

FORMAL AND PROFESSIONAL REQUIREMENTS FOR MEDICAL, PARAMEDICAL AND TECHNICAL STAFF OF HYPERBARIC CENTRES. PART 2

Piotr Siermontowski, Stanisław Skrzyński

Department of Underwater Works Technology, Naval Academy, Gdynia, Poland

ABSTRACT

This two-part article reviews the current legal situation of professional personnel implementing hyperbaric procedures other than those used for diving. Numerous inconsistencies between the existing legal acts and the lack of legal regulations concerning procedures not financed from the State budget are shown.

The first significant problem was the lack of mutual correlation of various regulations of the Minister of Health concerning hyperbaric diseases, as well as incoherence with medical and nursing specialisation programs in force in Poland.

The second problem is the lack of requirements in the documents of the Ministry of Health for medical staff other than doctors and nurses, including technical staff, necessary for the implementation of a safe oxybarotherapy procedure.

The situation is clearer with respect to technical personnel than in relation to medical personnel. There are provisions which strictly define the qualifications of such staff for a very narrow group of technical personnel. Although they deal with issues related to the use of hyperbaric chambers in diving, to date no other separate regulations have been developed for medical applications of hyperbaric therapy. Unfortunately, both in centres financed by the National Health Fund and in private centres, no-one observes these regulations because there is no such formal requirement.

The same applies to occupational research (occupational medicine) for all groups of personnel involved in hyperbaric oxygen therapy treatments.

It was also found that medical hyperbaric centres not seeking funding from the budget (the National Health Fund) do not have even minimum qualification requirements for the medical staff working there. Furthermore, there is no knowledge of the requirements set out in other legal acts other than those concerning medicine.

Keywords: hyperbaric treatment, medical staff, technical staff, specialisation, qualifications.

ARTICLE INFO

PolHypRes 2020 Vol. 70 Issue 1 pp. 7 – 20

ISSN: 1734-7009 **eISSN:** 2084-0535

DOI: 10.2478/phr-2020-0001

Pages: 14, figures: 0, tables: 0

page www of the periodical: www.phr.net.pl

Original article

Submission date: 12.01.2020 r.

Acceptance for print: 22.01.2020 r.

Publisher

Polish Hyperbaric Medicine and Technology Society



INTRODUCTION

The first part of the article discusses the requirements for doctors providing hyperbaric treatment in Poland against the European regulations. These requirements have been shown to be completely incompatible with both the needs of patients and the system of specialisation training in Poland. The first part [1] was published less than three years ago and, regrettably, the situation of patients waiting for an increase in the availability of hyperbaric treatment artificially limited by the requirements for doctors has not improved. The letters to the Ministry from the Conference of Presidents of Polish Medical Societies or the National Consultant failed to provide the expected results.

In the second part of the article, we present the qualifications required by law in the light of training programs other than those of the professional doctors dealing with oxygen hyperbaric treatment. These are:

- nurse,
- operator of the oxygen therapy chamber,
- technician,
- the chamber assistant, the so-called "attendant".

NURSE

In the USA, whose organisational solutions and especially high level of medicine are often referred to in Poland, there is a separate nursing specialisation of a baromedical nurse (BN). Of course, this specialisation has no counterpart in Poland and, according to the authors, very rightly so, because the knowledge necessary for a nurse, like a doctor, to conduct hyperbaric oxygen therapy in cases other than diving or aviation accidents and gas embolism (i.e. 99% of all cases) [2] is not so extensive as to create a separate specialisation. A short course conducted at an appropriately equipped and experienced facility is sufficient.

According to the announcement of the Minister of Health of 14 April 2016 (J.L. 2016, item 694) on guaranteed services in the field of hospital treatment, the so-called "basket regulation" [3], a nurse taking part in hyperbaric therapy should meet the following requirements:

- specialist in anaesthetic and intensive care nursing or a nurse following a qualification course in anaesthetic care nursing and intensive care, or two years' experience in a Department of Anaesthesiology and Intensive Care,
 - a) not less than 160 hours training in diving and hyperbaric medicine,
 - b) completed a course in diving medicine (40 hours),
 - c) completed a course in hyperbaric medicine (40 hours) as recommended by the ECHM, (these are included in the *European Code of Good Practice in hyperbaric oxygen treatment* [4]),
 - d) 2 weeks' training (80 hours) in a hyperbaric facility operating in accordance with the recommendations of the European Committee for Hyperbaric Medicine.

