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**DIABETES AND WORK AT SEA:
HAS EVERYTHING BEEN ALREADY SETTLED ?
ARTICLE FOR DISCUSSION**

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ABSTRACT

Along with increased worldwide incidence of diabetes, the frequency of its occurrence among persons employed on seagoing vessels has also grown (12). According to the current regulations, persons treated with insulin are not admitted to work at sea, and those treated with oral drugs have a markedly limited access to such a work. This may lead to concealing the fact of being a diabetic, thus enhancing the existing hazards.

Current improved methods of glycemia self-control and treatment of diabetes have radically improved vital abilities of diabetics.

Having this in mind, a question arises whether the binding regulations on the fitness of diabetics for work at sea should be verified.

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The main goal set by the authors of this paper is to discuss fitness of seamen having diabetes for the work at sea. This problem has become even more important in the light of the increased incidence of this disease observed worldwide in this occupational group (16), which is close to that noted in the general population, fluctuating between 5% and 7%. This tendency pertains chiefly to type 2 diabetes, accounting for about 90% of diagnosed diabetes cases (19).

At the same time, the progress in modern methods of diabetes control and management allow diabetics to take up normal life activities. Professional career is one of the fundamental aspects of life of everybody, and the fact that diabetes was diagnosed should not significantly limit his ability to work in his occupation (10).

Such an opinion and its implications are comprised in the recommendations and directives of the European Union. The exception is the situation when the health state of the diabetic poses a threat to the safety of other persons.

May persons applying for the work at sea display carbohydrate metabolic abnormalities?

According to the order of the Minister of Health in this country, candidates for the work on seagoing vessels should not display disorders in carbohydrate metabolism. Both types of diabetes bring about preliminary disqualification. While such opinion is commonly shared with regard to type 1 diabetes, the views on type 2 diabetes are more liberal.

What is the position with regard to persons already employed, in whom the diagnosis of type 2 diabetes has been made? Have any standard procedures been established in such cases?

Type 2 diabetes does not automatically disqualify from this occupation. This rule applies to persons with diabetes diagnosed at the time when they already worked at sea.

Such a diagnosis in a seafarer should oblige to maximally individualized approach in order to evaluate the current clinical state of the patient, in particular:

- a) the level of glycemia control,
- b) complications of diabetes,
- c) concomittant diseases.

Of great significance is also the moment of disclosing the disease, and the possibility of occupational retraining, taking account of the work specificity (related with the post held), as well as of social and economic consideration (7).

Are there any specific factors affecting the development of diabetes in a seafarer?

Apart from genetic predispositions, environmental factors related with the specificity of the work at sea, favouring the body mass growth, are essential (14, 15, 17). The most important are:

- highly caloric diet, frequently inadequate to energy expenditure (15)
- lack of proper, regular physical activity (1, 8, 14)
- psychologic mechanisms: habits and preferences (15)
- chronic stress and deprivation related with the monotony of the life at sea, irregular and/or casual sex life, limited possibilities to realize and cultivate own interests (10). Seamen frequently treat meals during the sea voyage as a substitute for other unfulfilled pleasures.

Can various jobs on a ship (work posts) be classified as less or more exposing to the risk of diabetes?

Few publications indicated, that the highest percentage of diabetics was found particularly among higher-ranking seamen with the longest work experience: officers and chief engineers (15). At the same time, it should be pointed out that publications and other sources of information on this subject are mostly outdated, and are very few. New data have to be acquired, and a better methodology of their analysis should be employed.

What poses the greatest hazard to diabetic seamen?

Hypoglycemia definitely poses the highest direct threat to the diabetic seafarer, as well as to safe operation of the ship.

Rarely observed, severely developing hyperglycemia and diabetic ketosis may be a risk factor during a sea voyage, due to a long distance from shore and medical services centres there (10).

Another risk are vascular complications and neuropathy, especially if they were not diagnosed previously

Disturbances of mental and psychosocial nature may also have a negative impact on the work of the crew of a ship (9, 10, 11).

What is the principal goal of treatment of diabetics in this occupational group?

This goal does not much differ from that formulated for the general population.

It should be based on the proper control of glycemia, preventing or delaying the development of complications, and reduction the risk of iatrogenic hypoglycemia (19).

What are the main factors affecting the safety of glycemia control?

- errors in insulin and oral drugs management (6),
- shift work at sea, disturbances of diurnal rhythm of the patient (4, 10),
- hyperthermia and dehydration (13),
- inappropriate, highly caloric diet,
- insufficient or excess exercise,
- and variability of climatic conditions affecting the instability of energy expenditure (10),
- stimulants (alcohol: increased risk of hypoglycemia! narcotics) (5, 20),
- drug interactions (5).

