wide variety of finished cosmetic products to use. Fungi are generally responsible for the lowering of the quality of cosmetics and in exceptional cases, can cause infections especially in immunocompromised users. It speaks for the desirability of forming appropriate consumer awareness and the constant care of the quality of manufactured products. Proper use and storage of cosmetics should protect them from deterioration and the consequences of the use of contaminated products [4].

Predisposition to infections with *C. albicans*

As it was shown above, *C. albicans* colonization has specific places in the body where it can take the form of infectious. A few factors promote the formation of an infection: humidity, liquid acidic soap, topical corticosteroids [5] and a number of health predispositions, long-term treatment, and various medical treatments. These abilities include in particular: immunosuppression, steroid treatment, prolonged catheterisation, surgical treatment within the abdomen, treatment with antibiotics with a broad spectrum of activity, the perforations in the stomach and intestines, severe skin burns, mechanical ventilation, decreased kidney function, bone marrow transplantation, premature birth of a child with low weight and critically ill newborns, glycosuria, HIV infection.

In addition to endogenous infections rare cases of infections of external origin, caused by contaminated solutions and related materials catheterisation and transfusion were also described [6].

C. albicans virulence factors

C. albicans has its own mechanisms of invasion, in addition to resulting from host medical condition or treatments. These are:

- morphogenic change of yeast to filamentous form. This form enhances the adhesion and the ability to invade host cells by factors related to fillment including the adhesion molecules, the mycelium adhesion molecules, and the secreted hydrolytic enzymes.

Strains of *C. albicans* with more virulence factors and easily transfer from the yeast into the

pseudo and the true filamentous forms represent a particularly serious problem. These strains are capable of adhesion to the substrates, both biological and inert to the production and secretion of hydrolytic enzymes and biofilm formation [7].

Extracellular enzymes as virulence factors

C. albicans is a manufacturer of extracellular hydrolytic enzymes that beyond simple digesting food molecules, perform other functions. Among them there are three most significant extracellular hydrolytic enzymes: phospholipase, lipase and partially secreted protease apartyl (Saps).

Phospholipases are important determinants of pathogenicity. There are four types of secretory phospholipases A, B, C and D. Among them, phospholipase B contributes to damage of the host cell membrane by destroying phospholipid, fungi transfer and eventually leading to cell lysis.

Lipases are enzymes which catalyze both the hydrolysis and synthesis of triacylglicerole. *C. albicans* can produce at least 9 lipases that can hydrolyze the ester linkages are mono-, di-and triacylglicerole. Supporting the infectious process by lipase was confirmed in studies on the model of hematologically disseminated candidiasis in mice.
Lipase activity is considered as one of the major virulence factors of *C. albicans*.

Among the 19 various hydrolytic enzymes, studied in yeast-like fungi that cause mastitis in cows leucine arylamidase showed the highest activity [8] and asparyle proteases (asparyle proteases (Saps) are the most associated with the virulence of strains isolated from humans [6]. They belong to a group of cysteine and asparyle hydrolases, and metalloproteases [9].

C. albicans secretes apartyl proteases (Saps) representing a family of 10 related proteases [6]. The studies using the technique of immune-signing with gold reveal that Sap proteins are localized in the cell wall of *C. albicans*, both in the form of filamentous and yeast associated with virulence of *C. albicans*. In addition, proteases seem to have specialized functions preventing the antimicrobial activities of the infected host, e.g. Saps proteases degrade and inactivate the central human complement components C3b, C4b and C5 and block the effects of the risk of activated complement system. Sap genes showed a differential expression according to the morphological form of the fungus and the surrounding environment. Saps discloses as filamentous form is driven by the use of the polypeptide medium culture. It was found that the yeast form of the cells produce mainly Sap4, while filamentous cells produce mainly Saps 6.

However, so far there has not been complete knowledge of the Saps expression in various *C. albicans* pleomorphic forms.

In fact, there are no comparative studies conducted by different authors, using the same technique, model or the site of infection [6]. Regardless of these differences it is certain that the secretion of Saps asparyle protease components plays a key role in the pathogenesis of *C. albicans* infections [6].

Forms of *C. albicans* infections

Fungi of the *Candida* species are the most common pathogens among yeast-like fungi. Frequently it comes to skin infections within the skin folds where are the favourable conditions that include heat and moisture. Infections of the skin cause skin damage, injury rates, and feet and nasis damage, and chronic local application of corticosteroids and an increased concentration of carbon present in terms of occlusion help them [10].

C. albinans infections are divided into superficial and deep (systemic) [11.6].

Superficial infections are mainly mucosal and epidermal candidiasis. These include: oro pharyngeal candidiasis (oropharyngeal candidiasis — OPC).

OPC is the increased risk seen in smokers of tobacco or in patients with the following disorders: xerostomia, Sjogrens syndrome (SJS), a local cancer treatment preceded by mucosal injury, and patients with systemic treatment with steroids and antibiotics. In addition, OPC is one of the first clinical signs of HIV infection, and is recognized in over 95% of patients with AIDS. The main OPC lesions are alleged membrane

(called thrush), redness and inflammation of the mouth angles.

Cutaneous candidiasis – CC

Fungal infections of the skin concern the most often its superficial layer and appendages: nail and hair [10]. When growth of the skin microflora is inhibited (e.g. as a result of intensive antibiotic therapy), the epidermis is often infected with *C. albicans*. Excessive and undesirable long baths with products that contain detergents are not recommended as well [12].

Unusual skin infections take the form of deep fungal infection, including the deeper layers of skin coat and may develop in the case of immunological disorders.

Vulvo inguinal candidiasis (vulvovaginal candidiasis – VVC)

C. albicans is responsible for 85% cases of VVC for over 75% of all women. In addition, approximately 5-10% women have recurrent form. Unlike systemic candidiasis, characterized by the presence of *C. albicans* in a normally sterile body areas, VVC and recurrent forms attack the vaginal tissue where *C. albicans* can be normal commensals.

Chronic mucosal candidiasis (mucocuaneous candidiasis - CMC).

It is characterized by recurrent chronic infection of the oropharynx and esophagus with no tendency to systemic spread and increase in frequency of problems in the functioning of the endocrine glands.

C. albicans systemic infections

In addition to diseases of the skin and mucous membranes against fungal one distinguishes deep mycosis and organ mycosis, causing the formation of inflammatory processes in tissues, often necrotic. However, as the duration of the chronic inflammatory process starts and after some recovery time in the inflamed areas scar tissue may appear [13].

In the systemic infections *C. albicans* **can attack**:

1) respiratory system (acute primary pneumonia, secondary pneumonia, bronchitis, and aspiration pneumonia);

2) Urinary system (cystitis, pyelonephritis, infection of the implanted kidney);

3) Digestive system (from the described above oral candidiasis, to candidiasis of esophageal, stomach, colon, peritonitis, cholecystitis); Intestinal candidiasis include catarrhal inflammation, hemorrhagic-necrotic or changed membranous;

4) Central nervous system (inflammation caused by *C. albicans* penetrating the bloodstream during fungemia);

5) Osteoarticular system (inflammation of marrow and bone, muscle inflammation);

6) Inflammation of the eye and endocarditis is included in deep and organ candidiasis as well.

General candidiasis (sepsis symptoms are usually lighter than bacterial sepsis. It often accompanies of inflammation of the mouth and disorders of the digestive tract) [11].

Hospital infections of *C. albicans*

In the United States and Europe in recent years there has been a significant increase in fungal hospital infections. About 30 species of fungi that are the perpetrators of infections are mentioned. The share of fungal pathogens compared to other etiological factors have increased in recent years twice [10]. *Candida*, as a factor in hospital infections occupy fourth place after S. aureus infections, coagulase negative staphylococcus and P. aeruginosa [10]. As elsewhere, here *C. albicans* is an opportunistic pathogen manifested as pathogenicity after the removal of the normal bacterial flora by chemotherapy [11]. Thus they are endogenous infection, but in the case of *C. albicans* infection in neonates, these are exogenous infection as a result from poor hygiene of the environment.

In hospital infections are a serious problem resulting from transplantation procedures. Fungal

infections generally occur shortly after the treatment, as a result of intensive administration of chemotherapeutics. It was found that liver transplants pose a greater risk of fungal infections than kidney or heart transplants.

In bone marrow transplant recipients prolonged neutropenia is the most important factor disposing to the formation of fungal infections. [11].

An effective tool for the treatment of hospital infections, including fungal infections, is a rapid diagnostics using the method of real-time PCR [8].

Participation of *C. albicans* in the pathogenesis of other diseases

Studies involved several thousands of patients with non-specific gastrointestinal symptoms revealed that the presence of fungi was in 61.5% of stool samples and 70.9% of these *C. albicans* was found. In 20.8% of cases there was a breach of intestinal microbial balance. The study of isolates drug resistance showed lower than the normal sensitivity to azole derivatives, amphotericin B and 5-fluorocytosine [14].

Other clinical reports indicate that *C. albicans* can among others cause infection in patients with systemic lupus erythematosus [11]. Easy locating of the *C. albicans* in cracks in corners of lips is a known phenomenon. Apart from bacterial superinfections, yeast superinfections as off-white macerated skin detachment can be found there [15].

C. albicans in the pathogenesis of allergic diseases

Hypersensitivity to fungi of *Candida* kind, causing superficial fungal infections of the skin and mucous membranes, can lead to a severe urticaria.

Among type II hypersensitivity reaction to fungal antigens, sporadic cases of allergy to mannan (polysaccharide cell walls of fungi, among others of *Candida* species were described. Mannan is a major allergen in patients with atopic dermatitis. Diseases related to hypersensitivity to fungal allergens include asthma, bronchial asthma, allergic rhinitis, allergic sinus mucosal inflammation, allergic conjunctivitis, atopic dermatitis and urticaria. In one study, the authors report that in 57% of patients with asthma the *Candida* fungus allergen derivatives were found. If you are allergic, it is proposed to carry out analysis in the direction of the fungal infection in order to reduce the severity of the treatment of asthma include anti-infective Trychophyton fungi, *Candida* [10].

Epidemiology and fighting *C. albicans* infections

The percentage of fungal infections caused by *C. albicans* is relatively high in the USA. In Europe, the number of infections in humans is also increasing. The appearance of the most dangerous forms of candidiasis, candidemia in intensive care units, is particularly disturbing. Studies in neonatal intensive care units in the United States and France have shown that *C. albicans* was the most common species responsible for invasive candidate infections in neonates. Disseminated and invasive candidiasis seem to be very similar in the U.S. and Europe, and are estimated to be 49 to 55% of all candidiasis. Among the predisposing factors for candidemia and disseminated candidiasis are the following: cancer (26%), surgery within the abdomen (14%), diabetes (13%) and AIDS (10%). According to statistical data of the etiology of systemic fungal infections of *C. albicans* formed a serious medical worldwide problem. The high incidence of these infections, as well as the high mortality of patients with immunosuppression increase the interest in the study of the virulence factors of *C. albicans*i and the appropriate candidiasis treatment strategy [6].

C. albicans infection sources can also be found in the animal world. Even the outer shell of free-living animals the presence of numerous opportunistic fungi, including *Candida* was detected [16]. It was reported that from the samples taken from the dog with demedocosis *C. albicans* was isolated without bacterial growth. This strain was sensitive to flucytosin, amphotericin B, and nystacine and only moderately sensitive to fluconazole and ketonazole. Oral treatment with Amitraksem (an antiparasitic), and in conjunction with ketonazole mikonazole ointment resulted in complete cure within 9 weeks. Demedocosis infection and colonization of *C. albicans*

on lesions are likely to lead to a synergistic effect of the parasite on the fungus. Isolation of *C. albicans* from lesions and positive reaction of a sick animal to antifungal treatment confirmed the role of the yeast in the described infection [17].

Diagnosis of *C. albicans*

Isolation and identification of *C. albicans* in clinical laboratory

Clinical material should be obtained directly from the place where the disease process takes place and tested as soon as possible. From the point of view of cosmetologists skin, nails and hair are important areas. Skin scrapings should be taken with a scalpel in a few places with the most recent changes to the banks. The vesicles or pustules, purulent samples are taken with a swab moistened with saline. Similarly, samples are taken from the mucous membranes.

The affected several hairs are collected using tweezers. Samples are taken from under the changed nail.

Skin, nails and hair are opaque. Prior to microscopic examination of samples a solution of 10-30% NaOH or KOH (or 10% of sodium sulphide and laluryl sodium sulphate) is to be addend. Such radiolucent preparations were tested under low and high magnification. According to Grama, Giemsa, etc. the formulations can also be dyed with blue methylene. On the medium surface Sabouraud grows in the form of damp, shiny, grey-white colonies. The microscope slides are shown round or oval cells, which can be in the process of budding (yeast phase, the phase of Y — yeast), or create pseudohypha (mycelial phase - M).

Clinical material is placed on Sabouraud solid surface, where the macroscopic appearance of colonies is estimated. They are damp, shiny, grey-white.

The sexual form of *C. albicans* has recently been described. It shows features of basidia. It comes from *C. albicans* chlamydospore with double amount of DNA in a cell which is in the course of budding [11].

Further discussion of research techniques of cosmetic raw materials and the direction of *C. albicans* are in the official rules [34,35,36] and normative acts discussed further below.

In addition to *Candida* in clinical material there has been a type of Rhodotorula, Pityrosporum, Trichosporon yeast. Rhodotorula species are found in healthy people, but also in the materials from patients with respiratory infections. Pityrosporum yeasts are visible in the preparation of material from patients as a round or oval cells.

Among described several species of Trichosporon only Trichosporon cutaneum is pathogenic for humans. It causes hair fungus (white piedra).

Serological diagnosis of *C. albicans*

Over 80% of infections caused by budding yeast are attributed to *C. albicans*. Antigen selection of a large difficulty in serological diagnosis. In addition, some C. albcans antigens were detected in other species, therefore serological cross-reactions may occur [11].

The most often used group is glycoprotein antigens constituting the cell wall with active polysaccharide ingredient (mentioned mannan is the most commonly used antigen) and intracellular proteins. The demonstration of mannan is important to differentiate the form of candidiasis. Several tests are used simultaneously to confirm the causative agent of infection.

Serological methods are sensitive for the detection of IgM antibodies to polysaccharide antigens. Various modifications of hemagglutination reaction are used herein with polysaccharide extracts of *C. albicans*. In healthy patients 1:20-1:40IgA class antibodies are often found, while in ill patients above 1:160. Later in the infection, in similar sensitive hemagglutination reactions towards polysaccharide antigens, IgG antibodies are detected.

Antibodies to protein antigens (intracellular) are detected in precipitation, immunodiffusion, immunoelectrophoresis tests. In immunosuppressed patients, especially in the systemic candidiasis and chronic mucosal candidiasis antibodies of *C. albicans* antigens are detected, both

protein and polysaccharide. Latex and ELISA tests are applied here [11].

Methodology for susceptibility determining

As with bacterial infections, fungal infections knowledge of the pathogenic fungus sensitivity to chemotherapeutic agents is the basis for rational treatment. To evaluate the susceptibility quantitative and qualitative methods are used.

Quantity methods

They are used to determine the minimum fungicidal concentration - MFC. Dilution methods in a solid or liquid surface are applies for this purpose. Dilution micromethod is still the reference method (MIC/ in mg/l).

Another method is applied to determine the chemotherapeutic concentration causing 50% inhibition (IC50) or 90-99,9% (IC99, 99%) of yeast cells in liquid culture [11].

Diffusion cylinder method in agar is another embodiment. MIC value is calculated from the curve of the relationship between a zone of growth inhibition around the wells in the agar and the logarithm of medicament concentration.

Quality methods

These are diffusion method using flimsy discs soaked with appropriate antifungal medicament. Practically they are used for routine susceptibility testing for flucytosine and some imidazole.

For polienyle antibiotics diffusion cylinder method is applied the most often. It is recommended to use a synthetic substrate of specified composition as YNB-agar (Yest nitrogen base + 2% glucose, 1.7% agar), SAAF (synthetic amino - acid fungal medium), MVA (yeast morphology agar), and others. Note that the popular Sabouraud surface used to determine the susceptibility, may exhibit antagonistic effects of synthetic antifungal compounds.

The result for susceptibility of yeasts to chemotherapeutics is achieved after 48 hours of smearing in 37°C [11].

Body defence against infections

In the development of candidiasis transition from health to disease occurs when there is interaction between the fungus and the mucosal membrane (or skin of the host). Resistance to *C. albicans* is involved with both innate and acquired immune response mechanisms. Status of the immune system of the infected person is the main barrier inhibiting the transition of *C. albicans* commensals to the form of the pathogen. Likewise, in preventing the spread of pathogens from the site of infection plays an important role in defence mechanisms of mucosal/ or the skin of the host

The defence against infection is involved with many types of innate immune cells: neutrophils, monocytes, macrophages, NK cells, dendritic cells, T cells, epithelial cells and keratinocytes mucosa.

In case of the system infections release of interferons (IFs) and lymphotoxin (LTA) from Th1 cells is responsible for activating the antifungal properties of neutrophils and macrophages in the deep tissues. IL17 and IL22 release from the specific cells causes accumulation and activation of neutrophils to the elimination of mucosal infection. It should be noted that in the reduction of infection in the body various other commensals in the oral cavity, GI tract and vagina play an important role.

