

## **FACT SHEET – OCCUPATIONAL HEALTH AND SAFETY**

### **Exposure: Hot temperature conditions and extreme heat**

**Vulnerable group:** Diabetics

#### **1 Basic description**

Diabetes mellitus is an umbrella term for various metabolic disorders. They all have in common that they lead to increased blood sugar levels because of a deficiency of the hormone insulin and/or a reduction of the insulin effect. The main forms are type 1 and type 2 diabetes mellitus (Bundesministerium für Gesundheit, 2019).

The treatment of diabetes requires a high degree of self-discipline. To reduce the need for insulin, people with type 2 diabetes usually have to change their diet (Kulzer, 2019). The modification of health behavior is advisable. Beyond that, various drugs are available which can be taken as pills and alike. If the disease progresses more, type 2 diabetics must inject insulin. Hence, regularity should be ensured (Bundesministerium für Gesundheit, 2019). Where patients days vary greatly and are difficult to plan, blood glucose control can be particularly challenging. Crucial for the motivation to carry out the diabetes treatment conscientiously is the feeling of being able to do something. Nonetheless, sometimes the illness becomes a permanent psychological burden - especially, if the fear of secondary diseases is a constant companion in daily lives (Kulzer, 2019).

Most performance-limiting or dangerous problems at work are caused by hypoglycemia (Kulzer, 2019). The risk of hypoglycaemia is higher in occupations in which the working conditions prevent food intake at all times, e.g. work with prescribed protective clothing (Deutsche Gesetzliche Unfallversicherung, 2010). Thereby, a meal might need to be skipped or insulin might be injected too long before eating (Fritsche & Vosseler, 2019). Additionally, especially in professions in which alcohol is seen as part of the lunch break, the blood sugar level can drop sharply after drinking beer, wine and the like (Fritsche & Vosseler, 2019). Also, physically active jobs increase the energy requirement. The body burns extra calories for a long time afterwards, so that hypoglycemia can occur even hours later (Fritsche & Vosseler, 2019). The consequences can be serious: Sweating, trembling, hunger or even clouding of consciousness occur. In the case of severe hypoglycaemia, diabetics are dependent on help from others. In an extreme event, a glucose solution must be administered into the vein to stabilize the values again (Fritsche & Vosseler, 2019). In individual cases, these factors may militate against taking up such work or may require additional protective measures for people with diabetes, in accordance with the results of the workplace risk assessment (Deutsche Gesetzliche Unfallversicherung, 2010).

A disabled person's pass is available for diabetics, if in addition to the therapy effort, i.e. frequent measuring and injections, their everyday life is massively impaired. It offers so-called compensations for disadvantages, such as improved protection against dismissal or tax allowances. But it still has a number of disadvantages. Especially children and young people can develop a feeling of inferiority. Diabetics may also face refusal of or limited

insurance coverage, e.g. in life insurance, private health insurance or occupational disability insurance (Ebert, 2019). But yet, according to the Occupational Safety and Health Act (ArbSchG), a standard assessment of the fitness for work of persons with diabetes is no longer permissible (Arzneimittelkommission Der Deutschen Ärzteschaft (AkdÄ) et al., 2013).

## **2 Main impacts of extreme temperature and heat on human health**

Heat can cause an increased heart rate and loss of water due to increased sweating. Heat edema, a swelling mainly noticed in the ankles, heat rashes, spots resulted by inflammation and heat cramps in the muscles due to a salt imbalance, are common when experiencing extreme heat (Canadian Centre for Occupational Health and Safety, 2016). Further, the heat is a risk for sunstroke, heat exhaustion, heat stroke and, at worst, heat can lead to heat death (Berufsgenossenschaft der Bauwirtschaft, o. J.). Extreme heat can also worsen pre-existing chronic conditions such as cardiovascular and respiratory diseases (National Institute of Environmental Health Sciences, 2017). It may increase irritability, loss of concentration and the loss of ability to do mental and heavy work (Canadian Centre for Occupational Health and Safety, 2016).

In addition to heat, solar radiation while working outdoor poses a risk. Sunburn increases the risk of skin cancer and could cause conjunctivitis. The ozone exposure increases the risk for burning eyes, irritation in throat and pharynx, shortness of breath and headaches. The UV radiation endangers due to interactions with plants such as giant hogweed, parsley or medicines, as well as some antibiotics, blood pressure and heart medications (Berufsgenossenschaft der Bauwirtschaft, o. J.).

## **3 Main impacts of extreme temperature and heat on the health of diabetics.**

High temperatures and the close humidity can have an additional influence for people with diabetes (Diabetes.co.uk - the global diabetes community, 2019). Dehydration can be an issue in hot weather, and higher blood glucose levels can further increase this risk. The body's metabolism is higher in hot and humid weather which can lead to an increased chance of hypoglycemia (Deutsche Gesetzliche Unfallversicherung, 2010; Diabetes.co.uk - the global diabetes community, 2019). This is because insulin is absorbed into the blood more quickly when it is warm (Fritsche & Vosseler, 2019). Furthermore, when carrying diabetes supplies which need to be kept cool, e.g. insulin and test strips, the heat of summer can be a problem as well (Diabetes.co.uk - the global diabetes community, 2019).

Equally, diabetics face extra challenges if a strong storm knocks out the power or they have to seek shelter away from home. Therefore, they should plan how they handle medicine that needs refrigeration, such as insulin (CDC, 2018).

Advisable measures of protection and prevention for diabetics:

- Shadowing of workplaces
- Air-conditioning of closed workplaces, e.g. vehicles

- Reduction of physical work and shifting physically demanding work processes to cooler days or times of day
- Avoidance of activities, especially in direct sunlight
- Additional staff
- Increase in the number and length of rest breaks
- Regular short drinking breaks and provision of cool drinks/ small snacks
- Instruction of employees on the operational measures and on the correct behaviour in hot weather, on the symptoms of heat-related illnesses and on first aid (Berufsgenossenschaft der Bauwirtschaft, 2020)
- Providing employees with appropriate occupational health information for dealing with diabetics at work
- Imparting knowledge to direct colleagues on how they can support the employee in an emergency
- Regular examination by a medical officer (Rinnert et al., 2019)
- Testing more often, especially with increasing temperature
- Knowing signs of low blood pressure
- Keeping a source of fast-acting carbohydrate at hand, such as glucose tablets or a sugary drink (Diabetes.co.uk - the global diabetes community, 2019)

#### 4 References

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