These provisions largely mirror the complete separation of the content of the regulation from the principles of training of professional health care personnel in Poland, discussed in the first part of the article [1]. An anaesthesiological course seems to be completely unnecessary, especially for a nurse. It is not known exactly how to interpret point "a", which refers to no less than 160

hours of training. Is it the sum of the next three points or the first, most important course followed by subsequent ones? However, regardless of the interpretation, under these regulations the training of nurses is longer than that of doctors.

According to the European Committee for Hyperbaric Medicine (ECHM), the qualification requirements for nurses are less detailed and somewhat more logical. [4] There are no rigid requirements for specialisation or training hours. They are as follows: A hyperbaric nurse must have the appropriate degree of specialisation. A specific (and not specialised - author's note) training in Intensive Care Nursing will be very useful. Knowledge of other specialised areas such as angiology, traumatology and wound treatment will also be appropriate.

Special courses in hyperbaric medicine are important. Nurses may receive the necessary practical training in the same institution, supervised by a medical manager.

Special courses for hyperbaric nurses are highly recommended but will not be strictly required.

Hyperbaric Nurses may also receive supplementary training, consistent with their professional preparation, in the following subjects:

- Main principles of decompression theory, diving techniques,
- Hyperbaric technique,
- Safety and prevention measures,
- Use of a single-seat chamber or multi-seat HBO chamber,
- Intensive patient care,
- Other aspects related to both diving and hyperbaric medicine, in relation to the profession of a nurse.

Basic training and nursing specialisation should be required. Special courses for hyperbaric nurses are highly recommended but will not be strictly required.

Particularly noteworthy is the correlation of qualifications "with the most common pathologies during hyperbaric treatment". It is the nurses with qualifications in the treatment of chronic wounds, which constitute the majority of cases treated with hyperbaric treatment, that are most useful in practice. And these skills are not included in the nursing specialisation "Anaesthesiological Nurse".

As in the case of medical specialisations, nursing specialisation programmes were analysed in terms of the content concerning hyperbaric therapy. The list of areas of nursing and areas applicable in healthcare in which the specialisation may be conducted is set out in the Regulation of the Minister of Health of 12 December 2013. "On the list of fields of nursing and fields applicable in healthcare in which the specialisation and qualification courses may be conducted" [5]. Specialist training for nurses takes place on the basis of the "Act on Professions of Nurse and Midwife" art. 67 section 1 of the Act of 15 July 2011 [6].

The website of the Centre of Postgraduate Education for Nurses and Midwives [7] contains current and previous nursing specialisation programs. Among the mentioned specialties, apart from Anaesthesiological and Intensive Care Nursing, the following areas of specialisation were analysed: Rescue and surgical nursing on account of the fact that the most frequently treated hyperbaric pathologies are chronic wounds and diabetic

foot.

However, as in the case of medical specialisation in the field of anaesthesiology and intensive care, the current "Program of specialisation training in the field of anaesthesiology and intensive care for nurses" does not contain any mention of hyperbaric treatment, treatment with oxygen under increased pressure, etc. Also the contents concerning oxygen hyperbaria (but also the treatment of chronic wounds) could not be found in the current "Qualification course programme in the field of anaesthesiological and intensive care nursing". Similarly, the earlier programme of this nursing specialisation, which was valid until 2016, did not contain any content on hyperbaric therapy.

The current "Programme of Specialised Training in Emergency Nursing for Nurses" indicates in point W52 the requirement of the knowledge "of the indications for passive, active and hyperbaric oxygen therapy". Whereas in the list of skills of this specialisation in point U138 there is a requirement "to administer modern wound treatment methods". The current "Qualification course programme in the field of emergency nursing" no longer contains such information. In the specialisation program valid until 2016, there are provisions analogous to the current one, i.e. there is nothing on the subject of hyperbaric therapy.

The current "Specialist Surgical Nursing Training Programme for Nurses" contains no mention of hyperbaric oxygen therapy, but there are topics where this issue should be addressed, such as: W16 "characterises modern methods of wound treatment", U10 "assesses the condition of the wound, recognises early symptoms of its infection and selects the means and dressings for the type of wound and its healing phase (traumatic, surgical, chronic wounds)", U63 "assesses the chronic wound, selects the means and dressings for the type of wound and its healing phase", U64 "cares for a patient with a wound in diabetic foot syndrome." The "Qualification course programme in the field of surgical nursing for nurses" also includes similar topics, e.g.: W13 "characterises modern wound treatment methods". The specialisation programme valid until 2016 contained the same provisions as the current one.