Specific prevention

Skin infections are usually self-limiting and treatment is associated with a state of limited immunity to reinfection. This resistance probably depends on the IV type answer (delayed) to the fungal antigens. Cell-mediated immunity seems to be important in other fungal infections, since it can be moved by means of sensitized T cells. It is supposed that TH cells release cytokines that activate macrophages to destroy fungi.

As it was already emphasized, immune deficiency caused by immunosuppressive medicaments

or destruction of normal bacterial microflora by antibiotics may be the reasons for the invasion of *C. albicans*. *C. albicans* infection, often seen in congenital or acquired immunodeficiency, suggest that only the mechanisms of proper resistance are able to eliminate or control the growth of fungi [18].

The above explanations justify the lack of prospects for the production of an effective vaccine against candidiasis, although it was already in 2002 that American sources signalled candidiasis vaccine was at the stage of research, development and preclinical studies [19].

Treatment of infections and medicaments sensitivity of *C. albicans*

Antifungal chemotherapeutics are represented by the different groups with different properties and different pharmacological action time [11]. Traditional antifungal agents, particularly fungal surface, were simple chemical compounds (salts of mercury, chlorine, and iodine). Currently these compounds are sometimes used for the treatment of fungal infections of the skin (ointments, powders, suspensions). Moreover, there are preparations containing phenol derivatives, salicylic acid, sulphides, sulpfonates, hydroxycholine derivatives, invert soaps. In the treatment of superficial mycoses solutions of the dyes are also used, such as bitterness violets and ointments containing it [20]. Using pharmaceuticals for external use their impact on the behaviour of antimicrobial properties of the skin needs to be analyzed. Their adverse effects was demonstrated in the study of the effectiveness of anti-mite preparations: oxalic acid and amitrax and formaldehyde. They reduce antimicrobial activity (e.g. against *C. albicans*) of the surface of the skin. Upon activation of these preparations the activity was decreased or disappeared for a period of 4 weeks [20].

As indicated, in the pathogenesis of candidiasis the first colonization step is the adhesion. Quaternary ammonium compounds seem to meet these expectations by showing inhibition of the adhesion properties. Among alanine and glycine-derivates containing ten-coal alkyl chains are those which do not show any mutagenic while effectively combating biofilms and are inhibitors of H +-ATP yeast membrane [21]. There is a growing interest in ksantone derivatives, which also has a high antifungal activity. The studies on the effect of ksantone derivatives on dimorphism of *C. albicans* cells showed that the most active compounds contain chlorine and prenyl derivatives in the molecule. These compounds significantly reduce or completely deprive the fungal cells the ability to pass in a virulent filamentary form [23]. Much attention is given to research activity of essential oils against yeasts, among others, *C. albinas* [11]. Inhibitory concentration of ethereal oils results in 2-4 fold increase in sensitivity of *C. albicans* to factors penetrating cell guards. Similarly, tolerance to oxidative stress is significantly reduced. For this reason opportunity to improve the effectiveness of antifungal specifics by associating them with oils activities emerges. Such a strategy can be proposed at least for the topical treatment of chronic infections of C. albonas [24]. Positive results were obtained also for volatile fractions of ethereal oils against fungal biofilm infections causing chronic local infections. Because of the potential cytotoxic and irritant effects of medicament oils in a cream, ointment or talc the effects of the volatile fraction appears to be a good treatment [25].

C. albicans as commensals in the oral cavity poses a threat in the increasingly popular dental implant. Such treatment requires appropriate antiseptic preparation of the oral. Many patients have a prosthesis which predispose to oral colonization by yeast-like fungi capable of making biofilm as a danger to the success of the surgery and maintenance of the implant. For the best selection of mouthwash fluids the activity of selected solutions was assessed: 0.1% chlorhexidine digluconate, tincture of arnica, potentilla rhizome extract, plantain leaf, marigold basket and the arnica basket. A solution of 0.1% chlorhexidine digluconate demonstrated fungicidal activity with respect to all strains of *C. albicans*. Tinctures and extracts inhibited the growth of strains or did not show antifungal activity in varying degrees. Thus, in order to decrease the amount *C. albicans* before implantation preparations of chlorhexidine digluconate can be used, and plant preparations at the recommended concentrations are not suitable fungicidal activity [26].

As it was already discussed above numerous enzymes are largely responsible for the virulence of *C. albicans*. Therefore, the effect of ethereal oils was tested: clove, geranium, melissinic and cytroneol on the activity of phospholipases, proteases and hemolysin produced by *C. albicans*. The validity of the assumption was shown that the etherreal oils used in lower subinhibition concentrations decrease the activity of several hydrolytic enzymes performing an important role in the pathogenesis of *C. albicans* infection [27].

There are efforts to take advantage of oriental medicine, often popular for the treatment of fungal infections. The attention is paid on the antifungal activity of Raoultella ornithinolica bacteria that lives in Dendrobanea veneta earthworm gut wall. Glyco-protein complex purified from fluid postcultivated from the bacteria in preliminary experiments showed antifungal activity against *C. albicans* [28].

Antifungal treatment with chemotherapeutic agents

The final stage of mycological diagnosis, in addition to the identification of fungi and to determine the amount of clinical material, is the assessment of the sensitivity to antifungal chemotherapeutics [29].

The main groups of chemotherapeutic agents include antibiotics, antifungal and synthetic chemotherapeutic agents from the group of imidazoles. Pyridone derivatives, morpholine and allylamine were introduced into candidiasis medical treatment [11].

Only a few antifungal antibiotics with hundreds had therapeutic use. They can be divided into two groups: polyene and non-polyene macrolide antibiotics.

Polyene antibiotics

These are products of metabolism of actinomycetes (Streptomyces). They are effective against fungi, including opportunistic yeasts. The ready-made specifics of the final group include popular nystatin and polifigmine, on which are the most strains of *Candida* are sensitive. Similarly, natamycin (pimarycin) known as primafucin acts on the yeast.

Another antibiotic amphotericin B (preparations: Amphonoronal and Fungilin) is considered to be the most important antifungal medicament. In combination with dioxycholane sodium it is produced as Fungizone preparation for the treatment of general and systemic fungal infections.

Non-polyene antibiotics

These are a variety of compounds having common antifungal feature. Medical use was found among others in Griseofulvin and Aktydion (cycylohexide). The latter is added to the substrate as a selective agent.

Griseofulvin (prep. Commercial Gricyn, Gryfulwin, Grisovin, Gryseofulvin forte) is toxic and photosensitising.

Imidazoles

Among others metronizadole is a synthetic compound involved in a group of azoles (imidazoles, triazoles or trizoles). Clotrimazole and miconazole show activity against yeasts. Note that the activity of these compounds depends on the type of fungus, and even strains within a species. They are highly effective against *C. albicans*, but are inactive against other species of this type (C. kruzei and *C. tropicalis*) [11]. Other authors have confirmed that the spectrum of activity of the imidazole derivatives is varied to different *Candida* species [30]. However, different chlorides of imidazole derivatives may have high activity against *C. albicans* [31]. Enikonazol belonged to the group of imidazoles as antifungal was applied to combating fungi on living environment of poultry and other animals. Enikazol proved to be an effective agent for a broad antifungal activity against opportunistic fungi, but also against yeasts, among others *Candida* [32]. Imidazoacridines appeared to be photosensitising compounds [33].

Flucytosine

It is a synthetic compound known as 5-fluorocytosine (5-FC) with high activity against yeasts. It influences on ribonucleic acid by blocking the synthesis of protein.

With the synergistic effect with amphotercin B it is sometimes the only medicament with systemic mycoses and sepsis [11].

Candida albicans in clinical and microbiological purity assessment of cosmetics according to legal requirements

Microbiological requirements for cosmetics are specifically defined in the law, where *C. albicans* is considered as the only eukaryotic test organism. Cosmetics Act of 30 March 2001 sets out a number of requirements that must be met by cosmetics manufacturer. One of the articles of this law refers to the microbiological purity [34]. However, the Act does not provide any specific guidelines for microbiological control and acceptance criteria, testing methods. These guidelines can be found in the Regulation of the Minister of Health of 23 December 2002 on the definition of cosmetics sampling procedures and laboratory testing procedures [35]. While cosmetics manufacturers are required to produce cosmetics that meet the requirements of this regulation, they may use their own, more stringent criteria and testing methods. The regulation describes how to test the preservation of products, handling of raw materials and semi-finished and finished products, provides the requirements of the microbiological purity of cosmetics and research methodology. Maintenance effectiveness of cosmetic products protecting against fungal contamination is being investigated in the stress testing of *C. albicans*. The test load controls systems preservative efficacy against *C. albicans*, based on pharmacopoeia requirements and their own experience of laboratory control. As in the case of products. This regulation indicates the need to study the same materials and intermediates in the direction of *C. albicans* contamination as well. In terms of microbiological requirements cosmetics are divided into two categories:

Category I: cosmetics intended for children, and around the eyes.
Category II: other cosmetics.

Microbiological criteria include establishing, inter alia, the total number of *Candida* albicans.

Proceeding

a) Preparation of the homogenate
Weigh 10 g of the product into a sterile container (in the case of a small weight 1g can be weighed). After weighing the sample dilute 1:10 with the dilution fluid. After dilution, the sample is shaken until complete homogenisation. In case of the anticipated growth of microorganisms and prepare dilution of 10-2 and further.

b) Detection of the presence of C. albicans in 0.1 g of product.
Homogenate diluted samples in a volume of 0.1 ml are plated using the "pitch method" on the solid Sabouraud surface. *C. albicans* grows in the form of white or beige colonies. In the presence of these colonies further identification should be done by plating on chromogenic substrate specific for *C. albicans*.

No characteristic colony appears to be interpreted as the absence of *C. albicans* in 0.1 g of the product.

Specific requirements for cosmetics are as follows:

CATEGORY I. Care for children and the eye area:

Total number of *C. albicans*, as well as testing bacteria can not exceed 100 cfu/g or ml (CFU — colony forming units).

CATEGORY II. Ather cosmetics

The total number does not exceed 1000 cfu/g or ml.

CATEGORY III. Regulation of the European Parliament and of the Council 1223/2009/WE of 30 November 2009 on cosmetic [36].

It shall apply from 11 July 2013. It does not contain specific research methods or define microbiological requirements, but refers to harmonized standards:

In accordance with Article. 12: "research methods must be in accordance with the relevant harmonized standards, the references of which have been published in the Official Journal of the European Union". Harmonised standards are developed by ISO, as generally applicable in the Member States. The list of harmonized standards

provide the standard: PN EN ISO 18416:2009 for the detection of *C. albicans*.

Current interest in *C. albicans* in cosmetic microbiology

As it was already stressed, *C. albicans* is the only eukaryotic organism officially used to evaluate microbial contamination of raw materials and cosmetic products, as well as the efficacy of preservatives added to cosmetics. For this reason, the characteristics of the organism must be taken into account in any study on this subject. The presented literature review points out the role of asparyle proteases in the pathogenesis of *C. albicans* infections [6], the assessment of materials and substances filled with cyclodextrins and antiseptic substances that may have a use in cosmetics [37].

Continuing interest in the use of essential oils as ingredients of cosmetics is maintained [7]. Sensitivity of *C. albicans* to 12 different oils was tested and showed that most of them inhibit the growth of microorganisms, which indicates the possibility of their use as active ingredients of cosmetics used for example for oral hygiene. However, further in vitro studies should be conducted to confirm the effectiveness of antiseptic and low toxicity [38]. Much attention was paid to the action of ethereal oils against *C. albicans* alongside various species of dermatophytes and filamentous fungi capable of creating biofilms. For example, clove oil work in the volatile phase after 4 hours of exposure reduces *C. albicans* biomass by 1.33%. The concentration of geranium oil 1/2MIC against C. albcans caused the decrease in this concentration of added fluconazole with 12 mg/l to 0.064 mg/l. [7]. In a study of a synergistic antifungal medicines and the effect of ethereal oils several times lower MIC antimycotics values was obtained [7]. Similarly, flucanozole activity against clinical strains of C. albians with the combined effect of Melaleuca alternifolia tea tree oil increased [39]. It is proposed to evaluate the effectiveness of essential synergistic with fluconazole and voriconazole by MIC determination using test strips [40].

A new proposal concerning the way of preparing dressing materials which could be used in cosmetics, is filling dressings and antimicrobial substances with cyclodextrins. Cyclodextrins are natural cyclic oligosaccharides produced during the enzymatic degradation of starch by a bacterium of Bacillus genus. For antimicrobial substances, such as iodine, polihexamid and chlorhexidine acetate, placing in the cyclodextrins gives better compatibility with the skin, higher anti-microorganisms activity and greater durability in storage. Fabric with beta-cyclodextrin with polihexamid showed strong antifungal activity and complete growth inhibiting of *C. albicans* [4].

Summary

This paper is the third part of the monograph discussion of microorganisms contained in the of official rules for the microbiological testing of raw materials and cosmetic products. *C. albicans* is one of many microscopic fungi contaminating cosmetics. The paper presents its ability to cause a variety of opportunistic diseases and ubiquity as commensals in the human environment. Superficial skin disease and mucous membranes diseases closer to cosmetology were widely discussed.

The opportunistic ability of *C. albicans* not only to self-induce various diseases, but the pathogenesis of complications complicating pathogenesis and hindering the treatment of other diseases were shown. Research methodology and ease stress tests should encourage manufacturers of cosmetics to reach for verification of the effectiveness of maintenance and microbiological safety of cosmetic products and thus ensure the safety of their everyday use as much as possible. This study, because of monographic approach has didactic features and can be used by teachers in the preparation of lectures and exercises in microbiology, cosmetics and students writing theses as a comprehensive source of references.

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Nature and scope of activities of a disaster medicine

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Summary:
A disaster medicine has become an important field of the scientific system, supported by a number of modern specific sciences such as: strategic management, probability theory, any forms of environmental engineering, etc. It was established in 1973 in Mainz under the auspices of the United Nations. This paper attempts to systematize the degrees and types of disasters and their effects as an important part of a disaster medicine.

Key words: disaster, disaster medicine, rescue, rescuer, prophylaxis, disaster classification.

The civilization of the 21st century placed the nature of a disaster in the centre of perception of the phenomena accompanying a human being and his/her development. Thus it cast a shadow on the issues of the security of people in a general sense, the condition of a human being entangled in a variety of issues that are not always in his/her favour. Medical assistance, which for centuries has adopted the model of a rational process, not to use the term discourse, led to the emergence of the sphere of intervention, dynamic, immediate actions. It is accompanied by complex measures, in many cases forces, which constitute a broad setting for its core structures, without which it would be useless, would not bring desired effects. To this day, there have been disputes about whether we are dealing here with an emergency medicine, accident medicine or a "disaster medicine".

Etymologically, rescue, rescuer have existed longer than the term disaster. The former is associated with any form of delivering assistance in various situations, "emergencies, especially those that are life and health threatening". "The emergency" has been heightened by various causes, not always treated on a par with disasters. As a phenomenon, an accident has always surprised with the so to speak drama of events, and often affected one person or a few people. Its results have been connected with disastrous effects of destruction of property, numerous body injuries, often fatalities. The outcome of an accident has always been rather measurable, could be clearly captured, a certain prophylactic measures could be used against it, it could be counteracted in various ways, prevented directly or indirectly.

The scientific and technical civilization has increased the share of the latest means, fundamentally changed the view of the world, the environment of a human being and his/her contribution to the creation of culture in a broad sense. The view of the surrounding nature has changed, so has the way it is perceived by the entity that exploited it, i.e. human being. As a result of permitting its shameful devastation, the term "disaster" emerged as a hardly predictable, sudden state, the size of which is difficult to determine.

The state of a disaster often equals the state of calamity, as events of this kind usually entail tragedy intensified effects. Increased threats to human life and health usually take the "hyper" dimension. The unprecedented frequency and scale of natural as well as increasingly man-made disasters determined an increase in the number of the injured, rarely encountered in the history before. The increasingly global effects caused by a human being are wars understood as a consciously conducted destructive activity on a multifaceted and mass scale. The shape of current civilization led to a significant broadening of the term war in which a relatively small group of people can be responsible for effectiveness of destroying any living force. This, of course, refers to terrorism, which today is global and became the most important problem to the modern world and people in general. Its effects created the necessity for a broadly understood medical assistance to extend beyond a broadly specialized group, as we previously thought of a medical personnel, that is doctors, nurses, and related technical personnel.

The present situation places the duty of delivering medical assistance on those professional groups that previously dealt with the elimination of the material effects of various kinds of accidents and calamities. The operation of the medical personnel themselves becomes, at a wider level, specialized and necessitates an integrated work with other services (fire brigades, law enforcement authorities). Such an integration was known in military medicine before, but it is hard to say whether there was similar multifaceted structural connection. The whole medical personnel were obliged to focus attention on medical issues connected with distribution of assistance in mass and concentrated injuries, whose variety often is impossible to predict. Thus, the knowledge in this area must be broadened permanently. Currently, it is necessary that these services act effectively in states of disasters bordering on wars whose range of accompanying circumstances has not been predicted by anybody yet.