How to minimize the risk of hypoglycemia:

- by education of the diabetics (3),
- knowledge how to control glycemia (3),
- treatment adjusted to the patient's needs,
- psychologic support (9, 11),
- strong motivation related with the possibility to continue the work at sea ,
on the condition that glycemia will be under control

The opinion of the American Diabetes Association in 1984 was that in view of great progress in the treatment of diabetes, persons reporting hypoglycemia episodes should not be discriminated in their work career, unless safety of other persons or the public safety is endangered.

It should be emphasized that the number of diabetes-related accidents accounts for only a small proportion of the percentage of all of them. The organization of the work at sea and the system of control can minimize the dependence of the ship's safety on the state of health of individual persons.

The binding regulations do not admit patients with type 1 diabetes and insulin-dependent type 2 diabetes to the work at sea. It is very well known that insulin-dependent diabetics in fact work on seagoing vessels, having concealed the disease when applying for the health certificate, and from their co-workers as well (18). The dissimulation and concealment of diabetes and related ailments poses a much greater hazard, making the first aid in case of emergency at sea impossible.

In view of constant improvement in the methods of self-control, education, and treatment of diabetes, a question arises as to the liberalization of the present regulations in order to treat individually the admission of an insulin-dependent patients to work at sea. It seems that the restrictive approach to health requirements to be met by seamen and fishermen may in fact deprive of work many well-trained employees, adapted to their workplaces and, as a consequence, perhaps charge the society for their early retirement or their pension (10).

Discussions during medical meetings and workshops, also during the 8th International Symposium on Maritime Health which was held in Rijeka, Croatia, in May 2005 revealed different approaches among doctors as to:

- 1) the admittance to the work at sea of new employees with type 2 diabetes,
- 2) disqualification of insulin-dependent diabetics, even those with good glycemia control, and long work experience at sea,
- 3) the necessity of having insulin in the ship's medical chest, according to recommendations comprised in the updated 3rd edition of the WHO International Medical Guide for Ships

These and other problems related to the work of diabetics at sea await first of all the expert verification of regulations on this problem, and later proposing the legislative solutions.

The authors of this article would appreciate any comments on it, and invite specialists to join in the discussion, on pages of the International Maritime Health journal.

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COMMENTS FROM GERMANY

Also in Germany, there are diabetic seafarers expecting to be declared fit for work at sea.

But during their medical examinations, we follow the ILO/WHO Guidelines (1) on this subject.

Before we bring the question of their fitness for work on ships and present them to people who are not specialists in this field and to non-medical decision makers, we at first should try to review and verify the problem ourselves, and come to solutions agreed by medical practitioners and specialists.

If we have not yet reached that point, we should be very careful with revealing (in publications) any controversies in opinions among us – maritime medicine doctors.

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COMMENTS FROM DENMARK

This paper is relevant and interesting. There is certainly something to discuss.

An additional problem with a diabetic seafarer is the risk of suddenly having a sick person aboard who may need medical assistance and possible evacuation.

The commentary by Jaremin et al. focuses on an important subject. Obesity and lack of physical activity causes what is called the metabolic syndrome which in many cases develops into diabetes. In many parts of the world, we will without much doubt see an increasing number of active seafarers with diabetes.

Jaramin et al. argues that a seafarer with diabetes to a greater extent should be able to continue working at sea.

The Danish legislation on minimum standards for the health of seafarers is liberal compared to many other countries. Insulin dependent diabetes is a disqualification if you are to start a career at sea although there are exemptions for persons, who are not a member of the safety crew, e.g. the catering crew. Professional seafarers who develop diabetes during their career may continue working at sea as long as they can prove that their disease is well regulated without hypoglycaemic episodes within the last two years. Besides this, the seafarer should be under regular supervision of a doctor and seafarer taking insulin should be able to perform blood sugar measurements.

The experience with this liberal attitude is in general good. Within the last two decades, there have been a few fatal accidents involving diabetics but none of these was directly caused by acute incapacity of the diabetic seafarer. There have also been a few

deaths at sea among diabetics. In one case, the deceased died due to dysregulation. The victim was the captain himself and had refused any assistance which actually would have been available. The encountered serious problems are limited in a merchant fleet of this country, which comprises about 1.3% of the world merchant fleet.

The advantages of the liberal attitude towards diabetes are obvious: Very few seafarers have lost their job at sea due to diabetes. The advantage for the diseased are clear but also the shipping industry has gained from not losing experienced crew members in whom there has been made large investments in general education and specialization.

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The Danish *Shipping Tribunal – Health* is a Governmental Institution under the Danish Maritime Authority which handles complaints against decisions made by medical practitioners doing pre-employment health examinations of seafarers and fishermen.