The website of the Centre of Postgraduate Education for Nurses and Midwives also includes course programmes whose titles are unrelated to the nursing specialisations. The "Diabetic Nursing Qualification Course Programme for Nurses" contains subjects similar to the surgical specialisation programme which may include knowledge of hyperbaric therapy, such as W 34 "differentiates between non-operative and surgical treatment of chronic wounds in the course of diabetic foot syndrome", W70 "explains alternative methods of care for ulcers caused by diabetic foot syndrome".

In the "Specialist Wound Treatment Course Programme for Nurses", apart from numerous references to the treatment of chronic wounds, lower limb wounds or diabetic foot, we also find a topic directly related to the treatment with oxygen under increased pressure: W8 "explains the role of hyperbaric oxygen and vacuum therapy in wound treatment".

On the basis of the above analysis, it can be concluded that no nurse training programme includes the topic of hyperbaric oxygen therapy and that this method of treatment is only mentioned in the specialisation programme for emergency nursing and in the specialist course of wound treatment. Therefore, as in the case of physicians, the designation of anaesthesiological nurses to

participate in hyperbaric therapy in the Regulation of the Minister of Health is not justified in terms of their qualifications.

Except for acute cases, e.g. carbon monoxide poisoning or arterial gas embolism, proper qualification of patients for implementation of hyperbaric treatment prevents the use of procedures reserved for anaesthesiologists or anaesthesiological nurses. For this reason, the groups of patients undergoing hyperbaric therapy in chambers are not accompanied by physicians, or nurses, but persons not mentioned in the Regulation of the Minister of Health referred to several times before. Meanwhile, it is the "chamber assistants" called "attendants", who spend most of their time in conditions of increased pressure.

ATTENDANTS – MEDICAL ASSISTANCE

According to the European Committee for Hyperbaric Medicine (ECHM), as outlined in the European Code of Good Practice for Hyperbaric Oxygen Therapy [4], p.4, the attendant is a person responsible for the care of patients inside a multi-seat chamber, in accordance with the limitations resulting from their qualifications. Annex 1 of this document [4], p. 25 states that attendants may come from various professions related to underwater and hyperbaric medicine, such as: sports and commercial divers, assistant professions, medical students, paramedics, , and other professions preferably but not necessarily related to health care. We further read that the training and practice of these professionals can be undertaken in the same hyperbaric facility. A compulsory first aid course is listed as the required education. According to the ECHM, the course preparing for work as an attendant should cover the following aspects: basic principles of medicine and therapy, medical first aid, basic principles of diving and hyperbaric medicine. Unfortunately, despite such an important role that attendants play in the process of hyperbaric therapy, they are not included in the "Basket Regulation" at all, and therefore, random people work in the chambers, often without even basic training not only in hyperbaric therapy, but even first aid.

CHAMBER OPERATOR AND TECHNICIAN

Another staff member not mentioned in the Regulation of the Minister of Health [3] is a person on whose proper training and experience depends the correct and safe course of a hyperbaric exposure.

In Poland, the regulations and formal requirements for domestic and industry documents concerning the exploitation of the HBO chamber are unknown, although formally there are specialisations created for this purpose in professional and commercial diving (Ministry of National Defence, Ministry of Internal Affairs). Although the documents of European and world associations have been defining areas of specialisation and training of operators for over 20 years, in our country this problem is being "solved" differently. Chamber operators are most often trained by the manufacturer (training on the job), or at courses abroad (very rarely). Also, the qualifications obtained during military service are used.

Sometimes the HBO chamber is treated as a pressure vessel and, in the opinion of the owners, certificates of approval for operation and maintenance of

these vessels are sufficient. The general national system of training in operation and maintenance and supervision in our country is not organised for a simple reason; it is the responsibility of the Ministry of Health and the HBO chamber is treated as a medical device.

The authors believe that entrusting an operator with diving systems to operate HBO chambers is, in their opinion, a certain simplification of the solution to the problem, although under current conditions it is the best one. It should be noted that operators with many years of experience and full practice can be counted on the fingers of both hands in Poland. Not all dive system operators have a broad scope of training, and even those that do, don't possess the complete range of skills required in relation to the requirements [8] of HBO chamber operators specified in regulations of other countries.