To ensure the protection of mankind as a whole against losses and a planned elimination of related adverse phenomena, a decision was made at the forum of the 51st Session of the United Nations Economic and Social Council (ECOSOC) about global assistance in disasters, emergencies, larger collisions and natural disasters. As a result, during an International Symposium of Disaster Medicine in 1973 in Mainz a new, independent field in medicine was created—a disaster medicine. Its main objectives focus on research problems connected with its functioning in calamity states, as well as on organization and training aimed at effective work for the benefit of a large number of people in such specific conditions as unpredicted calamities are.

Following the views formulated in Mainz and at subsequent scientific conventions in the following years, various states and Poland elaborated the issues connected with a disaster medicine in a broad sense. Apart from a broad range of studies, the issues started to be implemented.

Medical assistance to those affected in the conditions of a huge number of the injured, with which "a disaster and emergency medicine" deals, is understood as ensuring the survival of the largest possible number of the injured and preventing other threats to their health and life, mass assistance delivered using limited means, obligation of segregation, evaluation and selection of the injured according to how urgent it is to deliver assistance and transport them.

An important task of a disaster medicine is to facilitate the teaching of the abilities to deliver medical assistance to the injured (the wounded, sick, disabled) in various conditions, using limited forces and means of health care. The term "various conditions" should be understood as non-normal circumstances, even primitive, dictated by the pressure of time. As a rule, these are irreversible situations, requiring taking immediate and firm decisions.

Thus, a disaster medicine suggests knowledge and prophylaxis that should be used when the number of casualties or injured exceeds the amount of the health care resources that are allocated for their treatment in normal conditions covered by a classical medicine.

An accident not always can be equated with a disaster. It, however, reaches the scale of a disaster when the needs of the rescuers significantly and rapidly exceed the forces and means that are at the disposal of the health care in given circumstances.

The observation of civilisational conditions and states in the 1970s suggested the emergence of a disaster and emergency medicine. This independent discipline closely cooperates with other medical disciplines, and draws on various fields of crisis management, using their achievements, research methods and ways of operation.

In terms of objectives and functions, it is close to a much longer existing military medicine. Thus, it maintains cooperation with, and takes advantage of organizations for health protection of armies. The ways and methods of medical protection of military operations of armies, as well as the tasks, forms and work methods of military health care organizations are quite closely connected with a disaster and emergency medicine.

The medical character of disasters and military health care organizations is more distinct from other medical disciplines. The latter more consistently follow the principles of medical deontology and promote the classically established doctor's approach towards the affected individual (patient). A disaster medicine and related disciplines (such as variations of a military medicine) are accompanied by a psychological shock. For a doctor, it is caused by the situation in which he/she must treat the injured, significantly different from normal hospital conditions, which makes it more difficult to establish a contact, make diagnosis, etc.

This area of medicine often involves the necessity of rescuing in the first place the injured who show the chance of survival. And those who don't have much of a chance of being rescued must be given a proper humanitarian care.

So, it can be stated that the general objective of a disaster and emergency medicine is to decrease the number of deaths, disabilities, consequences of injuries in all disaster states in which there is a huge number of the injured.

Outline description and taxonomy of disasters

When defining the nature of a disaster we must assume that disasters are not n the "macro scale", similarly as a personal car is not a variant of a truck.

Etymologically, the term "disaster" is derived from the Latin "astrum", which means star. This suggests that a given extraordinary event was caused by an uneven or unusual position of stars.

The literature of the subject provides a number of definitions of a disaster. In a general sense, this term is used to refer to any event of local or regional extent which disturbs the proper functioning of a local community and is threatening to the life, health and property of the inhabitants. [1].

From a linguistic perspective, a "disaster" is defined as a "sudden and usually unexpected event of mechanical, chemical, geophysical or meteorological character with tragic and extensive consequences, causing huge losses, usually including fatalities" [2].

The penal code states that a disaster occurs when there are serious effects in the form of damage of significant extent to property or persons. Such even must cause at least body injuries to a few persons or a significant damage to a property. The degree of body injuries is not important here. They can be even minor injuries, as specified in article 157 §2 of the Penalty Code. A significant damage is one whose value at the moment of the act is over two-hundredfold the amount of the lowest monthly salary [3].

In rescue services "a disaster" is defined as an extraordinary event with a significant number of the injured and extensive ecological impact, whose consequences cannot be handled using available means and outside help is needed [4].

A disaster differs fundamentally from an accident or mass accident. An accident is a limited event whose consequences can be handled using available means, whereas a mass accident is any event resulting in enough victims to disturb the normal work of rescue services and hospitals. Such an even affects small areas and doesn't pose risk to a large number of inhabitants. However, when developing the organization and management principles in events of this type we can adopt ones that can be used both when a mass accident and a disaster occurs.

Classification and character of disasters

There are a lot of ways of classifying disasters. The most popular one is distinguishing between natural disasters – such as floods and hurricanes - and man-made disasters, i.e. those caused by a human being—collapses of buildings, airplane crashes, train derailments, etc. A more detailed division is as follows:

1) Natural disasters (water, land, fire, air)

1a) Earthquakes and floods, accounting for 80% of all natural disasters:
- Flood (high wave), breaking of flood banks, violent high tides;
- Avalanches, mountain landslides, volcanoes;
- Fires;
- Hurricanes, typhoons;
- Draughts;

2) Man-made disasters:

2a) Wars:
- using classical weapons,
- using mass destruction weapons (nuclear, chemical, biological wars).

2b) Civilisational disasters:
- Communicational—mass collisions on motorways,
- rail smashes,
- plane crashes,
- ship sinkings.

2c) industrial and construction disasters:
- explosions,
- poisonous substance leaks,
- irradiation,
- collapses.

2d) Huge fires of:
- department stores
- schools,
- hospitals,
- skyscrapers.

3) Secondary consequences of disasters—famine, infectious diseases, epidemics, epizootics, environmental devastation.

For some time, there has existed another kind of classification of disasters, more useful in planning the activities necessary to be taken at the very beginning of their occurrence. It refers relatively to the type of injuries suffered by those affected. Thus, we can distinguish:

- a "surgical" disaster, understood as a disaster whose victims sustain injuries caused mainly by a mechanical factor, burns or gunshots;
- "general-medicine" disaster where the affected people sustain general injuries not requiring a surgical intervention.

Apart from that, we have a toxicological disaster, epidemiologic disaster, etc.

The information identifying the kind of a disaster determines a better preparation of hospitals for delivering assistance to the injured.

In the construction of a management system, it is particularly useful to classify disasters according to the degree of engagement of medical and logistic services. Here, we distinguish three degrees:

- **I degree**—a disaster during which local medical and logistic resources are sufficient once a response plan has been implemented.
- **II degree**—a disaster during which local medical and logistic resources will be inefficient and assistance from neighbouring areas will be needed.
- **III degree**—a disaster during which local and neighbouring rescue systems will be overstrained and it will be necessary to use the regional and national resources.

Planning as well as trainings always require that attention is paid to a quick classification of events to one of these three degrees. If a disaster is bigger than I degree we should take into account additional time and effort needed to obtain necessary outside assistance.

The character of disasters allows us to realize the following three possibilities:
- a disaster occurs in a neighbouring region and local units may be asked for help,
- a disaster occurs in the area serviced by a local rescue system – this is a typical scenario for which action plans are developed,
- a disaster concerns a rescue system entities.

A local disaster affects equipment, premises, its effects are damages (for instance to a hospital by a flood, watchtower, school, etc.)

The disaster site is an Emergency Call Centre. Scenarios of this type are usually not taken into consideration, nevertheless we cannot forget about them or exclude the possibility of their occurrence. This issue is emphasized by various cases faced by rescue systems.

At this point, we should mention the stages of the procedure during disasters. These are:
- activation stage,
- implementation stage,
- return to previous state.

The activation stage comprises:
- mobilisation and initial response,
- command organization and evaluation of the place where the event occurred.

The implementation stage comprises:
- searching and rescuing,
- collection of the injured, segregation, stabilization and transport,
- managing the place where the event happened.

The return to the previous state comprises:
- retreat from the scene,
- return to minimal operations,
- reporting.

For the purpose of organizing the planning, the reaction (response) to a disaster can be chronologically divided into sequences of successive events. As they occur, specific actions are taken as a response to the disaster.

Doctors usually focus in their activities on direct actions of saving the health and life of those affected. However, disaster planning and training require knowledge of the issues of organization and management. Engaged in managing the consequences of these events are the following services: rescue and firefighting units of the State Fire Service, the police, ambulance service, hospitals, non-governmental rescue service organizations, energy teams, telecommunication companies, municipal services, self-government or government administration representatives, etc.

In II and III degree disasters, similar groups to those mentioned above are engaged – from other regions. This makes it necessary to ensure that the plans and schedules take into account the principles of management and cooperation of units and entities operating in individual potential threat events on the local, regional and national scale.

Sadly, a common shortcoming of trainings and exercises is the fact that they are held only within the framework of the existing rescue system without participation of public services. This leads to a huge chaos and confusion if a real disaster occurs.

Trainings and exercises must be held jointly with these services so that the personnel can get to know both each other and each others' abilities. For instance, exercises may be held with the scenario of a plane or helicopter crash in a distant region requiring bulldozers to make it possible to get to the site of the crash. This would make it possible to find out whether and how fast the public works office can provide the necessary heavy specialist equipment.

Rescue medicine specialists must view the issues of public safety in immediate and extraordinary risks in a comprehensive, even systemic manner. It cannot be treated on a par with a conduct in emergencies in hospitals, but as a rescue service in a broad sense, with numerous structures taken into account. It is also necessary to conduct a continuous risk assessment and prophylaxis.

Assistance in the event of a disaster is not an individual service, but results from a cooperation between non-governmental, technical, medical and administrative bodies.

The medical aspect is only a small, although an important part of the whole issue. Doctors and medical personnel are helpless unless they are provided with the access to the victims and treatment facilities and this access is maintained.

During mass accidents and disasters there is, as the definition states, a disproportion between the need for assistance and optimal possibilities of providing it, between the necessity and possibility.

The assistance in these conditions is a mixture of improvisation and organization. The better

the assistance is prepared, the less room remains for improvisation and confusion during the first hours during which it is provided. All these are the issues that are the subject of interest of a disaster medicine. What is necessary is the synchronization of the actions of various services and social factors. This advantage of cooperation can be ensured by intensively conducted trainings and knowledge of appropriate field and local structures by the communities inhabiting given areas.

A disaster medicine comprises:
- medical assistance,
- management of forces and means,
- sanitary-epidemiological provision,
- logistics,
- psychological issues of rescue operations,
- secondary effects,
- life-long training of medical personnel.

Medical assistance in a disaster medicine includes:
- anaesthesiology,
- surgery,
- internal medicine and toxicology,
- gynaecology, ‘ - paediatrics
- psychiatry,
- radiology.

Management in optimal functioning of a disaster medicine constitutes the most important motive for crisis action. It comprises such elements as: planning, organizing, managing.

Logistics constitutes a material and locomotive basis of a disaster medicine and includes: medical supply of medical and technical resources, provisions, evacuation, communication.

Secondary effects move the planning of medical actions to further effects of every disaster that can include: infectious diseases, epizootics. Concentrated technological facilities, unprecedented means of transportation and communication existing in the proximity of huge agglomerations carry the risk of various failures, difficult to predict, whose effects have the scale of disasters. Tackling such tragedies requires multidimensional, rationally conducted operations. Any chaos, getting into a panic, lack of methodical distance may only bring disastrous effects.

The intervention in the event of various tragedies by means of methods used in a disaster medicine became expediency today—rise of global terrorism, any disastrous effects for a random human being that this movement causes by its methods makes it necessary that the populations of cities, villages and regions be prepared for action. A specific readiness, constant awareness of delivering assistance, permanent capability of various social cooperation became essential. These elements can be strengthened through a planned system of programme trainings and organization of exercises using forces and resources. This is an effective way of ensuring that the character and scope of activities of a comprehensive disaster medicine is consolidated in the awareness. In the event of various potential events it becomes a necessary condition for functioning of a society that knows the canons of values of the surrounding environment.

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Military medicine

Actual state of affairs of the training of the medical service personnel training prior to deployment in a foreign operation at Role 1

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Summary:
This work presents the current system of the medical personnel training for foreign mission. Members of the Medical Service of the Czech Armed Forces have been a part of troops participating in different operations out of the Czech Republic for nearly 20 years. Successful performance of the tasks is, apart from other things, dependent on quality of the training as well which medical personnel and the support units complete before their deployment to the foreign mission.
Training for a foreign mission is divided into two parts: military (performed by all the members together) and specialized (performed by individual professions). This training for the Medical Service is provided by the Medical Service Support Department of the Forces Support Command in Hradec Králové in co-operation with the Department of Military Health Care Organization, the Department of Military Hygiene at the Faculty of Military Health Sciences of the University of Defence and other medical subjects in the area of CBO Těchonín. The training is divided into 3 phases: theoretical (gaining all the available information from the deployment), methodical (application and enlargement of military skills) and practical (trying out theoretical and practical specialized skills in real situations).
Unification of training forms and methods for performance of tasks in foreign missions including training contents is necessary for high-quality and effective training of the Medical Service personnel.

Key words: Medical Service, the Czech Army Forces, foreign mission.

Nearly twenty years have passed since deployment of medical detachment within chemical unit in operations Desert Shield and Desert Storm in 1990/1991 on the territory of Saudi Arabia and Kuwait. From this moment it started a modern history not only of the „post revolutionary" Armed Forces of the Czech Republic (ACR), but also of its military healthcare service [1]. Medical detachment members are an integral part of the units and contingents participating in operations outside the territory of the Czech Republic, irrespective of whether they are deployed under full-valued field hospital unit type (Afghanistan, Iraq) or as doctors, nurses and medics of self standing combat or support units (the former Yugoslavia). The fact remains that the medical personnel specialists at all levels are always very positively evaluated for their work, and it un-

doubtedly contributes to the quality, evenness and focus of preparation prior to their actual deployment [1].

Organizing, planning, preparation and execution of military healthcare service professionals have continuously developed during these almost twenty years, mainly due to changes of modern warfare nature [2,3,4]. From the symmetric operations, for instance the Gulf War mentioned above, and its "second act" named officially Enduring Freedom in 2002/03, to now more typical asymmetric operations in their wide range and specifics. This indicates that the high quality training of medical personnel has never been and even today is not considered to be a simple matter [5]. It is understood to be constantly evolving process and it is necessary to respond to each kind of operation requirements. Although the conditions may vary in different types of deployment, we can find points identical for each of them and as such can be generalized [6]. The objective of those who plan the content of medical professionals training, originates from the effort to set up the most realistic conditions and requirements prevailing in the area of deployment. Their correct evaluation, prioritization, processing of optima scope of employment covering the whole spectrum of possible actions is very important. It does not cover only a special medical training, but also a combined training part. It also entails organizational tasks such as planning area of deployment, time for training, providing material, equipment, lecturers and instructors.

The main objective is to prepare medical service personnel for their work in a particular foreign operation, to give them guidance on how to react in certain situations, but also to drill some specific activities. Meaningful, effective and quality training is always dependent on feedback. It is necessary for the organizers of preparation to collect and identify trainee's opinions and personal views on training, not only immediately after its completion, but especially when returning from an operation, because only thus can objectively evaluate the effectiveness of training to further improvement.

Contingent training [5,6]

Predeployment training is based on CGS ACR regulation concerning preparation troops prior to deployment to a military foreign operation. This document contains compulsory topics and scope for military as well as special training. Further topics reflect specific needs and requirements of the Contingent Commander or the unit itself, usually based on the nature of received operational tasks, commander's own experience gained from previous operations, additional requirements and options. The actual preparation of the contingent is divided into combined and specialized part, where all trainees carry out the first, the other by professionals covering individual military occupations, including military medical service.

In the last few years, the guarantee of military medical personnel predeployment training, particularly in Afghanistan and Kosovo, became a Medical Support Department of the Headquarters of Support Forces, whose members plan, organize and conduct the preparation of medical service professionals twice a year. It should be emphasized that this training is attended by medical service members of the Czech Armed Forces, regardless of their affiliation to operational levels. The decisive factor is a medical unit to be deployed, consisting of medical service personnel employed in various medical units and facilities (such as infirmaries, battalion aid stations, military hospitals, etc.). Based on the experience of medical personnel training it is proved that it is vital to coordinate medical teams prior to a Comprehensive Field Exercise (CFE) of contingent. During the CFE there is no space available for organizing professional activities, the need is to provide full-range medical support to exercising units. Therefore, medical units must be ready to perform assigned tasks prior to the practical exercise of the entire contingent. A good example is the medical support site in KFOR providing the role I care.

Training organized by the Medical Support Department of Headquarters of Support Forces takes its course in Biological Defence Centre (BDC) Těchonín, where appropriate background is created. Training is carried out in three phases. The first phase covers a theoretical preparation, in which participants get acquainted with the professional duties at deployment location. The second phase, a methodical rehearsal, affects mainly the application and extension of army skills in the performance of professional duties.

