

Are You Feeling Cold at Work?

It should be noted that the majority of cold-related mortality [...] occurs already at milder suboptimal temperatures.

(Ikäheimo et al. 2021: 200)

The Concept of Cold

Ambient cold climate is sometimes defined as a temperature below +10–15°C, or when a person has cold-related symptoms (BS 7915:1998; ISO 15743:2008; Mäkinen & Hassi 2009: 207). Looking at the yearly temperatures around the world, one third of all countries would thereby be considered cold (Trading Economics 2023). Thus, billions of people are exposed to cold daily, especially in the wintertime. If we include people working in cold storages and with cold objects, a couple of million people could be added to the overall number (Ikäheimo et al. 2021: 3).

For our human body to function normally, the core temperature needs to be around 37 °C (give or take 1°C) (Ikäheimo et al. 2021: 2; Stocks et al. 2004: 444). Even though the human body can regulate its own temperature, external factors such as climate, clothing insulation and activity play a major part in how we can manage to maintain our body heat (Hassi et al. 2002).

When we are exposed to cold, cooling-related physiological responses occur, specifically targeted to preserve our core body temperature, resulting in system-specific symptoms such as respiratory, musculoskeletal, or cardiovascular symptoms (Ikäheimo et al. 2021: 10). Frostbite, hypothermia, slips, and falls are all associated with cold exposure (Mäkinen & Hassi 2009: 209). Hence, not all cold-related symptoms are physiological. Exposure to cold also affects our cognitive performance, attitudes, and comfort, which in turn, changes our behaviour, movements, and productivity (Ikäheimo et al. 2021: 10).

However, cold is not as straightforward as just temperature, since each person's physiological response will differ depending on external factors such as wind and moist, but also internal factors such as age, gender, fitness, body size, health and acclimatization (Hassi et al. 2002; Stocks et al. 2004: 447). Depending on what you are used to, where you live, and where you were born, the experience of cold becomes more or less extreme. This makes the concept of cold very complex.

Cold Exposure at Work

Exposure to cold is a world-wide issue, especially in arctic and subarctic climates, not just in everyday life, but also at work. Every day, billions of workers are exposed to cold, increasing their risk for adverse health effects. Cold stress and tissue cooling, together with decreasing performance, are common outcomes of cold exposure in occupational settings (Hassi et al. 2002; Holmér 2009; Mäkinen & Hassi 2009: 208). Thus, obvious occupational areas such as construction work, cold storage work, military operations, farming, and fishing are not the only ones where people are exposed to cold. People working in less obvious areas, such as postal services, child and elderly care, food preparation, and law enforcement are also faced with daily cold exposure. In Sweden, one eighth of all work-related injuries are due to temperature and weather conditions (Arbetsmiljöverket 2022: 35), making protection against cold one of the key solutions to this problem (Ikäheimo et al. 2021: 23).

Legislations and international standards, as outlined by the International Organization for Standardization (ISO), regarding risk assessment of cold exposure at work, exist to some extent (Holmér 2009; Mäkinen & Hassi 2002: 216), and usage would serve multiple purposes such as survival, reduction of adverse health effects, increased performance, efficiency, and productivity, and the maintenance of comfort (Holmér 1993: 149). Unfortunately, documentation of the usage, implementation and evaluation are lacking, potentially leaving the workforce vulnerable to adverse health risks from cold exposure.

What Will I Do?

An overarching purpose of my project is to expand the knowledge on how cold-related adverse health effects at work can be managed. The project will be exploring and interpreting subjective and objective experiences of cold exposure at work and current risk management and preventive measures regarding cold exposure in occupational settings. The thesis will lay a foundation for further development of the risk assessment tool based on the ISO 15743:2008 for a sustainable work life in arctic regions.

To achieve this, firstly, a scoping review of current cold risk management research will be conducted. The aim is to review the current knowledge about cold exposure and preventive risk management and risk assessment methods for different effects in an occupational setting. If possible, the review will also describe differences between male- and female-dominated occupational sectors, tasks, and settings.

In the second, third and fourth papers, I will work closely together with different companies in the Västerbotten and Norrbotten counties, Sweden, where employees are exposed to cold in their everyday work. The cold exposure of employees will be investigated by technical and subjective measurements through temperature loggers and physical activity, as well as questionnaires based on previous research, namely Cold and Health in Northern Sweden (CHINS), the Potential Work Exposure Scale (PWES), and the Cold Work Health Questionnaire (Annex D) in the ISO 15743:2008.

Documentations of current risk management protocols will be collected from the workplaces together with semi-structured interviews regarding exposure experience and preventive actions. Health and discomfort questionnaires will be collected to fully grasp and understand the complexity of cold exposure at work, and how risk management tools could be used and developed in the future.

With my thesis, I am hoping to capture subjective experiences of cold exposure in occupational settings, technical measurements of current exposure, possible gender differences, preventive measures known and used, and hopefully be able to further the knowledge about cold exposure at work. By preventing cold exposure, we will not only prevent adverse health effects, but also increase the knowledge of how we can achieve a sustainable working life.

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