Due to the fact that in Poland there are currently several dozen HBO chambers in medical institutions, sports and spa centres, and other locations, as well as an unspecified number of "soft chambers", i.e. bags designed to prevent altitude illness advertised as chambers, the problem of technical protection of their work is a pressing one. The number of these devices due to the fashion for "hyperbaric oxygen" will be constantly growing and probably also in Poland there will be an international trend to own HBO chambers by private individuals, at home or e.g. in clubs, associations, etc. Currently, the cost of the "soft HBO chamber" is within the reach of an average American citizen, or a slightly more affluent Pole. The majority of deaths during therapy in the USA occur in private chambers [9] and there is no reason to expect that in Poland the situation will be different. In order to ensure a certain level of therapy performance, this problem requires a legal solution. The possession of technical personnel qualified to the standards adopted in international bodies dealing with oxybaro therapy should be obligatory.

According to the document *European Educational And Training Standards For The Staff Of Hyperbaric Medical Centres Joint Educational Subcommittee European Committee for Hyperbaric Medicine (ECHM)* [8], two technical positions are distinguished: a chamber operator and a technician. Naturally, these two functions can be performed by one person possessing the appropriate qualifications. The technician is the one who prepares and supervises direct work of the operators and operation of the chamber. This should be the preferred model of service and exploitation in Poland, giving the possibility of becoming independent of external service, mostly foreign, allowing the chamber to be maintained in efficiency and practically eliminating long breaks when the chamber is out of service for maintenance.

HYPERBARIC CHAMBER TECHNICIAN

The therapeutic process is carried out by the operator, or a trained person from among the medical personnel - the operator, with the support of technical personnel. The scope of this support must be defined for a given treatment procedure and depends on the design and purpose of the chamber. Contrary to the diving guidelines, in the case of conducting the oxybarotherapy procedures, the technical staff report to the doctor conducting the treatment.

The scope of activities of a diving system operator [10] compared to an operator operating HBO treatments differs in its essence in obvious and elementary conditions which and to be forgotten. In the case of a diving system operator, the chamber accommodates healthy people who

are prepared and trained to remain in the conditions of overpressure. The therapeutic chamber, on the other hand, is used by sick and untrained people.

Normally, the operator of the HBO chamber does not have direct contact with the patient and follows instructions or responds to signals from medical personnel. What elements of knowledge and skills does the HBO chamber operator share with the diving system operator? These are detailed in the *Educational And Training Standards For The Staff Of Hyperbaric Medical Centres*. [8] For example, it is a requirement to be able to transfer a HBO operator into the chamber while under pressure to check the correct functioning of certain equipment components. The HBO operator is also required to adapt and control the medical instruments brought into the chamber in order to ensure their proper functioning or to avoid undesired effects. The duties of chamber operators in both cases include operation of compressors, control systems, technical interventions and repairs that do not require specialised service. The above-mentioned document does not mention such an important skill as the operation and use of measuring equipment, including in particular important gas composition analysers, and the operation of an IT program controlling the course of pressure exposure.

From the described requirements of preparation for the work of a professional operator of the HBO chamber [8,11,12] it follows that there are two paths leading to achieving this goal in Poland. The first one is additional training of the diving decompression chamber operator in medical problems related to oxybarotherapy and cooperation with patients, or the second route - teaching the medical personnel prepared for oxybarotherapy to operate the chamber.

In comparison to a diving chamber operator, the HBO chamber operator must have in-depth knowledge and practice in several very important technical problems, including fire safety. These are problems related to ensuring oxygen and biological cleanliness, static electricity, preventing the formation of so-called oxygen pockets, and securing the flammable materials used in all phases of the therapeutic pressure procedures.

HBO CHAMBER TECHNICIAN

Each centre should have at least one technician whose functions are to control and supervise the chamber operators and medical staff assisting in the chamber during procedures. In addition, he or she should plan the operation and maintenance of the chamber, be authorised to perform service and repair work or choose a maintenance service for safety installations and devices and train the personnel of the facility.