The third phase, a practical training, examines the ability to combine both theoretical and practical skills of medical personnel in accomplishing tasks in real situations.

Theoretical preparation

In the first phase of training all available information provided by qualified personnel from previous deployment is utilized, as well as the latest news from medical intelligence sources. Chiefs of medical treatment facilities and other medical units are regularly invited to share their experience and to help to improve the training of medical personnel not only from the treatments, but the site organization of health care and treatment of medical materials. Since it is still a large number of professional soldiers who are sent to foreign operations for the first time, missing or psychological preparation. In the field of language training is to focus primarily on technical terminology and the ability to maintain radio communication.

Methodical training

An integral part of the second phase of the training is methodical training focused on survival in distress. It's organization is engaged by two departments of the Faculty of Military Health Science, University of Defence (FMHS-UD), namely K-302, Department of Military Health Organization and K-307, Department of Military Hygiene [7].

Training takes place under the tactical theme, which is divided into several parts. The goal is not practicing the basic knowledge and skills of combined training, but their extension with emphasis on the ability of application in an international environment.

During the first part all trainees are specified how the organization of activity is set before performing the task off the base. They get acquainted with methods of task assignment, principles of support prior to exiting the base, convoy procedures and last but not least, the principles of using weapons on and off the base. The aim of this part is to familiarize trainees with explicit principles of leaving the base.

The second part of methodical training is focused on helicopter operations. It is divided into theoretical and practical part. The theoretical part focuses on the principles of preparing the helicopter landing zone, helicopter hand signal guidance, the basic principles of movement in the vicinity helicopter and familiarization with the emergency on-board procedures when airborne. The practical part is focused on the proper technique of helicopter boarding/unboarding, equipment and firearms transport. The aim of this section is to provide training in helicopter transportation and mastering the principles of emergency procedures in situations of crash.

The third part of the training is focused on own survival. Trainees perform their tasks in squads under the tactical theme in outskirts of Těchonín. Squads move to predefined coordination, where they fulfil specific tasks given by training instructors. After assigned task is achieved, instructor provides a brief evaluation and issues new coordinates so the squads can move to another location. In this part the methodical training emphasizes the application of combined skills in carrying out professional tasks on the battlefield and is focused on areas:

- *Topographic survey and preparation*, where trainees practise using military maps, learn principles of map-reading, land navigation, using of compass and GPS devices in unknown terrain. Emphasis is put on the principles of safe movement and navigation on the enemy territory, the determination of the cardinal directions and time using improvised instruments. These skills are reviewed regularly throughout the next training in unknown terrain.
- *Signal preparation and training*, where trainees get familiar with radio assets used in ACR, their operation and the principles for establishing a radio connection. This activity is also rehearsed continuously throughout movement among sites and is partially conducted in English.
- *Medical support request* builds on previous area. Trainees are explained or recapitulated evacuation request procedures or call for support, what are the principles and procedures. Emphasis is placed on the ability to process and transmit request for medical evacuation with forms of CASEVAC, 9-Line MEDEVAC and situational reports METHANE - both

in Czech and English. Trainees must be able to deal with present scenarios during the exercise, where the above-described skills are drilled and tested.

- *Engineer support* preparation is aimed at detecting unmasking symptoms of minefields, mined areas and improvised explosive devices (IEDs) and rehearsal of possible actions performed in minefield on foot as well as on vehicles.
- *Medical aid in emergencies*, where extraction and evacuation procedures are trained, transporting wounded and injured under fire to safety as well as for longer distances, with or without improvised means. Trainees must be able to perform first aid, again, only with makeshift equipment.
- *Alternative alimentation and herbalism*. In this session trainees learn options and techniques to procure and conserve food and water in the wilderness and how to utilize Battlefield Food Rations (BFR). A special attention concerns recognition and correct technique of testing herbs suitable for consummation or treatment.
- The last session concerns *survival skills* and here the following elements are explained to trainees: the principles for selecting adequate area for bivouac in terms of safety precautions, principles of making a fire, procuring water and food, drying wet dress, building improvised shelters, safeguarding, area restoration, covering tracks etc.

It should be noted that this training is focused on the real state of emergency, when the trainees carry only equipment necessary for survival and rely on themselves and their skills. All activities are focused on practical training, because only in this way the trainee can gain self-confidence to master any challenging situation, which may undoubtedly occur during performing duties in foreign operations. Therefore, all training conducted in terms of the constant movement, sometimes up to a total distance of 20 km and tasks performing under pressure, because only this may examine the physical and mental endurance of trainees, and let them assess, whether they are able to handle these situations. The aim of this phase of training is to understand the principles of survival and to help to promote self-confidence of trainees to overcome hardships and discomfort.

Practical training

The third phase combines all the theoretical and practical skills of medical personnel concerning dealing with special tasks in real situations. Besides operatives and trainees, a referee is involved as well, who closely monitors the action of medical personnel making subsequent evaluation. If there were major mistakes, the referee is authorized to pause the action, notify errors made and indicate the correct solution or procedure. Then the exercise may continue. The masking of injured and wounded is largely achieved though cooperation with the Hospital Base, figurants are provided by the FHS UD. The referee board is nominated from the medical staff of the Medical Support Department, dispensaries and Hospital Base. These are experienced professionals who have successfully accomplished foreign operations at different stages of health care. To make lives of trainees more distressful, some figurants are instructed to simulate post-traumatic stress behavior in order to disrupt the team actions. Teams are also forced to deal with transporting of dead.

At this stage of training medical teams are assembled to perform various tasks. They consist of a doctor, paramedic and driver with allocated ground ambulance. Actions are performed in two phases. The first phase is focused on performing actions by the medical team. Meanwhile, the second phase includes the cooperation of several teams in the area of deployment, primarily in terms of mutual team coordination at the scene.

The first stage is aimed at the interplay within the medical team. Scenario considers fewer casualties with light and moderate wounds. It is mostly modelled as an accident during the training or improper weapon handling at the base. Medical team enters the scene right after the first aid by non-medical personnel is provided, for example by combat life savers (CLS). Based on their request for assistance medical team initiate its action. At the site they perform necessary tasks to stabilize wounded and prepare them for evacuation to a medical facility. This usually represents simulated higher stage of medical care (Role 2) of an alliance partner. To achieve this, doctor is required to communicate and maintain patient records in English.

Due to efficient use of time for non-exercising teams, members of CBD Těchonín organize a parallel training focused on providing first aid using the training phantom.

The second stage is aimed at cooperation among teams and coordination with other elements on the scene, including control authorities. In most cases, traffic accidents with or without international element are simulated. Similarly like in the previous scenario, figurants play their role here, but this time the situation is, more critical with higher amount of victims sustaining severe to heavy injuries. Occurrence of such a situation is immediately reported to the appropriate level of command, which carries out the activation of medical teams. According to the relevance, the first team entering the scene may ask for additional support, such as aeromedical evacuation or other specialists. Referee board monitors not only the level of treatment provided by medical teams, but also their decision-making process, management and coordination of medical units on the scene. Assessment comprises the speed and quality of triage, methods of treatment and sequence determination prior to evacuation. Other factors assessed include the coordination on the site of intervention, its overall length and methods of communication with the operation centre. Injuries are then transported to medical facilities where, as in the previous phase, doctor passes on patient with his/her medical records and provide all information available in English. Teams at this stage are also required to deal dead soldier transport.

It follows that these stages are focused exclusively on the medical service actions. A presence of combat units or military police personnel on the scene would bring a new dimension into the training, what is our ambition of further improvement.

Conclusion

The aim of this article was to bring closer the organization of medical service personnel training prior to deployment in a foreign operation at Role 1 stage from the perspective of FHS UD and MSDoHSF and simultaneously analyse its current condition. Even though the current form of training signifies in most cases satisfactory premises to meet specific requirements, it is still necessary to seek for the optimal variant of the training. If we manage to integrate our training in to a coherent training framework in the future, it would certainly be very beneficial. The MSDoHSF last year has attempted this approach, but on behalf of restrictions since 1st October 2009 it will not be capable to fulfil this task.

The starting point is the necessity to organize training of medical personnel prior to deployment in foreign operations continuously at all stages of ACR Medical Service by explicit concept. It is necessary to precisely define the therapeutic procedures and standards for pharmaceuticals and medical supplies used in operations and based on these assumptions plan the training. Also remains a necessity to analyse medical service needs and requirements to transfer them into the training outline with respect to its specifics. It is very important to handle both general needs assessment, i.e. those that are essential for members of medical service regardless of functional classification, as well as those specific to individual duties. The preparation for tasks performed in foreign operations must be comprehend standardization of forms and methods for high quality and effective medical personnel training.

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Nutrition

Assessment of protein-energy and mineral nutritional status of soldiers serving in the Cavalry Squadron of the Polish Armed Forces Representative Battalion

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Summary:

Introduction: Representative Battalion of the Polish Army is a military unit, which soldiers participate in all official state, military, religious and patriotic ceremonies during the year. Soldiers of the Cavalry Squadron form a sub-unit of the Representative Battalion of the Polish Army and participate in the state ceremonies as well.
Aim of the work: The aim of the work was to assess the protein-energy and mineral nutritional status of soldiers serving in the Cavalry Squadron of the Polish Armed Forces.
Methods: The aim of this study was to assess the nutritional status of students of selected higher educations institutions: The Main School of Fire Service (SGSP), Maria Sklodowska - Curie University of Warsaw, (UWMSC) and the National School of the Pope John Paul II in Biała Podlaska (PSWBP) as well as regular soldiers under the age of 30 years, serving in the chemical armies. The study involved the assessment of nutritional status of totally 741 young people, while 81.4% were male and 18.6% female. Assessment of nutritional status was based on the results of anthropometric measurements.
Results: Assessment of nutritional status was done on the basis of the body mass index (BMI) value. Measurements of the following parameters: body height, weight, arm circumference and thickness of 4 selected skin folds. Values of body weight and height were the basis for calculation of the BMI. Based on the BMI value subjects were classified to the following groups: standard weight, overweight and obese. Assessment of the bone mineral density was carried out by the densitometric method on a non-prevailing upper limb forearm bone, using the EXA 3000 apparatus, and bone calcification was evaluated based on the T-score value..
Results: Average BMI was 24.9 ± 3.2 kg/m^2. The standard BMI was found among 60% of examined soldiers, and overweight was found among 36% of men. Only one person was obese.
Standard bone calcification was found among 75% of examined. The T-score value characteristic for osteopenia was found among 20,8% of examined men while 4,2% of subjects indicated values characteristic for osteoporosis.
Conclusion: As a part of obesity and osteoporosis prophylaxis, it is appropriate to conduct training on nutritional health among soldiers serving in the Cavalry Squadron of the Polish Armed Forces.

Key words: nutritional status, body mass index, overweight, obesity.

Introduction

The Representative Battalion of the Polish Army is a military unit, which soldiers participate in all official state, military, religious and patriotic ceremonies during the year. From 2009 the Cavalry Squadron has been a part of the Representative Battalion of the Polish Army, which was formed in 2000 and has been continuing the 1000-year tradition of the Polish Cavalry. Just as before, so now, cavalry accompanies Polish President as military guard of honour during public ceremonies and accompanies his foreign visitors coming with an official visit to Warsaw. In addition, they participate in parades, festivities and other ventures. The Cavalry Squadron inherits thousand-year-old tradition of the Polish cavalry, especially from their predecessors from cavalry sub-units serving in the Second Polish Republic and in the post-war period [1,2]. Service and training program in the Cavalry Squadron, regardless of general military training, includes many hours of drill on horseback, what requires excellent physical condition and very good health, and therefore a good nutritional status of lancers.

Nutritional status is a resultant of energy and nutritional values of food ration used in alimentation and energy burden of man, and its assessment allows determination of nutrition correctness. Nutritional status disorders result from energy and/or nutrients deficiency, or are result of overfeeding, so too much energy supply with a daily food ration. In the first case we are dealing with low body mass, while overfeeding leads mostly to obesity and its adverse health effects. Both malnutrition and overfeeding resulting, among others, from improper nutrition, not only worsens human well-being, but is also a health and social problem related to limited possibility to do many professions, including soldier profession [3]. In connection with professionalization of the Polish Army and individual way of soldiers' feeding, it is necessary to monitor current soldiers' nutrition status, as part of diet-depending metabolic diseases prevention.

The aim of the work was to assess overweight and obesity occurrence and to estimate mineral nutritional status of lancers serving in the Cavalry Squadron of the Polish Armed Forces Representative Battalion.

Material and methods

Total of 25 men, lancers from the Cavalry Squadron of the Polish Army underwent the examination. The protein-energy and mineral nutritional status of all of them was determined. Based on the measurements of body mass and body height the BMI index was calculated. Obtained BMI values were the basis to classify examined subjects, in accordance with the Ferro-Luzzi classification [4] to the following groups: standard weight (BMI 18.5 – 24.9 kg/m^2), overweight (BMI 25.0 – 29.9 kg/m^2) and showing features of obesity (BMI > 30 kg/m^2). Measurements of selected skinfolds thickness: on biceps, triceps, under scapula and over iliac, were done as well. Percentage fat content in the body was calculated by the Durnin and Womersley method [5]. Fat content of 10 – 20% was assumed as standard [6].

Assessment of mineral nutritional status was done based on the examination of bone mineral density, which was performed by densitometric method (dual energy x-ray absorptiometry-DEXA) on a non-prevailing upper limb forearm bone, using the EXA 3000 apparatus. Bone calcification was evaluated based on the T-score value, where the average value and standard deviation in a group of young adults, regardless of the age of the patient was adopted as a reference value. The T-score value higher than -1 was adopted as a standard, which means that it is not lower than 1 standard deviation below the average value, the T-score between -1 and -2.5 was characteristic for osteopenia, while the value below -2.5 was characteristic for osteoporosis [7].

Results and discussion

The average age of examined cavalry lancers amounted to 26.5 ± 4.0 (20 – 38 years old). Among the subjects 79,1% was secondary educated, 16.7%—vocational and 4.2% university educated. Most of these men (66.7%) came from villages and 33.3% from cities of different size. Average body height of examined amounted to 179,8 ± 5.8 (166,4 – 89, 2 cm) cm, average body mass was 80.4 ± 12.3 kg (61,2 – 104,3 kg). Calculated, based on the body height and weight, the BMI value allowed classification of examined soldiers to the groups presented in Table 1.

Table 1: Overweight and obesity occurrence among soldiers serving in the Cavalry Squadron (in %)

Value of BMI (kg/m^2)	Percentage of examined soldiers
Norm (18,5 – 24,9)	60
Overweight (25,0 – 29,9)	36
Obesity (>30,0)	4.0

It was found that 40% of lancers revealed energy-protein nutrition disturbances, resulting from overfeeding.

While interpreting the BMI results fat content in the body should be taken also into account, because high BMI value does not always indicate obesity occurrence. In athletic people, especially ones going in for weight training, large body mass usually results from large muscle mass and not from high fat content. Hence, in case of huge muscle mass and short height, assessment of the nutritional status based on the BMI result may be false positive and testify to obesity occurrence, which really doesn't exist. It testifies to muscle overweight that is favourable form the health point of view. Total fat content in the body is determined by measuring thickness of the skinfolds. The thickness of selected skinfolds and fat content are shown in Table 2.

Table 2: Thickness of skinfolds, percentage fat content and lean body mass

Parameter	
Skin fold thickness on biceps (mm)	2.54±0.45
Skin fold thickness on triceps (mm)	2.82±0.46
Skin fold thickness under scapula (mm)	15.3±6.43
Skin fold thickness over iliac (mm)	23.79±10.2
Percentage fat content	16.72±4.4
Lean body mass (kg)	66.6±7.9

Comparison of an average fat content among examined lancers of 16.7% and BMI value of 24.9 kg/m^2 indicates that these values are included within the norm (10 – 20% for fat and 18.5 – 24.9 kg/m^2 for BMI).

The results of research of nutritional status of Polish soldiers carried out for many years indicate permanent occurrence of overweight and obesity [8]. Occurrence of nutritional status disorders among soldiers serving in the Cavalry Squadron that result from overfeeding were observed in smaller percentage of subjects than in other types of troops and military services (Table 3) [9, 10, 11, 12].

Table 3: Percentage of overweight and obesity occurrence among soldiers of different military units

Military unit BMI value (kg/m^2)	Chemical troops n-123	Military aircraft crew n-172	Medical aircraft crew n-57	Flight engineers n-44	Navigators n-28
Norm (18,5 – 24,9)	50	53.2	26.7	31.0	24.3
Overweight (25,0 – 29,9)	43.7	41.6	53.3	44.9	54.1
Obesity (>30,0)	6.3	5.2	20.0	24.1	21.6

In connection with physical burden resulting from the military training process and from performing tasks related to specificity of the service and the type of military unit, good mineral nutrition status is very important. Maximum bone calcification, known as the peak bone mass, is found between 25 and 35 years old, and so in the age bracket the examined soldiers are. Standard bone calcification was found among 75% of examined, mineralization characteristic for osteopenia demonstrated 20.8% and osteoporosis features—4.2% of subjects. Better bone calcification was found among previously examined soldiers of the Polish Army chemical troops and medical aircraft crews i.e. doctors and rescuers.