The ECHM's *Educational and Training Standards for the Staff of Hyperbaric Medical Centres* [8] requires a high level of knowledge and preparation. In order to obtain qualifications for the position of a technician, it will be much easier to train additionally a diving system technician, as such positions are envisaged during saturated diving. In our Polish experience, the diving system technician is assisted by an electrician of the diving system, who is responsible for the measurements of all parameters of the atmosphere in the chamber, recording the course of pressure exposure as well as vision and communication devices [13]. The issue for consideration will be the scope of medical knowledge necessary for good cooperation with doctors and other medical personnel. In Poland, the specialisation of a diving system operator

combines both these functions.

Based on domestic normative acts, the detailed scope of knowledge and skills of a diving system operator is included in the Regulation of the Minister of Infrastructure of 25 August 2004 on the training and examination of persons applying for the authorisation to perform underwater works [10], and in the organisational and formal scope in the Act on underwater works [14]. With the adaptation of the general operational and technical requirements of the classification societies' regulations and the national technical supervision regulations, we present below the desired qualification requirements for the HBO chamber operator. In contrast to the scope of knowledge and skills of diving specialists authorised to operate and utilise the chambers, which in our country are diving system operators and the international specialisation Life Support Technicians (LST) according to the requirements of International Marine Contractors Association [IMCA] [15], the knowledge and practical preparation of the HBO chamber operator and hyperbaric technician should meet the following requirements.

Based on the general requirements for dive chamber operators, HBO operators should have enhanced knowledge and skills:

1. Be familiar with national legal and formal regulations and selected foreign documents regulating the performance of HBO treatments, and be able to determine the validity of certificates and approvals of the HBO chamber and its equipment.
2. Know the types, construction, operation and use of HBO chambers and their equipment. Be able to carry out periodic and ad hoc technical inspections and repairs of the HBO chambers and their installations.
3. Know and be able to operate gas, electrical, communication, measurement, observation and parameter recording systems in medical chambers, as well as safety pressure vessels, air and oxygen safety devices, basic and auxiliary equipment. Understand how to operate low, medium and high-pressure oxygen and air tanks, and how to store and transport them.
4. Be able to control the technical condition of the equipment and the equipment of the chamber in accordance with the manufacturer's regulations or instructions and technical principles. The same applies to the types, construction, operation and maintenance of respiratory equipment and inhalers and their preparation for work.
5. Be familiar with the procedures for therapeutic treatments and the health and safety requirements (regulations) for their implementation, as well as the methods of providing first aid (at least having attended a first aid course). Be able to prepare the control station and the chamber for work and carry out decontamination of the respiratory equipment and HBO chamber equipment.
6. Be familiar with the design and principles of patient monitoring devices and their preparation for treatment under the conditions of overpressure. Be able to perform basic measurements of the parameters of atmosphere composition and the

level of harmful admixtures in the air and the chamber atmosphere (optional).

7. Know the basics of the physiology of the human exposure to elevated pressure as well as the rules of conduct in conditions endangering the safety of people in the chamber.
8. Know how to convert units and calculate the amount of gases and consumables for the preparation and stay of a patient or patients under pressure.
9. Be familiar with the organisation of conducting therapeutic procedures, including the scope of tasks and responsibilities of the HBO chamber technician.

Modern medical chambers are fully computerised and automated. The technical personnel of the HBO chamber must be able to know and operate the processes for controlling the automatic course of the therapeutic exposure, including actions during overrun processes and alarms.

Whereas *Educational And Training Standards For The Staff Of Hyperbaric Medical Centre 2004* [8] recommends the following skills of a Multiple Person HBO Operator:

1. Knowledge of the operation of internal and external chamber installations.
2. Control and operation of compression and decompression systems, and gas/oxygen mixture supply systems.
3. Control and application of safety regulations for the prevention of fire and oxygen toxicity.
4. Selection, application and control of the compression and decompression procedure for the patient and members of the medical team protecting the patient in the chamber. Knowledge of decompression and its implementation when necessary.
5. The ability to transfer into the chamber while under pressure, in order to check the proper functioning of the respiratory and safety installations of the chamber.
6. Preparation and control of medical equipment prior to its placement in the chamber to ensure its proper functioning and to avoid dangerous or undesirable effects.
7. Operation of chamber auxiliary equipment: air compressors, sources of compressed air or medical gases, air storages, gas installation and pressure exposure control systems.
8. Maintenance of the chamber's operational readiness.
9. Performance of minor repair work or technical intervention not requiring highly specialised technical personnel.