Table 4: Bone calcification among soldiers serving in the Cavalry Squadron, chemical troops and medical aircraft crew (in %)

Military unit T- Score value	Cavalry Squadron n- 25	Chemical troops n-32	Medical aircraft crew – doctors n- 15	Medical aircraft crew – rescuers n- 42
T >-1	75	80.8	86.6	85.7
-1 >T>-2,5	20.8	16.2	6.7	14.3
T<-2,5	4.2	2.5	6.7	-

Epidemiological studies carried out in many centres in Poland indicate occurrence of nutritional deficiencies, among others, calcium deficiencies leading to adverse changes in bone mineraliza-

tion and often causing osteopenia or osteoporosis [13]. Analysis of distributions of daily calcium intake along with a diet indicate that 70% of daily food rations Poles eat characterise too small calcium content [14, 15].

Conclusions

1) Occurrence of excessive body mass of different degree testifies to unbalanced nutrition of lancers.

2) Adverse changes in bone calcification of different severity found among more than 25% of examined soldiers can cause an increase in fractures occurrences in further periods of the service.

3) Reported disturbances of protein-energy and mineral nutrition status can cause elimination of soldiers from the service in the Cavalry Squadron of the Representative Battalion of the Polish Army.

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Nutrition

An assessment of nutritional status of young men – students and regular soldiers

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Summary:

Introduction: Obesity is currently a great epidemiological problem worldwide. Although obesity has been associated with a man for a long time, nowadays it is pandemic of obesity that is visible, and the diseases associated with it have become the leading cause of death. The causes of obesity are inconsistent. Incorrect diet and low physical activity are mentioned the most frequent as the causes of obesity.
Material and methods: The aim of this study was to assess the nutritional status of students of selected higher educations institutions: The Main School of Fire Service (SGSP), Maria Sklodowska–Curie University of Warsaw, (UWMSC) and the National School of the Pope John Paul II in Biała Podlaska (PSWBP) as well as regular soldiers under the age of 30 years, serving in the chemical armies. The study involved the assessment of nutritional status of totally 741 young people, while 81.4% were male and 18.6% female. Assessment of nutritional status was based on the results of anthropometric measurements.
Results: The largest percentage of respondents who were diagnosed overweight and obesity concerned PSWBP students, the lowest concerned students of the first and the second year of SGSP in Warsaw. Underweight was not diagnosed among students. However, underweight was observed in 6.9% of surveyed female students of UWMSC. Overweight was found in 29.5% of female students of PSWBP and in 14.9% of the women in UWMSC, while obesity was diagnosed in 10.4% of female students of UWMSC and in 8.3% of students in PSWBP.
Conclusions: Overweight among students and soldiers is a muscle type, as proven by the low rate of obesity. Obesity and underweight among the studied population indicates unbalanced nutrition in terms of energy, which in the long run may result in the formation and development of specific diet-related diseases.

Key words: nutritional status, underweight, overweight, obesity.

Introduction

Obesity is currently a great epidemiological problem worldwide. Although obesity has been associated with a man for a long time as evidenced by excavated stone statues derived from 50 thousand years [1]. Nowadays it is pandemic of obesity that is visible, and the diseases associated with it have become the leading cause of death. Since 1980, the worldwide number of obese has increased more than two times. In 2004, 1.4 billion adults had increased body weight, including

obese amounted to 200 million men and nearly 300 million women. In 2010, over 40 million children under 5 years of age were overweight, and 65% of all people living in countries where obesity kills more people than underweight [2]. According to data from representative national surveys conducted under the Household Food Consumption and Anthropometric Survey, in 2000, obesity was present in 41% of men and 28.7% of women. The prevalence of obesity was estimated to be 15.7% among men and 19.9% among women. This issue affects all age groups, regardless of age, gender and race.

Positive energy balance is always the cause of obesity, i.e. the energy value of food intake exceeds energy loose associated with the maintenance of basal metabolic rate and energy loose for activity and recreation [3]. The causes of obesity are inconsistent. Incorrect diet, low physical activity and genetic predisposition are among the most frequent causes. Statistics show increase in obesity, especially at a young age, which makes it necessary to monitor the occurrence of this phenomenon, particularly among young people [4].

In Poland, young people between 19 and 25 years of age take higher education. This time is special, because it is spent away from home by some young people, often in a completely different environment. A poorly balanced diet and low physical activity are the main cause of the development of obesity later in life [5]. Among the factors that have a significant impact on overweight and obesity one mentions, in addition to errors of dietary, genetic factors, low physical activity, socio-economic factors, concomitant diseases and medications [6,7,8]. The aim of this study was to assess the nutritional status of students of selected higher educations institutions: The Main School of Fire Service (SGSP), Maria Sklodowska–Curie University of Warsaw (UWMSC) and the National School of the Pope John Paul II in Biała Podlaska (PSWBP) as well as regular soldiers under the age of 30 years, serving in the chemical armies.

Material and methods

The study involved the assessment of nutritional status of totally 741 young people, while 81.4% were male and 18.6% female. Assessment of nutritional status was based on the results of anthropometric measurements, such as height and weight. These parameters form the basis of the calculation of body mass index (BMI). The obtained values allowed to classify the respondents according to Ferro-Luzzi classification [9] to groups of protein-energy malnutrition (BMI ≤ 18.4 kg/m^2), normal (18.5 ≥ BMI ≤ 24.9 kg/m^2) , overweight (25.0 ≥ BMI ≤ 29.9 kg/m^2), and showing evidence of obesity (BMI ≥ 30.0 kg/m^2).

Results

The average age of studied young males was 23.3 ± 2.7 years. The youngest group consisted of students of the first and the second year of SGSP (19.7 ± 1.1 years), and the oldest—chemical armies soldiers (25.6 ± 2.3 years). The average height and weight of the respondents amounted to 179.1 ± 6.4 cm and 79.4 ± 10.2 kg. The average lean body mass-BMI was 24.7 ± 2.9 kg/m^2 and was in the normal range; however, in the students of the first and the second year of UWMSC, the third year of PSWBP and chemical armies soldiers BMI values exceed accepted standards, indicating the occurrence of obesity (Table 1).

Table 1: Basic anthropometric indicators of studied young men

Higher education institute	Age [years]	Height [cm]	Body mass [kg]	Body Mass Index (BMI) kg/m^2
SGSP I and II year	19,7±1,1	180,5±5,8	77,0±7,4	23,6±1,9
UWMSC I and II year	25,3±4,6	178,3±7,9	80,0±14,3	25,1±4,2
SGSP III year	21,3±1,0	180,4±5,7	79,2±8,6	24,2±2,2
PSWBP III year	24,8±4,6	178,7±6,2	80,4±9,4	25,3±3,3
Chemical armies soldiers	25,6±2,3	177,8±6,3	80,3±11,4	25,3±3,1
Average	23,3±2,7	179,1±6,4	79,4±10,2	24,7±2,9

BMI indications showed that students of PSWBP constituted the highest percentage of respondents who were overweight and obese, the lowest among the students of the fist and

the second year of SGSP in Warsaw. Underweight was not diagnosed among the students (Table 2).

Average age of female students ranged from 20.3 ± 2.9 years (SGSP) to 29.0 ± 7.7 years (PSWBP). The lowest increase (164.9 ± 6.6 cm) concerned female students of UWMSC, while the highest — (166.6 ± 6.1 cm) female student of SGSP. The lowest body weight was observed in SGSP female students, the highest in PSWBP female students. BMI values ranged from 21.6 ± 1.7 – 23.9 ± 4.5 kg/m^2 (Table 3).

Based on the BMI results underweight was observed in 6.9% of female students of UWMSC. Among SGSP female students there was no overweight and/or obesity. However, overweight was observed in 29.5% of PSWBP female students and in 14.9% of the women studying in UWMSC, while obesity was found in 10.4% of UWMCS female students and in 8.3% of PSWBP students (Table 4).

Table 2: Overweight and obesity in young men (in %)

	SGSP I and II year	UWMSC	SGSP III year	PSWBP	Chemical armies soldiers
Normal body mass 18,5≥BMI ≤24,9 kg/m^2	77,8	42,1	64,9	37,0	48,5
Overweight 25,0≥BMI ≤29,9 kg/m^2	21,7	47,4	33,8	51,9	43,3
Obesity BMI ≥30,0 kg/m^2	0,5	10,5	1,3	11,1	6,2

Table 3: Basic anthropometric indicators of studied female students

Higher education institute	Age [years]	Height [cm]	Body mass [kg]	Body Mass Index (BMI) kg/m^2
SGSP	20,3±2,9	166,6±6,1	59,4±6,4	21,6±1,7
UWMSC	25,9±7,3	164,9±6,6	62,4±14,1	22,9±4,4
PSWBP	29,0±7,7	165,8±6,5	66,1±18,8	23,9±4,5

Table 4: Underweight, overweight and obesity in both groups of female students (in %)

	SGSP	UWMSC	PSWBP
Underweight BMI≤18,5 kg/m^2	-	6,9	-
Normal body mass 18,5≥BMI≤24,9 kg/m^2	100	67,8	62,5
Overweight 25,0≥BMI≤29,9 kg/m^2	-	14,9	29,5
Obesity BMI ≥30,0 kg/m^2	-	10,4	8,0

Discussion

For many years in our country the study of nutritional status of students has been conducted, because contemporary population leads specific lifestyle in which diet is usually irregular, and often appeared dietary mistakes may result in underweight, overweight, and obesity (Table 5).

Table 5: Underweight, overweight and obesity among students of different higher education institutes in the country (in %)

Location and year of study	Number of studied people	Underweight	Normal	Overweight	Obesity
Poznań 2001 [5]	62	9	63	28	
Gdańsk 2001/2002 [10]	272		83,4	12,8	3,8
Olsztyn 2001[4]	1406	29,3	59,2	10,0	1,5
Białystok 2002/2003 [3]	310	30,2	56,1	10,2	3,5
Łódź 2010/2011 [11]	350	11	78	10	1,0

The results of the study concerning nutritional status of students of different higher education institutions in the country show that the problem of overweight and obesity in this group of patients has been observed for years. While overweight is usually a muscle type, and does not cause health problems, obesity in young people is a serious problem from the stand-

point of public health, demanding appropriate preventive measures.

Both in Poland and other countries the issue of obesity among students is of interest of scientists, doctors and nutritionists. Study conducted among 701 university students in Saudi Arabia showed that among students at the age of 21.7 years only 45.7% showed normal BMI, overweight was found in 31% of respondents, while 23.3% were obese [12]. The results of other studies conducted in India showed that among 192 first-year students at the University of Karachi 22.1% of men and 27.1% of women showed overweight or obese [13].

Conclusions

1) Among the students and the regular soldiers to 30 years of age underweight was not registered. However, underweight was found among 6.9% of female students of Maria Sklodowska - Curie University of Warsaw.
2) Overweight among students and soldiers is a muscle type, as proven by the low rate of obesity.
3) Obesity and underweight among the studied population indicates unbalanced nutrition in terms of energy, which in the long run may result in the formation and development of specific diet-related diseases.

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Emergency Medicine

The sense of orientation in life and reasons for choosing the profession of paramedic

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Summary:

Introduction: An important aspect of the work constitute reasons for choosing the profession, which is particularly important for health care workers.
Aim: Understanding and analysis of why this profession and to present the relationship between these themes, and the sense of coherence affect the choice of a career paramedic.
Materials and methods: The study was conducted among 362 paramedics.The study was a questionnaire consisting of the general and life orientation questionnaire SOC-29.
Results: Paramedics chose their profession mainly because of the desire to help (35%), the desire to be needed (16%), accident (11%) and the ability to act independently (10%). The average value of coherence was 149.4 (SD 23.46).
Conclusions: Among the reasons to choose TO BE A paramedic prevailed: the desire to help and the desire to be needed. There is a statistical relationship between the designs, the profession and the global sense of coherence in seven of the nine factors ($p < 0.01$).

Key words: motivation, paramedic, personality, choice of profession.

Introduction

It is a well known fact that ,the choice of field of study, and thus future work is extremely a difficult choice. Is usually preceded by a number of thoughts engaging the needs of individuals, including felt its functional deficiencies (for a specific type of action), as well as the lack of symptoms (ie, the needs of specific things). Human development is a gradual process and proceed with satisfying the needs specific to the ontogenetic stage of development [1,2].

Emergency medical services is a relatively new profession in which personal values compatible with the values of unions is a necessary condition for maintaining mental health, and thus reduces the symptoms of burnout. Paramedic profession like nursing profession is a profession "stressful" because as defined prof. Kazimierz Obuchowski group these occupations may include occupations related to the mission, servitude and requiring a personal commitment to the values of the parent [3]. The profession of a paramedic, as already mentioned, requires reconcile personal values

with professional - then saving lives is a passion and the meaning of life. If both values are in opposition to each other, paramedic instead derive strength from their profession, gradually becomes entangled in described by Stephan Karpman triangle "dramatic" [4]. This triangle is unconscious, alternating entering in relation to the role of the Victim, Savior (Trustee) and persecutors. A person who in the role of victim (helpless and dependent) comes from "I am helpless, you're better than me." Rescuer by Karpman is a person who "under the hood obliging man, yes he saves others from oppression, but at the cost of their dependence on each other, or the one who is going to show that others are without it will celebrate". Persecutor, however, teases and orders others to strengthen their conviction that it is better than them. These roles can reverse and apply a variety of relationships, such as paramedic — the patient.

The study of motivation is one of the sources of knowledge and social psychological mechanisms regulating human aspirations. [5] It is, therefore, to carry out research on the evaluation of motives to choose an occupation. Among the most frequently mentioned in the literature, one can find such themes as interesting future work, the specifics of future work, wages, or the influence of the family [2]. Different people react differently to the work performed, the key here seems to be an indication of the orientation of a human life, that sense of coherence, which under the salutogenesis Antonowsky'ego, I generalised, emotional — cognitive way of looking at the world, including inextricably linked together three components: clarity, resourcefulness and wisdom. [6] According Antonowsky'm clarity indicates the degree to which the incoming stimuli man perceives both enviroments external, as well as internal, as understandable, clear, consistent and orderly. A person with a high level of comprehensibility expects that stimuli that come into contact in the future will be predictable. In the worst case, when it comes into contact with a stranger stimulus, it will be able to explain and to assign something. The controllability (resourcefulness) refers to the degree to which a person perceives the available resources, as sufficient to meet the demands posed by coming to the stimuli. Among these resources are both own resources as well as resource persons to whom this unit trusts and who can always count on. A person with a high rate of self-help, in the best case, when there are adverse stimuli will count that everything will work out well enough, as far as could be expected. At worst, the consequences have occurred that will give incentives to bear. Motivate individuals to act is, however, expressed as wisdom. For a person with a high level of meaningfulness - their problems are seen as challenges. It can therefore be assumed that the reasonableness of the degree to which a person believes that life has meaning in terms of emotional distress. Sense of coherence is a global orientation and the life of man, which is shaped in the whole of human life [6, 7].

Unfortunately, the literature does not meet the reports dealing with the problem of themes to choose an occupation and a sense of orientation in life in a group of professional paramedics. Research carried out by the author of an initiation test cycle of psychological determinants of labor paramedics.

The aim of work

The aim of this study was to present the relationship between sense of coherence and motives which had guided a person choosing a paramedic profession.

Materials and methods

The study included 362 emergency medical technicians working in the State Emergency Medical System in Poland.

Among the respondents were mostly men - 244 persons (67.4%) women were 118 (32.6%). Among the most numerous paramedics were people aged 20-29 (43%), and least of all people over 40 years of age (8.0%). Mean age was 27 ± 9.7 years.

Paramedic education obtained in the course of post-secondary vocational study legitimized to 186 people (51.38%), higher education had 176 people (48.62%).

Among the respondents, the largest group consisted of those living in the city from 50 to 100 thousand. population (46%). Other respondents - 18% lived in the city for 50 thousand. population, 8% lived in the city more than 100 thousand. residents, and 28% lived in rural areas.

Used for studies of diagnostic survey method using questionnaire technique using the Life

Orientation Questionnaire and the author of a questionnaire. The study was conducted in the period from 01.2012 to 09.2012 years.
The questionnaire contained 32 questions about the nature of semi-open and closed, the contents of which were focused on the factors, which are guided by the most respondents paramedics when choosing a profession.

The SOC-29 questionnaire (Life Orientation Questionnaire) consists of 29 test items, expres-sed as interrogative sentences. The questionnaire can be divided into three sub-scales, which correspond to the components of SOC: com-prehensibility (11 claims), resourcefulness — controllability (10 statements), meaningfulness (8 statements). Results are calculated based on the relevant keys that allow you to define a global sense of coherence and the three components [7].

The research material was coded in Excel and developed using the statistical package STATISTICA 8.0. In statistical analysis methods of descriptive statistics: mean, standard deviation, analysis of variance - ANOVA. In order to estimate the relationship between sense of coherence, and factors influencing the choice of a career paramedic in the group, the following levels of significance: $p < 0.05$ — the lack of statistical significance, $p < 0.05$ - statistical significance and $p < 0.01$ — high statistical significance.

Results:

On the Figure 1 were visualized reasons for choosing the profession of paramedic by the respondents.

The above figures show that subjects have the greatest proportion of the profession as a motif showed willingness to help (35%), followed by the desire to be needed (16%), case concerned 11% of people, 10% of people indicated as a career choice motive, opportunity work independently, 8% - natural talent, 6% — the prestige of the profession, 6% chance of making the decision, 2% — a family tradition, 2% — no other options, while 4% of respondents pointed to other reasons ($p < .01$).

Table 1 shows the correlation between demographic variables of the study group of paramedics and themes to choose an occupation paramedic.

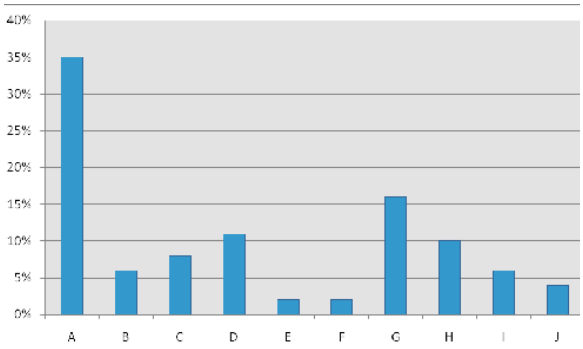

Figure 1: Themes paramedic career choice by respondents

Legend:
A – The desire to be needed, B – The prestige ofthe profession,
C – Innatepredispositions, D – Contingency,
E – Familytraditions, F – Nootheroptions,
G – Desireto be needed, H – The possibility ofindependent action,
I – Able to makedecisions, J – Other.

Table 1: The correlation between demographic variables and motifs to choose an occupation

The motives for occupation choice	Gender	Age	Level od educaton	Living place
Inner need for helping	0.29*	0.24*	0.29*	–0.25*
Sophisticated occupation	0.15	–0.05	0.09	–0.25*
Predisposed to occupation	0.12	0.07	0.03	–0.06
By accident	0.7	0.1	– 0.12	–0.28*
Familly tradition	0.09	–0.13	0.19	0.14
Lack of other possibilities	0.22*	0.04	–0.05	–0.26*
Inner need to fell being needed	0.055	0.29*	0.26*	0.07
Need to individual actions	0.02	0.03	– 0.23*	0.03
Ability to decide by oneself	0.04	0.05	–0.22*	0.08
*** p<0.05**				

The analysis showed the existence of statistically significant correlation between the willingness to help and the lack of other opportunities, and gender. Both factors are more important for women. In the case of the demographic variable defined as "age", significantly correlated with it: the desire to help and the desire to be needed. The level of education of paramedics correlated with willingness to help, willing to be needed, the ability

to operate independently and the ability to make decisions. For those who have completed post-secondary technical education, more important factors are the possibility of independent action and the ability to make decisions, and in the case of people with higher education: the desire to help and the desire to be needed. Significant correlations with respect to the variable "place of residence" was observed for the willingness to help, the prestige of the profession, if no other option. All factors were more important for those living in rural areas than in the city.

The average value of coherence for paramedics examined was 149.4. The results of the evaluator (SOC-29) in the group are shown in Table 2.

Table 2: The mean values obtained in the scales SOC-29

Scale SOC-29	N	Avarage	SD
Global sense of coherence	362	149.4	23.46
Sense od understanding	362	56.4	11.32
A sense of resourcefulness (controllability)	362	50.3	12.69
Sense od importance	362	46.5	8.65

Table 3: The correlation between the results of the Life Orientation Questionnaire and themes to choose an occupation as a paramedic Correlations between sense of coherence and themes to choose an occupation paramedic is shown in Table 3.

Based on the results shown in Table 3, it can be concluded that there is a high statistical correlation between sense of coherence and its components (a sense of clarity, a sense of resourcefulness and sense of meaningfulness), and: a willingness to help, the prestige of the profession, the selection of case studies, the lack of other possibilities. In addition, a statistically significant correlation was also found in the case of a global sense of coherence and family tradition, a desire to be needed, or the ability to make decisions.

Discussion:

Choosing a profession involves deciding on further substantial part of human life. It should therefore be a process of consciously realized in the long term. Choosing a profession is regarded as a sign of professional maturity of man. Professional decision is not only the result of the processes of development and training. It is the result of them occurring at the same time the educational process and evaluation situation in which the choice is made future profession. Conscious choice of profession means that the decision-making person is aware of the social significance of the profession, he knows, understands and appreciates its requirements psychophysical systems known characteristic of professional tasks and the resulting requirements, including the necessary professional skills. The test will be the correct choice of specialties in the future, the level and extent of identification with the profession, satisfaction with work and forms of social relations-union [8].

Motive for occupation choice	coherence	understanding	resourcefullness	sensfullness
Need for helping	0.36**	0.31**	0.41**	0,37**
Prestige	0.39**	0.49**	0.27**	0.29**
Hereditity predisposition	0.12	0.49	0.14	0.107
By case	0.32**	0.43**	0.31**	0.5**
Familly tradition	0.43**	0.15	0.32*	0.65
Lack of other possibilities	0.44**	0.38**	0.41**	0.47**
Need to be needed	0.3**	0.39*	0.12	0.36**
Ability for independent actions	0.1	0.23*	0.13	0.42**
Able to take decisons	0.26*	0.31	0.19	0.27**
* p<0.05; ** p<0.01				

In 2006, under the Law on State Emergency Medical Services, a new profession - paramedic. It is therefore a relatively new profession of medical professionals. Just as the medical profession, is associated with a specific area of activity and specific activity undertaken by a person engaged in this profession. Is inextricably linked with the saving of human life in different, often adverse conditionswork [9,10,11]. Since paramedics are required characteristics for influencing the patient to ensure the best execution of all tasks associated with the profession as a result of biological, psychological and social distinctiveness patient [12].

In the scientific literature does not meet the reports dealing with issues of due sense of coherence of designs to choose an occupation paramedic. Therefore, the author of the results can only be compared to the results for other related professional groups (doctors, nurses).

Answers were provided by all health care providers who have received the forms. Among the most important reasons to choose an occupation as paramedic can replace the desire to help other people. This result confirmed the findings of other authors: Sobczak [13], Binkowska-Bury et al [14], Waszkiewicz et al. [15] According to T. Szafranski one of the important roles played by the cognitive motives, a desire for social status or vocation. [16] In a study conducted in a group of paramedics, the prestige of the profession he was only sixth. Based on the analyzes, it seems that an important factor in choosing a career paramedic is sex. For women, an important motivation is the interest of man, the desire to help, the desire to be needed and a natural talent. But for most men, motive is the possibility of independent action and the ability to make decisions. These results are confirmed in clinical Neittaanmaki et al [17].

The questionnaire for the study of SOC does not have clear standards. The analysis of the results is based on a comparison of the results of the study authors with the results of other authors. The average value of a global sense of coherence in a group of rescue workers was 149.4 (SD 23.46). This result is higher than that obtained by other authors: Bińskowska-Bury — 147.0 (SD 28.64) [14], Bińskowska-Bury — 137.0 (SD 23.2) [18], Gruszczyńska — 131.95 (SD 20.27) [19].

With regard to the reasons to choose an occupation paramedic with a sense of coherence, carried out the analysis showed in the global sense of coherence and its components (a sense of clarity, a sense of resourcefulness and sense of purpose) dependence statistically significant in seven of the nine factors at the level of $p < 0.01$. The results may suggest that sense of coherence motivated to take active in the profession paramedic.

Results

1) Among themes to choose an occupation as a paramedic prevailed: the desire to help and the desire to be needed.

2) There is a statistically significant correlation between the experience of stress and gender, age, level of education and the workplace paramedic ($p<0.1$).

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Psychological aspects of emergency activities taken among small children

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Summary:
The course of emergency activities taken in cases of health and life threat of small children will to a large extent depend on, among others, their level of psychomotor development, verbal skills, cognitive functions development, experienced emotions and communication skills. The rescuers experience and their ability to provide medical service to so young patient and the ability to communicate with small children, also have profound influence.

Key words: emergency activities, small children.

Child is a big challenge for a rescuer because he may face some difficulties during examination, taking interview, making diagnosis and in actual treatment. Children can react very emotionally to sudden situations that put them in danger. Not unfrequently we cannot count for their cooperation. Considering strong emotions, difficulties in communication, contact with young patients is limited, which makes hard to collect information about reasons or symptoms of health threat. To esstablish and maintain contact with such patient isn't only a part of psychological support but also a part of conitnous observation. The way of course of emergency activities taken in cases of health and life threat of small children will to a large extent depend on level of psychomotor development, verbal skills, cognitive functions development, experienced emotions and communications skills. A profound influence has rescuers' experience and their ability to provide medical service to so young patient and the ability to communicate with small children. Lack of this sort of abilities may result in rescuers' fear of wrong life threat's recognition or hurting child, hence the rescue action may run in hasty, chaotic way, then the main goal of rescue team will be the fastest transfer of children wherever instead of proper medical center [1, 2].

The course of emergency activities will differ when child is at the age of infancy and preschool age; it is because of the intellectual level of child, experienced emotions, as well as lexicon and and abilities linked with the communication skills.

Verbal contact with child in his babyhood (until 1 year old) is limited. Active vocabulary of children at this age is quite poor, it's limited to a couple of words, passive vocabulary is bit wider. 1 year old infant can understand and do simple commands, especially if they are connected

with a gesture. A mean of communication is a gesticulation and also rich facial expressions. A child can show his needs and make a "dialogue" with parents in order to fulfill his needs.

An infant can experience wide range of emotions such as: love, joy, envy, embarrassment, fear. A smile has a significant value in communication. 1 year old baby can recognize his close relatives, often can react in anxiety or cry when baby see strange people; infant react in that way when is separated from parents [3, 4].

Crisis situations linked with an accident, sudden health and life threat connects with pain and suffering. In order to do painful and hard medical procedure, rescuer often has to control child's and also parent's emotions. Infant may cry because of pain or fear caused by critical situation, also rescuers as perfect strangers can stress him. Child which is crying or is scared will not cooperate with rescuer. The best solution is when parents are holding their baby . Actions which distracts baby's attention can be very helpful to calm him down. We can give him a toy or any safe item in which baby shows interest, rustling paper of syringe packing, we may turn some medical procedure into a fun-play, cannula can imitate a butterfly which pinches in hand etc. We shouldn't do any violent motions to cause additional anxiety. Considering the psychical state and harmful consequences of strong pain and fear in this type of situations, painkillers are given to children more often than to adults [5, 2].

In traumatic situation caused by accident or sudden health threat it is crucial not to separate child from his parents, their presence has soothing effect. Because of baby's psychomotor development, restricted verbal skills, information about the accident and condition of child must result from searching analysis of patient's state, interview with parents or guardians and other witnesses of accident.

Children at after-infancy age (2 – 3 y.o.) have got better communication skills. Their lexicon of active and passive vocabulary is wider; vocabulary of 3 y.o. child. Meaning of words are precisely defined. At the age of 3, child can build sentence of several words, with proper grammar, thus his communication skills are increased. Speech is strictly linked with action and is understandable in relation to current situation [7]. Emotions of child at after-infancy age are lively, unsteady and quickly changeable.

Understanding of social sitations at this age is becoming better and better. Baby's communication skills increase help in wider and growing social contacts, which can broaden social behavior at the level of psychomotor development [6].

Communication with children at this level of psychomotor development will be difficult in case of sudden health threat. Children's traumatic experience can cause strong emotional stress, feeling of anxiety and threat, fear and regressive behaviour. In these situations rescuers need to act calmly and firmly. Presence of parents is important during examination, also physical contact with them is important. But we need to take into consideration their current psychical tension, it's crucial that their emotions wouldn't pass on child. Close presence of parents who act calmly can assure feeling of safety for a child, also they may be involved in the process of rescue, i. e. Oxygen mask can be hold by one of the them. Presence of parents is advantageous for child as well as for rescuers. If little patient feels parent's support, it will be easier to stabilize his state. Moreover, parents know behaviour of their children and may faster notice some alarming reactions, what's more, they better understand their child's pronunciation, especially if there occur a lot of speech impediment or distortions. [8, 9]

Children has lower skill in localizing source of their pain, thus we should give considerable amount of attenion to child's facial expression and movements during the entire whole examination. Rescuer's face should be at the height of child's face, it helps to make an easier contact. It's essential to talk with him using simple, undestandable words; tone of voice needs to be gentle and soft, we should use child's name, explain and warn him about current proceedings. If there is such a possibility, child may sit on parent's lap, hold favourite toy or hug cuddly toy.

Children at the preschool age (4 – 6 years old) have wider lexicon, they learn 9-10 words daily.

Because of the wider vocabulary, their communication skills are better, one them is skill of telling stories. They build longer sentences with more correct grammar structure. Skill of conversation improves. At early preschool age there may occur strong emotional lability, it means they often change their emotions. Emotions are strong, intense, although short-lived, children show their emotions very brashly and in impulsive way, they easily get angry, shout, stamp their feet, are in a huff, cry, react anxiously in new situation.

Children at late preschool age gain more skill in expression of their emotions. Child can describe their experience, can predict behaviour of others linked with their expressed emotions. Older preschool children learn remedial abilities, which allow them to manipulate other people's behaviour by expression of their own emotions. It helps them in contact with adults and peers [10, 11, 12].

Durin rescue acitvites child in a shock may hamper the actions, he may protest from taking to ambulance, make difficult to take care of wounds or immobilize, especially when he lose physical or eye contact with parent, it causes strong fear of separtion with parent. In this sort of situation we should maintain constant verbal contact with the child. Also, it is important not to lose eye contact. A person who examines the patient should talk to him a lot, explain him the need of every taken action, it reduces the fear and creates atmosphere of safe and trust in rescuer. Movements during the medical proceedings have to be calm and cool. We should warn about every action and explain why we do it. When we talk we need to use child's first name, simple and understandable langueage, tone of voice should be calm, and sympathetic. We need to assure if baby understands what we talk to him. Just the oral contact (beside the will to cooperate) can help us to assess consciousness of little patient. To keep up the contact we may ask about his interests, favourite soft toy, forms of play he likes. If the rescue service takes longer period of time, we may introduce ourself, tell who we are, just try not to talk about topics linked with current situation (i. e. ask about favourite cartoon, chant rhyme, ask child to tell us about him, his siblings, friends, we may tell him about other child with the same name as his, tell him some story etc.). Maintaining contact has purpose to gain child's trust, distract him from the negative influence of traumatic situation and medical problem, also it helps to keep child conscious, particularly when we deal with head injuries or severe bleeding, when it's crucial to keep child in the state of awareness.It is worth to maintain physical contact, put your hand on his arm or head, cover him with warm blanket, give him a cuddly toy to hold, it effects reassuringly.

At every age the presence of parents is crucial. Expect for special situations, child has the right to constant care of his parents or guardians; it is guaranteed by Convention on the Rights of the Child, which was ratified by the Republic of Poland. In situation of child's sudden health threat, parents are driven by strong emotions, so rescuers are obliged to give them the proper information about the health condition of their child, rescuers should calm them down and act in a way which will not allow parents to disturb medical procedures or influence negatively on psychical state of the child, parents need to be an additional help but not be involved in rescue services [1, 2].

Each rescuer should absorb basic knowledge from the range of developmental psychology and skill of communication with children at every stage of their growth, at that point help in situation of health threat can be delivered faster.

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Psychology

Sources of job stress amongst paramedics

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Summary:

Introduction: Paramedic speciality is defined to be as one of the most stressfull as well as stresogenic. The time pressure, often unconfortable conditions hinders paramedices of giving the accurate medical help in severe acute cases when needed.The main aim of work:This papier work is our trial to set up the sources and reasons of stress in the speciality of paramedics.
Materials and methods: Screen tests were done in the period from 1st of January 2012 up to December 2012, in these screen tests a group of 362 paramedics working as EMSwas taken into consideration, question papiers were held amongst this group.
Results: Paramedics endure stress at work due to :1-low payments 97%, 2-time stress factor 99%
3-near approach to death factor 90%, 4-over work time factor 90%, 14 stressogenic factors were set. Out of them, 3 were correlated with gender, 4 with age the rest were correlated with education level and place of living of paramedics.
Conclusions: the main stressogenic factors amongst paramedic specialists are due to: low payments, lack of time and pressure from the surrounding while offering medical help in severe cases, thiereexcists a real corrolation amongst the factors: age, gender, level of education agmonst paramedics or place of work

Key words: stress,paramedic, specality.

Introduction

Stress is component in medical specialists fields like nurse, doctor and paramedics. Positive stress has sort endurance, works like a push, allows for positive thinking and efficient results, but this type of stress is not common in EMS. EMS deals with long term stress, tough conditions, the results of such a stress are felt during as well as after the shifts. It touches both the physical and psychological aspects [5,6,7]. Symptoms like headache, stomach, cardiac discomfort, digestive disease are only some of the symptoms observed among specialist enduring a long term stress.