At first glance, when comparing these requirements, no major differences can be seen between the qualifications of diving chamber operators (the national specialisation of a Diving System Operator, international and according to IMCA a Life Support Technician)

However, significant differences exist:

- the operator of the HBO chamber must be qualified to be under pressure (be a diver or a caisson worker), which is not provided for in the formal documents for chamber personnel,
- there are no requirements to carry out hygienic and decontamination activities for the

equipment and accessories of the chamber and its entire interior, which, however, is the responsibility of diving chamber operators,

- no skill as important as operating life support systems and maintaining the atmosphere in the HBO chamber is foreseen,
- omission of electrical and IT measurement issues.

The document *Educational And Training Standards For The Staff Of Hyperbaric Medical Centre 2004* [8] recommends that HBO chamber operators should come mainly from commercial diving environments. The authors of *Educational And Training Standards For The Staff Of Hyperbaric Medical Centre* [8] believe that HBO chamber operators may have other qualifications. If they originate from non-medical professions, they will have to learn basic medical issues as they are going to have contact with patients. Some paramedical professions can be a good basis for training a candidate and will facilitate the qualification of a chamber operator. However, definitely, the candidate for the HBO chamber operator qualification would need a technical education from a variety of mechanical specialties.

Additional technical qualifications and documented authorisation for e.g. operation and filling of pressure vessels as well as electrical authorisations up to 1kV should be particularly required for operators in hyperbaric centres not located within hospitals or other structures with a 24-hour duty team. The ability to cope with a failure of e.g. the electrical power supply may be decisive for the survival of the people being treated in the chamber.

TECHNICAL SUPERVISION STAFF

Introduction to the therapy in HBO chambers and their operation require the supervision of specialists and experts who conduct audits and reviews of the quality of the technical supervision and maintenance and help ensure that the safety requirements necessary for preserving the CE mark are met. The supervision should be selected according to the treatment tasks and purpose of the chambers. Of course, the persons performing the audits and reviews are not strictly the personnel of a given hyperbaric centre, but the role of these persons cannot be overestimated. The development of the scope of inspections, technical and therapeutic procedures and accompanying formal documents requires the participation of specialists and experts from many fields. The main role is played by medical specialists taking into account the requirements of technical and other specialists, e.g. fire protection, IT specialists, etc.

The supervisory staff, like in other countries, should be trained at scientific or academic centres. This is a task for the Ministries of Health and Higher Education. Both in medicine and in hyperbaric medicine, in line with the well-established practice in the EU for people who already work at the level of specialists and experts/consultants in their country according to *ECHM-EDTC Educational and Training Standards for Diving and Hyperbaric Medicine 2011* [11], it is necessary to provide for the absolute participation of these people in the new rules for accreditation and specialised training. In order to register these persons under the supervision programme, their long experience as recognised practitioners should be considered. They should be entered in the relevant register for conducting supervision. The period required

for the status of a professional has been established by the EU as being an individual with a minimum of 8 years experience. The expert level is generally underpinned by scientific status and is achieved after a further 8 years according to EU ECHM recommendations. These periods concern medical specialists and can be accepted for specialists and technical experts. In hyperbaric technology, there is a very small group of technical specialists in our country, the circle of medical specialists is slightly wider.

A very important issue is the health qualification of employees for whom the workplace is burdened with high pressure conditions. Unfortunately, the Polish occupational medicine service does not deal with this problem at all.

The only normative act defining (apart from the Ministry of National Defence and the Ministry of Internal Affairs and Administration) the health requirements for workers performing work in hyperbaric conditions is the Regulation of the Minister of Health on the health conditions for performing underwater works [16] last amended in 2019. It clearly defines the scope of examinations to which a person exposed to hyperbaric conditions should be subjected during their work. There are also specific provisions on the qualifications of the doctors who are entitled to issue diagnoses in this area.

Meanwhile, the practice of both individual occupational physicians and Provincial Occupational Medicine Centres is fundamentally different. Employees of hyperbaric facilities are usually examined like officials. Health risks at work are usually defined in references to sedentary work, exposure to computer radiation, etc. Sometimes stresses related to a specific medical specialty are added. However, there is NO practice of testing for suitability for work in high pressure conditions. In this case, there is a joint action, presumably agreed upon, that the employer be required to refer staff to proper examinations or the inspection authorities choose not to pay attention to the lack of proper staff examinations. Among employers, this is partly due to ignorance and a lack of tendency to obtain such knowledge, especially in small private centres, but it is not difficult for the authors to indicate the reason why this practice is tolerated by control centres.

Exposing staff, and in particular completely random people such as chamber assistants, will inevitably result in accidents. Litigation and compensation will probably force employers to ensure that staff are properly qualified or perhaps also attract the interest of the controlling authorities.

As far as determination of the fitness for work in hyperbaric conditions is concerned, as opposed to professional qualifications for this work, there are specific and logical provisions in Poland, the adherence to which would ensure workers' health security. Unfortunately, only few hyperbaric treatment centres, both public and private, apply in practice the recommendations of the Regulation of the Minister of Health and direct their employees to the relevant examinations and practitioners.

CONCLUSION

The problem of the qualification of technical staff has been reported for years by centres and institutions with HBO chambers. Based on international solutions, they should be implemented taking into account the specificity of our country, logic and common sense. These problems should be solved by the existing domestic supervisory

institutions on the basis of conclusions of medical and technical specialists and experts.

It is also necessary to introduce legal regulations codifying the operation of hyperbaric centres, which would, on the one hand, increase safety and, on the other hand, limit the activity of fraudsters benefiting from the fashion for "hyperbaric oxygen".

REFERENCES

1. Siermontowski P., Janas B., Olszański R.: Formal and professional requirements for the staff of hyperbaric centres. Part 1. PolHypRes 2017; 4(61), 7-14 DOI: 10.1515/phr-2017-0017;
2. Sieroń A, Cieślak G. Zarys Medycyny Hiperbarycznej α –medica press Bielsko – Biała 2006; 235. Polish [Outline of hyperbaric medicine]. ISBN 83-88778-97-8;
3. <https://www.prawo.egospodarka.pl/akty/dziennik-ustaw/2016/000/694>, data pobrania 2019-11-17;
4. A european code of good practice for hyperbaric oxygen therapy. Opracowane przez Grupę Roboczą «SAFETY» Programu COST B14 «HYPERBARIC OXYGEN THERAPY» Maj 2004;
5. <https://www.prawo.egospodarka.pl/akty/dziennik-ustaw/2013/000/1562> data pobrania 2019-11-17;
6. <https://www.infor.pl/akt-prawny/DZU.2011.174.0001039,ustawa-o-zawodach-pielegniarki-i-polozonej.html> data pobrania 2019-11-17;
7. <http://www.ckppip.edu.pl/poziome-menu/archiwum/programy-ksztalcenia-2/specjalizacje.html> data pobrania 2019-11-17;
8. Educational And Training Standards For The Staff Of Hyperbaric Medical Centre 2004;
9. Schorow S. The Air in There NFPA Journal January 3, 2017;
10. <https://www.infor.pl/akt-prawny/DZU.2010.126.0000856,rozporzadzenie-ministra-infrastruktury-w-sprawie-szkolenia-i-egzaminowania-osob-ubiegajacych-sie-o-uprawnienia-do-wykonywania-prac-podwodnych.html>, data pobrania 2019-11-17;
11. ECHM. Recommendations of the 7th European Consensus Conference on Hyperbaric Medicine. Lille, France 2004;
12. Classification and Compensation Division Job Class Profile: Hyperbaric Technical and Safety Coordinator. Government of New Founland and Labrador Canada 2005;
13. Skrzyński S. i wsp. Technologia Nurkowania Saturowanego w Kompleksie Nurkowym AF-2 Część II. Realizacja Nurkowania Saturowanego LOTOS Petrobaltic 2011; [Saturated Diving Technology in the AF-2 Diving Complex Part II. Implementation of Saturated Diving by LOTOS Petrobaltic 2011];
14. The Act of October 17, 2003 on the performance of underwater works. Dz. Of Laws No. 199, item 1936, of 2004. No. 273, item 2703, of 2005. No. 155, item 1298 and of 2007, No. 64, item 428;
15. IMCA D 013 Offshore Diving Supervisor and Life Support Technician Certification;
16. Regulation of the Minister of Health of September 17, 2007 on the health conditions for performing underwater works. Acts U. 2007 item 1440.

dr hab. med. Piotr Siermontowski, prof. AMW

Katedra Technologii Prac Podwodnych
Akademii Marynarki Wojennej
ul. Śmidowicza 69
81-127 Gdynia
p.siermontowski@amw.gdynia.pl