Physical discomfort can be tuned or cured pharmacologically, a worse element is the psychological one.
Psychological element can enhance bigger and more complicated unites that can affect not only work life but as well private life.

Here, its important to enphasise, that people enduring a long term stress try to find a solution

in an improper way by themselves. Related to the above, an earlier recongnistion is a very important element to find a solution for this problem among specialists.

The aim of work

To find out some stress factors amongst paramedics.

Materials and methods

This work included 362 paramedics working as EMS the major group was identified as a men gender — 244 people (67.4%), 118 were women (32.6%) in paramedics group the average age ranged 20-29 years old (43%) whereas aged above j 40 years old (8,0%). age average ranged as 27±9,7 years. Paramedics still on process of self education 186 (51,38%), with higher education 176(48.62%) to achieve this work paper, we questioned a group in the term 01.2012 to 09.2012. The question contained 15 questions characteristically conservative or liberal with much attention to the stressors present at work .

This work had been performed using program Excel, using STATISTICA 8.0 in analyzing we used program Statistica 8 (StatSoft®, Tulsa, USA).

The normality of distribution of variables was tested by the significance level p of the Shapiro-Wilk test. In the case of normal distribution of mean differences were tested by Student's t-pairs. Investigating the relationship between the frequency of occurrence of the variables tested in the analyzed sections were tested by chi-square independence of the adopted significance level of p = 0.05. For arrays two-way strength of the relationship between the variables examined further factor V-Cramer.

RESULTS

Figure 1 represents a collection of stressors pointed by the screened paramedic group.Figure 1. Stressogenic factors indicated by screened paramedicsAs is apparent from the above figures shown the biggest stressors in the opinion of the respondents were low salaries (97%), followed by haste and time pressure during rescue operations (95%), contact with death (90%), a large number of working hours (90%). At least as stressors paramedics indicated unpleasant working conditions (58%), underestimated by the physician (54%) and too many duties (43%) ($p < 0.001$).

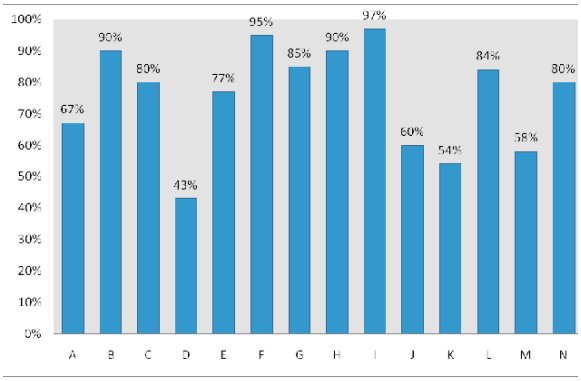

Figure 1: Stressogenic factors indicated by screened paramedics

Legend:
A – personal unsafty ,
B – dealing with death issue,
C – watching others in pain,
D – exceed of responsibilites,
E – lack of personel,
F – pressure on lack of time,
G – night shifts ,
H – number of work hours,
I – low payment,
J – no chance of promotion,
K – lack of respect from the doctors side,
L – personal bad relations,
M – bad work conditions,
N – limits in pharmacotherapy.

Stressors shown in the above figure were analyzed on the basis of socio-demographic factors such as gender, age, level of education (medical study of post-secondary education, higher education) and place of work (emergency department, a team of medical emergency exit). The correlation between the stressors and sociodemographic factors are presented in Table 1.

Table 1: The correlation coefficients between stressors and demographic variables

Stressor	Gender	Age	Level od educaton	Working place
Personal unsafty	0.28*	0.08	–0.11	–0.27*
Contact with death	0.21*	0.18	–0.09	–0.23*
Pain association	0.05	–0.13	0.07	–0.21*
Exceed of responsibilities	0.19	0.07	0.21*	0.17

Stressor	Gender	Age	Level od educaton	Working place
Lack of personel	0.1	0.21*	0.24*	–0.27*
Hurry and time limitation	–0.25*	–0.27*	–0.22*	–0.29*
Night shifts	0.06	0.23*	0.27*	0.13
Number of work hours	0.12	0.13	0.23*	0.12
Low payment	–0.06	0.09	0.28*	–0.22*
Lack of promation chances	0.1	0.21*	0.29*	0.16
Understimation from doctors side	0.16	–0.08	0.23*	0.17
Interpersonal problems	0.17	–0.08	–0.15	0.28*
Bad work conditions	–0.18	–0.16	0.19	–0.27*
Limited pharmacotherapy	–0.13	0.19	0.26*	–0.29*
*** p<0,05**				

Analysis presented research material revealed a statistically significant correlation between the threat to personal safety, contact with death and the rush and pressure of time and gender. Hurry and time pressure were more stress-factor for men and for women more stressors were a security risk and personal contact with death. With age, the intensified stress factors showing a statistically significant correlation was shortage of staff, night shifts, and limited opportunities for advancement. For young stressful factor was the rush and pressure of time. In the case of the demographic variable "education", it significantly correlated with such factors as excess duties, shortage of staff, rush, time pressure, night shifts, a large number of working hours, low wages, limited opportunities for advancement, underestimation by a doctor and restrictions on the use of drug therapy. All these stressors outside the rush and pressure of time more correlated with higher education. Hurry and time pressure were more stressful factor for people who have completed post-secondary study medicine. Furthermore, the analysis showed significant correlations with respect to the variable "place of work". In view of those working in the emergency department was an important factor in stressful personal game. The work in the emergency medical teams away correlated significantly following actors: the risk of personal safety, contact with death, the association of pain, f lack of staff, the rush and pressure of time, low wages, unpleasant working conditions, and restrictions on the use of drug therapy.

Disscusion

In the present study attempts to picking the biggest stressors among paramedics. Paramedic profession is one of the professions related to the mission, servitude and requiring a personal commitment to the values of the parent, is therefore consistent with the nature of their work profession "stressor" [8].

Medical rescuers working both in hospital emergency departments, as well as in medical rescue teams away unequivocally determined the stressors in their work. These were mainly: financial remuneration received for the work, time pressure during medical procedures performed or contact with death and suffering. An important factor stressful for paramedics was also a factor referred to as "personal game". These results confirm studies carried out on Gugały nurses working in departments of cardiology and cardiac intensive care units, the most stressful factors associated with them in the workplace were considered: rush, staff shortages, limited opportunities help some patients, direct contact with death, responsibility for the lives of others and low wages. [9] The problem of low wages as a stressor also raised the research team led by Jośko that among 154 physicians found that 97.4% of respondents indicated low wages as a stressor [10]. This is especially a problem that requires attention, since, according to a study conducted by Bartkowiak confirmed on the example of nurses that low wages have a significant impact on the emergence and development of professional burnout syndrome [11]. The problem of low wages as the stressor reported by other authors [12]. Conflicts with co-workers and health risks were significant stressors for research Czabak-Garbacz et al [13]. In our study, personal conflicts as

a stressor were indicated in 84%. This result was lower than in studies Zielinska-Więczkowskiej, which showed that in a group of nurses, it is the contact with the doctors were the most important stress factor [14].

The effect of stress on health is undisputed, as confirmed by the results of many years of research. Stress can cause adverse health effects such as heart disease, high blood pressure, stroke, cardiac arrhythmia [15]. The increasing number of people who complain of psychosomatic diseases as a direct result of occupational stress. The deterioration of health and well-being of practitioners paramedic after prolonged exposure to stressors may be due to the inability to cope with the direct reaction of stress. Just such a situation can transform over time in physical illness [16]. Left untreated, can permanently affect the personality, and may be a factor in the deteriorating quality of life [17]. Therefore, this study is the beginning of our research on the occurrence of stressful situations and how to deal with them in the work of paramedics.

Results

1) The most important and most indicated stresogennic factors amongst paramedics are low payments, time pressure factors .

2) There is a common relation between gender and felt stress, age, level of education and place of work of paramedics.

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Girl scouts and pharmacists of the Kieleckie-Radomskie HA "Jodla" Region in conspiracy service

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Summary:
The time of occupation is a story of heroic struggle of PRC and Polish Scouting and Guiding Association (ZHP) to realize the ideas of humanitarianism. Service to the people constituted the basis of their existence. From the first days of functioning of the scout organization, i.e. since 1911, sanitary and Samaritan activity constituted the core of civic education of scouts. Sanitary service as a patriotic duty in the period of fighting for freedom and providing skillful aid were the subjects of constant training.

Key words: World War II, conspiracy, girl scouts, Polish Red Cross, pharmacists.

Cooperation between girl scouts and the Polish Red Cross

Pharmacists constituted an integral part of underground health care services. They saved lives of the wounded and the ill where no doctors were present. Carrying loads of medicines, they traveled many kilometers to get to the wounded partisans. Pharmacies were often turned into conspirational points, hospitals, safe houses for the Jews and escaped Soviet prisoners. Under the guise of manufacturing medicines, pharmacies produced explosives and poisons. People resettled from the Western territories were provided with financial and material aid.

Pharmacists employed outstanding scholars in their pharmacies (unemployed due to closing of universities) and young people at risk of deportation and conscripting for forced labor.
Pharmacies were also used as distribution points for underground newspapers. They provided the forest squads with medicines, dressings and surgical instruments as well as clothing, money and explosive materials, so-called "solidowki".

Girl and boy scouts provided sanitation services in the Polish Rifle Squads and the Legions as early as during World War I. Red Cross Society (RCS) established in January 1919, from early moments of its existence was an ally and aided in charity work. Its program encompassed nurse training, establishing treatment facilities for civilians, providing first aid and training of so-called paramedics. Nurse training was commenced in 1922. Cooperation between RCS and ZHP first became evident during war in 1920. Scouting War Emergency established in Kielce (particularly a team of girl scouts under the leadership of Anna Czarnecka and Maria Selek) actively supported the Red Cross Society in handling sanitary trains and performing auxiliary functions in hospitals. Programs of scouting actions included, beside other duties, emergency rescue and first aid training. In the following years, a lot of attention was paid to the youth and training in premedical care. Close cooperation between scouts from Kieleckie region with PRC allowed for raising future activ-

ists within both organizations. This cooperation tightened even more in the 30's, when people became aware of the necessity to prepare sanitation and emergency services in the event of warfare.

A group of scout instructors from Kielce, Suchedniow, Opatow, Sandomierz participated in the first training action conducted in 1930 for the Emergency Team Commanders of the PRC. Female Scout Emergency Services with particularly proficient sanitation service were formed in September 1938. Sanitation rescue teams of older girl scouts from Kielce, Opatow and Ostrowiec received rescue equipment from the PRC. It included gas masks, stretchers and sanitary equipment.

With the outbreak of war, scout teams together with sanitation services of the PRC participated in the rescue of people gathered in railway stations in Kielce, Ostrowiec, Starachowice, Skarzysko and Jedrzejow. Moreover, members of rescue teams provided emergency aid to the Polish Armed Forces defending Kielce, prisoners of war, civilians evacuated eastward and to the first youngest casualties of war. Maria Chodnikiewicz recalls:
In the first days after Germans' entry to Kielce, the Red Cross was allowed to provide food to the captives. Wearing Red Cross armbands, we passed between groups of prisoners with baskets full of bread and distributed dressings, medicines and food. A hospital was organized in the building of the present seminary at the Swierczewski Street for polish soldiers – prisoners of war suffering from dysentery. We gathered dried bread for them and, as PRC sisters, provided them with medicines and civilian clothing. Many of those captives left the hospital disguised as women with us, thereby avoiding prisoner camps. When nurses went to the front with the army, we were allocated to serve in a children's hospital on Langiewicza Street in Kielce, where we served as auxiliary help to sick children, occupying their time with writing and reading lessons, games and recreation. Many of these children had nowhere to go to. They came to the hospital from train stations and transports, wounded and orphaned [1].
It should be added that scouts were also involved in sending and delivering letters to families of soldiers held in prisoner camps.

Scout sanitary emergency services played a special role in the period when the Germans ordered sudden evacuation of the sick and wounded solders and civilians from the hospitals located in Kielce and Opatow. A former boy scout from Kieleckie region, Jacenty Kolodziejski, reports this event in such manner:
In the first days of war, dr. Jan Latala ordered me to immediately gather as many scouts as possible in St. Alexander's Hospital. At the hospital, we received Red Cross armbands and were put at the disposal of Mrs. Helena Witt. As wounded civilians and soldiers were carried in, it was our duty to distribute food on hospital floors and to roll bandages. After two or three days, Germans occupied the hospital and ordered evacuation of the wounded. Patients were transferred to a new hospital on Bandurski Street. We participated in providing our soldiers with civilian clothing. We carried these clothes hidden in baskets filled with linens or bread. After changing into civilian clothing and putting on a Red Cross armband, we walked out of the hospital together, carrying the basket. Gates were open and we were free to enter and leave while wearing a PRC armband [2].

It is worth noting that the entire scouting equipment (particularly linens and blankets) was handed over to the hospital and was stored in PRC repositories.
Thanks to their female colleagues working as PRC paramedics, boy scouts from Kielce who fought in the forest squads, received aid in a form of medicines, dressings and treatments provided by trained personnel.
At the time of throttling of the Warsaw uprising, the Kieleckie region took in many of the deported. They were provided with medical aid in hospitals organized by scouts in cooperation with Polish Red Cross.

Girl Scouts from Ostrow region formed a sanitary aid point at a railway station. Under the leadership of Maria Rostocka, girls efficiently managed the wounded. Following the Warsaw uprising, they organized an infectious diseases hospital for the people evacuated from the capitol.

In Opatow, as a result of Germans overtaking the local hospital, girl scouts from a sanitary team participated in evacuation of patients. They served the sick located in private quarters. They constituted auxiliary PRC personnel. These Samaritans, trained before the war, constituted sanitary air-defense patrols, aided in hospitals for the ill and wounded fugitives and

transported the wounded between the 1st and the 7th of September, 1939. When hospital personnel succumbed to panic and doctors and sisters of mercy left for Sandomierz, girl scouts took day and night shifts in the abandoned hospital. The scout troop commander, Waclawa Lipinska-Forowicz, reminisces:
When I arrived at the hospital in the morning on September 6th, I only found the severely ill patients lying in feces and blood, covered with glass pieces after a bombing. Girl scouts cleaned up the wards, managed the ill and cooked them food [3].

In Sandomierz, girl scouts organized sanitary aid in a railway station for the arriving soldiers. They aided in moving patients from the Holy Spirit Hospital during a fire. They organized auxiliary hospitals and mini-hospitals in schools and private flats. Franciszka Sawinska, Janina Bien and Katarzyna Wos-Kolodziej particularly distinguished themselves in this work.
In Radom, sanitary service was provided by Maria Skalska and Janina Kaczorowska. They helped the abandoned children and trained paramedics.
Girl scouts from Czestochowa took over the service at a railway station from PRC. They worked as paramedics in the municipal hospital, where many of Polish Armed Forces soldiers were treated. Scout troop commander Jadwiga Sawczak, girl guide Krystyna Galecka-Roland, Maria Kostrzewska, Jadwiga Lewandowicz, Lucyna Kornet, Irena Kubisztal, Krystyna Pfranger showed particular selflessness [4]. Activity of PRC sisters grew very dynamically. Great challenges presented before these women. Lack of food, poverty, filth, scarcity of housing and fear led to catastrophic health conditions and deaths not only of families, but also of entire villages and settlements. In 1940, epidemics of typhus, dysentery, tuberculosis, diphtheria and trachoma as well as lice and scabies were spreading at a dreadful rate in the entire region of the General Government. The example of Poland showed that in these troubled times the Red Cross organization forms an uninterrupted chain of mutual aid. People affected by tragedy owed their health and lives to those brave, selfless women.

Pharmacists in underground services

The time of war and German occupation established German legislation in the General Government region. In 1940, the General Gubernator, Hans Frank, called into existence the Supreme Pharmaceutical Chamber (SPC) based in Cracow, together with four of its branches located in the following districts: Cracow, Lublin, Warsaw, Radom.

Dr. Weber (a German) was the head of SPC, while dr. L. Kietrzynski and M. Sieg M.S., who were Polish, served as his counselors. Two counselors and provincial delegates (there were 15 of them in Radom) were appointed in each district. At that time, pharmaceutical chambers did not form an actual pharmaceutical council. However, positions of some of the provincial delegates provided coverage for their underground activities and formation of this chamber significantly simplified their work for the resistance. Beginning with spring 1944 until the end of the war, activity of chambers was gradually abolished.

Kielce constituted an important and large center of resistance. The main organizational facility of the underground health care was situated in St. Alexander's Hospital. Pharmacy located in this hospital had limited means. Therefore, additional back up for providing medicines, dressings and physiological fluids was necessary. All pharmacists from the region were involved in this aid. Eugenia Boryczko (M.Sc.) and Maria Bujak (M.Sc.) worked in this pharmacy. Effectiveness of health care in the city and in the country was limited due to increasing shortage of medicines. Pharmacies only possessed the simplest drugs in minimal quantities. Therefore, people were treated with herbs and homemade treatments (cupping therapy, leeches, onion syrup). They searched for medical guides and recipes for gathering and preparing herbs. Due to lack of pre-made medications, pharmacists produced most drugs by themselves in their pharmacies from chemical substrates gathered before the war or acquired illegally, often risking their lives [5].

In Kielce, Maria Malikowa (M.Sc.) provided shelter to people persecuted by Gestapo on pharmacy premises. She employed young people at risk of being deported to Germany and conscripted for forced labor. She also supported financially and materially the people exiled from Poznan region. She passed medicines and dressing materials to forest troops. Within her pharmacy, she created a chemical laboratory for purposes of secret teaching– chemistry class was conducted there. It was

used for production of infusion fluids, poisons and explosives [6].

Janina Sikorska's (M.Sc.) pharmacy supplied medicines to partisan troops [7]. Helena Zerbe (M.Sc.), exiled from Poznan, took a job in the Social Insurance Company pharmacy in Ostrowiec Swietokrzyski and cooperated with the resistance movement from this region [8]. Urszula Ossowska (M.Sc.) was involved in conspiracy activities in the Koneckie municipality [9], Maria Rakowska in Wodzislaw [10], Anna Wasilewska-Bielnicka in Wislica [11] and Janina Niezabitowska in Daleszyce [12].

Sets of medicines and dressing materials were provided by the pharmacy of Helena Pietkowa (M.Sc.) of Ozarow [13]. The pharmacy managed by Maria Siwecka (M.Sc.) located in the Sandomierz Market Square was the center of underground activities in the Sandomierskie municipality. It provided great aid to the partisans. Maria Siewecka, warned by the intelligence of Home Army (HA) about a possible arrest by Gestapo, left for Warsaw but did not avoid persecution. She was held prisoner in Ravensbrück concentration camp [14].

Underground work of doctors and underground health care had very zealous and devoted allies among the owners of pharmacies in Radom. They selflessly supported the resistance movement, generously providing dressing materials, medicines, surgical instruments and money. Kamila Lagodzinska (M.Sc.), an owner of a pharmacy and a pharmaceutical depot on the Constitution Square, associated with the HA since 1940, deserves special distinction. Alongside her constant aid in the transfer of drugs, dressings and considerable cash donations, she also stored weapons, ammunition and underground press in her large cellars. The majority of pharmacy's personnel actively participated in the resistance movement, including paramedics: Stefania Berczowa, Irena Kozlowska and Zofia Sliwinska. They would send the surgical instruments necessary for field hospitals [15]. Halina Kasprzykowska (M.Sc.) paid with her life for her work in the resistance movement – she died in Oswiecim (Auschwitz) together with her son. Large pharmacy cellars were used for storing explosive materials and weapons. Pharmacy's resources were used to create a spare secret storage of medicines and dressing materials in the building belonging to the School of Economics on Traugutta Street [16]. Resistance movement authorities also ordered the pharmacists to produce poisons and weapons necessary for fighting the enemy. This task was given mainly to a pharmacist Maria Zabicka (M.Sc.) [17].

Kazimiera Brusnicka (M.Sc.), Danuta Lotoczko (M.Sc.) and Teodozja Szarkowska (M.Sc.) were also active participants of the resistance movement in Radom [18]. They gave medicines, food and provided shelter to people persecuted by the Gestapo; they also financially and materially supported people exiled from their homes.

Jozefa Widawska (M.Sc.) was arrested by the Gestapo and deported to the concentration camp in Majdanek in 1943. In the face of a typhus epidemic she extorted camp's chief doctor's consent to organize a post, which included a hospital and hospital pharmacy. She produced various infusions there. In the spring of 1944 she was moved to the camp in Oswiecim and subsequently to Ravensbrück. She was freed by the Allies and returned to the country in 1945 [19]. Hospital pharmacist, Maria Ptaszynska (M.Sc.), paid for her conspiracy activities with imprisonment and serving time in a concentration camp in Oswiecim. She worked in the pharmacy of the Social Insurance Company [20]. When the Nazi occupation authorities imprisoned the Jewish population in a Radom ghetto, pharmacies hurried to help by providing medicines, dressing materials and food. During the Jews' uprising in Cracow, they also sent explosives.

Janina Skrzynska (M.Sc.), the owner of a pharmacy in Garbatka, corresponded in German between prisoners held in concentration camps in Oswiecim, Gross-Rosen, Buchenwald, Dachau and their families. She also sent packages and stored food. In her own words, she writes:
this occupation was to somehow soothe their severe misery. I think that the letters give them the power to survive and food packages allowed them to survive the hardships and give them will to live [21].

In Kozienice, medicines and dressing materials were provided to the underground movement by Stanislawa Wojciechowska's pharmacy [22].

In Pionki, Maria Dutkiewicz (M.Sc.) equipped a bunker-hospital in Kozienice with surgical instruments [23].
In the Zwolen region, Stanislawa Jaglinska (M.Sc.) cooperated with the resistance. Aside from providing the partisans with medicines, she also supported financially and materially families of people imprisoned by the Gestapo [24]. Stanislawa Nagrodkiwicz (M.Sc.) cooperated with the partisans from the Ilza region [25].

Moreover, all pharmacists and pharmacy owners willfully committed to employ the pharmacists exiled from Warsaw. A special section was formed in Czestochowa to manage funds obtained from voluntary collections and dues. This money was intended for pharmacists from Warsaw who settled in this area. Also, many pharmacists provided financial and material aid to their colleagues as their means allowed them. Beside pharmacy owners, their employees also participated in this action [26].

In Czestochowa, the pharmacy of Janina Stepkowska-Kozakiewicz (M.Sc.) cooperated with the resistance [27], while Alicja Biesiaga (M.Sc.) "Sroka" (Peasants' Battalions liaison) was involved in Radom [28]. Following the Warsaw uprising, 150 pharmacists passed through Czestochowa only. Many of local pharmacists employed two or three persons in their pharmacies.

Warfare, terror inflicted by the occupant, severe fights and a large number of the wounded necessitated additional production of medicines and dressing materials, especially that the only production center in Warsaw was destroyed. In order to fill this gap, pharmacists from Czestochowa formed two factories for producing injectables. One of them worked to meet the needs of the pharmacy by which it was created and the other to supply all other pharmacies in the area. These factories contributed to maintaining drug supplies in pharmacies, which were indispensable for partisan troops (e.g. anti-tetanus injections) [29].

In this group, there were many women who paid for their conspirational activity with arrests, deportation to death camps, their own deaths and deaths of their families.

This selflessness and aid provided everywhere where needed despite constant threat is worth emphasizing and remembering.

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Military Centre of Pharmacy and Medical Technique in Celestynów

OFICERS' PROMOTION at the Military Center of Pharmacy and Medical Techniques

The meeting of soldiers and civilian workers started on 7th March, 2013 at 10.00. At the beginning of the meeting the Chief of General Branch – LTC Andrzej SKONIECZNY reported to Commandant of the Military Center of Pharmacy and Medical Techniques. The Commandant of MCPMT welcomed gathered soldiers and civilian workers and gave an order to read out the order on appointment of MAJ Andrzej KONIECZNY on Chief of Branch position and 2nd LT Małgorzata NIEDZIELSKA on senior pharmacist position. Decisions of Minister of National Defence about promotions to higher ranks were also read out.

At that solemn moment, saying some words is not inclined by baroque rhetoric but pure intention of congratulation of your promotions. This moment is for you the specific allegory of responsibility on previous positions, fulfilling your obligations on those positions.

Each institution performing responsible task needs from its personnel of fulfillment of certain mission and personal relations which are built with great effort. In the case of Polish military units, they are: subordination, submission to military discipline but also responsibility for subordinates, with the principle – preparation of subordinates and then setting requirements. For specific contrast, because it always coloring reality, I would like to add that not everyone in your age and with similar experience managed it.

Officer's dignity and honor are perceived exceptionally conscientiously and are disclosed in particular situations. The known principle – much sweat in everyday exercises less blood in battle, during last years has turned into thesis – much everyday effort, less tragedy.

Discouragement, deprivation of best intentions, willingness and kindness of human being is the most misfortune of military service. Remember please that here is the place where your responsibility has been cumulated. So choose the following cultural way – if someone is different does not mean he/she is worse. Colorfulness of landscape makes it interesting and difference of each person conveys full essence and opportunities. It is an art to appropriately utilize this variety, give chances and possibilities. Otherwise it is, what was described by author of Crowd Psychology - Gustave le Bon – unintentional action of a team, crowd starts having an advantage over deliberate action of an individual, destroying its rights.

Newly promoted officers made their speeches at the end of the meeting. They thanked Commandant and all gathered participants of the ceremony.

Military Centre of Pharmacy and Medical Technique in Celestynów

WOMEN'S DAY at the Military Center of Pharmacy and Medical Techniques

The meeting of soldiers and civilian workers started on 8th March, 2013 at 11.00. At the beginning of the meeting the Chief of General Branch – LTC Andrzej SKONIECZNY reported to Commandant of the Military Center of Pharmacy and Medical Techniques. The Commandant of MCPMT welcomed gathered soldiers, civilian workers and invited guests. Next public relations officer of MCPMT, Mr Krzysztof BARCZEWSKI reminded history of Women's Day and emphasized significance and role of tradition in everyday life and mutual relations both official and professional.

Traditions are historically shaped customs and rules of acting based on process of cultivation and popularization of achievements of predecessors for history. In social and anthropological aspect, traditions mean possession and cultivation of heritage and continuation of that, what comes from generation to generation, property and spiritual achievements of ancestors.

Public relations officer of MCPMT, Mr Krzysztof BARCZEWSKI read out the speech of Commandant of the Military Center of Pharmacy and Medical Techniques – COL. Radosław ZIEMBA, PhD.

"As we are celebrating eighth time the Women's Day during my term of office, I will try to refer to some essential thesis, which I have chosen many time.

I have found, with great difficulty, a logic key according to it, and currently times helped me with that, it's proper to acknowledge that peculiar feminization accrued of relatively recently male, let me say tough, professions, positions rules or missions. It can be clearly seen on a background of cultural theater of the world and any fragment of current civilization. Just yesterday's promotion to an officer rank of one of our female soldier can be the example of that.

What are the next suggestions of just said thesis? The word parity notes down to it. I think that optimal expression of parity is measurement of rational and innovative participation of you – women in harmonized life of this institution - the Military Center of Pharmacy and Medical Techniques. Quoting Shakespeare's – we strengthen each human being in addition to his/her work.

Your work starts at home, upbringing (maybe often husbands, fiancés, ending on children) by establishing relations at work.

It is proper to paraphrase someone from Poland – Władysław Tatarkiewicz – women's virtues are not only virtues but also, in most cases, life effective recommendations …

On that solemn day – me and all the male part of our Military Center – would like to sincerely wish you – ladies all the best, remembering that Sun is the beginning of the day, day is again the end of the night, misfortune is the end of luck, and luck is the end of misfortune …
Traditions build among the soldiers and civilian workers relations not forced by regulations and hierarchic structure. They create emotional ties resulted from respect to the history, national and military symbols and shape humans' virtues.

Commandant of the MCPMT and the male participants of the meeting presented a symbolic flower and sweets (delivered by trade union) to each female participant.

II Regionalna Sesja Naukowo-Szkoleniowa – Łódź 14.06.2013r.
Środki uzależniające: chemia, farmakologia i klinika
Temat Sesji: *Nikotynizm a Zdrowie Publiczne*

Organizatorzy

— Uniwersytet Medyczny w Łodzi;
— Oddział Łódzkiego Polskiego Towarzystwa Farmaceutycznego w Łodzi;
— Departament Spraw Społecznych;
— Urzędu Miasta Łodzi;
— Miejskie Centrum Zdrowia Publicznego w Łodzi.

Data i miejsce

04.06.2013r. (piątek), godz. 12^{00}, Gmach Wydziału Farmaceutycznego, ul. Muszyńskiego 1, 90-151 Łódź. Sale wykładowe nr 4a i 4b (parter).

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— Rektor Uniwersytetu Medycznego w Łodzi – **prof. dr hab. n. med. Paweł Górski;**
— Prezes Zarządu Głównego Polskiego Towarzystwa Farmaceutycznego w Warszawie – **prof. dr hab. n. farm. Janusz Pluta.**

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Program Sesji

12^{00} -12^{30} Wykład Inauguracyjny:
Stan zdrowia Polaków
Prelegent: prof. dr hab. n. med. Witold Zatoński, Kierownik Zakładu Epidemiologii i Prewencji Nowotworów Centrum Onkologii im. M. Skłodowskiej-Curie w Warszawie

12^{30}-13^{00} Temat 1:
Tytoń a zdrowie – molekularne aspekty ryzyka raka płuc
Prelegent: prof. dr hab. Krystyna Fabianowska-Majewska - Wydział Nauk o Zdrowiu Uniwersytetu Medycznego w Łodzi

13^{00} -13^{30} Temat 2:
Biochemiczne i neurofizjologiczne mechanizmy uzależnienia się od nikotyny
Prelegent: prof. dr hab. Janusz Szemraj, Wydział Nauk o Zdrowiu Uniwersytetu Medycznego w Łodzi

13^{30}-14^{00} Przerwa na kawę i herbatę

14^{00} – 14^{30} Temat 3:
Prawne aspekty kontroli epidemii tytoniowej w Polsce
Prelegent: dr n. med. Dorota Kaleta - Zakład Medycyny Zapobiegawczej Uniwersytetu Medycznego w Łodzi.

14^{30} – 15^{00} Temat 4:
Zachowania dotyczące palenia tytoniu przez studentów Wydziału Nauk o Zdrowiu w Uniwersytecie Medycznym w Łodzi w latach 2007-2011g
Prelegent: dr n. o zdrowiu Adam Rzeźnicki - Wydział Nauk o Zdrowiu Uniwersytetu Medycznego w Łodzi.

15^{00} – 15^{30} Temat 5:
Farmakoterapia zespołu uzależnienia od nikotyny
Prelegent: prof. dr hab. n. med. Jerzy Z. Nowak, Kierownik Katedry i Zakładu Farmakologii i Farmakologii Klinicznej Wydział Lekarskiego Uniwersytetu Medycznego w Łodzi.

15^{30} – 16^{00} Temat 6:
Cytyzyna – historia, badania i przyszłość
Prelegenci: dr n. med. Dorota Lewandowska, starszy asystent w Klinice Medycyny Transplantacyjnej i Nefrologii WUM.
prof. dr hab. n. med. Witold A. Zatoński, Centrum Onkologii Instytut im. Marii Skłodowskiej- Curie WHO Collaborating Centre Kierownik Zakładu Epidemiologii i Prewencji Nowotworów w Warszawie

16^{00} – 16^{30} Temat 7:
Interakcje leków u osób palących
Prelegent: Prof. dr hab. n. farm. Andrzej Stańczak, Kierownik Zakładu Farmacji Szpitalnej Wydziału Farmaceutycznego Uniwersytetu Medycznego w Łodzi

16^{30} – 16^{50} Temat 8:
Niquitin – nowoczesna forma Nikotynowej Terapii Zastępczej
Prelegent: lek. Robert Rosiek, Konsultant Medyczny firmy GlaxoSmithKline Consumer Healthcare

16^{50} - 17^{00} Temat 9:
Zjawisko nikotynizmu – historia i współczesny rozwój
Prelegent: Wiktoria Pietras i Zuzanna Nowicka

17.00-17.45 - Dyskusja – Wystąpienia prelegentów młodzieżowych z Liceów Ogólnokształcących i Studentów Uniwersytetu Medycznego w Łodzi.

- Konkurs Plakatowy nt. „Zwalczanie nałogu tytoniu i jego skutków dla zdrowia publicznego" – ocena plakatów przez Komisję

18:00 - Podsumowanie i zakończenie sesji.

I Ogólnopolska Konferencja Naukowa – Zakopane 14-17.10.2013r.

Suplementy diety: za i przeciw stosowaniu

Organizatorzy

— **Fundacja dla Uniwersytetu Medycznego w Łodzi** we współpracy z Narodowym Instytutem Leków oraz Głównym Inspektoratem Sanitarnym

Data i miejsce, zgłoszenie udziału

14-17.10 2013r.,
Ośrodek Antałówka w Zakopanem.
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Karta zgłoszenia

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— Suplementy diety ich zakres i możliwość działania przy uwzględnianiu składników: karotenoidy, flawonoidy, tokoferole i tokotrienole na funkcjonowanie skóry;

— Suplementy diety i ich stosowanie w neurologii kosmetycznej;

— Nowa rola parafarmecutyków w suplementach diety w dermatologii i w żywieniu

— Ocena składników w suplementach diety dla określonych grup konsumentów: kobiet w ciąży w okresie menopauzy, dla sportowców i seniorów itp.;

— Aktualne akty prawne regulujące rynek suplementów diety i odżywek;

— Oświadczenie żywieniowe i zdrowotne.

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4) **Structured abstract** (**Summary**) — up to 250 words) — consisting of the following sections: Background and study aim, Material and methods, Results, Conclusions:
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5) **TEXT**. The text of the article should be divided into six paragraphs labeled: Introduction (or Background), Material and Methods, Results, Discussion, Conclusions, References. Prior references, if necessary, you can attach Acknowledgements, and at the end of work — Appendix. Each of these sections must be clearly separated with a bold title.

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