

CONSIDERATIONS ON THE HEALTH STATUS OF LOGGERS IN SUMMER AND WINTER WORKING CONDITIONS

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RESEARCH ARTICLE

Abstract

Outdoor work, especially for loggers in forestry operations, involves significant health risks amplified by extreme weather conditions and climate change. This article examines the health risks and working conditions of forestry loggers, who are considered outdoor workers exposed year-round to extreme climatic factors. The analysis details the seasonal impact of high and low temperatures, which can lead to serious health conditions, including cardiovascular and respiratory diseases, as well as injuries from frostbite or sunburn. In summer, loggers face risks of dehydration, heat exhaustion, and ultraviolet radiation, while in winter, extreme cold and moisture increase vulnerability to hypothermia, frostbite, and reduced immunity. Prolonged exposure to extreme temperatures is associated with decreased productivity, increased stress, and a higher risk of accidents. The article also highlights the need for protective and adaptive measures, such as health monitoring, equipment innovation, and psychological support, to mitigate the impact of extreme conditions on the health and performance of loggers.

Keywords: loggers, environmental factors, seasonal work, heat stress, cold exposure

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INTRODUCTION

The health and safety of outdoor workers can be affected by various factors, such as rising temperatures, exposure to pathogens, ultraviolet radiation, air pollution near work sites, and extreme weather conditions. Each of these extreme factors can lead to different health issues. For instance, severe weather conditions can increase the risk of burns, frostbite, toxic gas poisoning, and extreme heat. These hazards amplify existing risks or can lead to new ones, including heat-related illnesses, vector- and waterborne diseases, accidents, allergies, and even cancer (ANSES, 2018). The emergence of such health issues results in a diminished quality of life, increased healthcare costs, and, ultimately, decreased work productivity and reduced output (Dasgupta et al., 2021; Dasgupta & Robinson, 2023). Beyond physical effects, these factors can also impact the mental health of workers (Schulte et al., 2016; Dasgupta et al., 2021). The severity of health issues is particularly high among older workers, those with preexisting medical conditions, and individuals with a low socioeconomic status.

Loggers, who form an important category of workers in the forestry industry, are included among outdoor workers. They are responsible for cutting and processing wood for various uses. In their work, loggers rely on chainsaws to ensure efficient cutting processes. Although

productivity and efficiency are greatly enhanced, the health and safety risks are significant. Prolonged use of this tool can substantially impact the health and performance of workers.

The purpose of this article is to present aspects related to the health of loggers, classified as outdoor workers, during their work in summer and winter. The presentation is organized separately for these two seasons, with climatic factors, especially temperature, considered the primary significant factor in this analysis.

WORKING IN SUMMER CONDITIONS

Loggers work outdoors and are exposed to numerous environmental factors that can impact their physical and mental health. In summer, high temperatures can impair the body's ability to regulate its temperature, which may worsen respiratory, cardiac, and renal conditions, lead to dehydration, and, in extreme cases, cause heat strokes (Parsons, 2002; Varghese et al., 2018; Wiki SSM, 2023). These conditions create heat stress as loggers perform strenuous physical activities in hot and sunny environments, straining their bodies. Extreme heat affects cardiovascular function, forcing the heart to work harder to cool the body through sweating. For loggers, intense physical exertion under the sun significantly increases the risk of hypertension and other cardiovascular issues, particularly during periods of extreme heat. If

loggers work overtime in such heat, recovery from heat stress may be insufficient, impacting reflexes, concentration, and other functions (Jones et al., 2020; Narocki, 2021). Loggers are exposed to high temperatures for at least a quarter of their working hours. Research indicates that in the summers of 2020–2022, elevated temperatures in southern Europe led to numerous accidents and fatalities among outdoor workers, including those in forestry (EU-OSHA, 2024).

During summer, working in high temperatures causes loggers to lose fluids and electrolytes rapidly through sweat. Without adequate rehydration, symptoms of dehydration and heat exhaustion can occur, such as fatigue, dizziness, and nausea. As the body strives to regulate temperature, loggers may experience muscle fatigue and slower reflexes due to overheating, increasing the risk of accidents and diminishing concentration in high-risk tasks. Prolonged work in intense heat can raise stress and anxiety levels. Physical and mental exhaustion are particularly pronounced in summer, with associated discomfort affecting overall well-being, potentially leading to irritability and sleep disturbances. Such conditions are common among workers exposed to daily sun and heat.

The environment in which loggers work - forests, underbrush, and grasslands - can also increase disease risks (Covert & Langley, 2002). Such areas can harbor insects that carry pathogens, including ticks. Due to climate change, the proliferation of these pathogens and vectors is expanding across Europe, exposing loggers to vector-borne diseases such as tick-borne encephalitis and Lyme disease (Jones et al., 2020; Meima et al., 2020; EU-OSHA, 2024). Additionally, diseases previously non-endemic to Europe, like Rift Valley fever, yellow fever, and malaria, are now potential threats (EU-OSHA, 2024).

In summer, loggers are frequently exposed to pollen, dust, and other particles that can irritate the respiratory system. Additionally, heat increases the risk of air dryness, which can exacerbate pre-existing respiratory conditions such as asthma or bronchitis. The combination of heat and dust may have long-term impacts on loggers' lung health.

Loggers are also at an increased risk of exposure to ultraviolet (UV) radiation due to the changing climate, which can heighten the risk of sunburn and, ultimately, skin cancer. Studies show that outdoor workers, including loggers,

in Europe face a higher risk of skin cancer than indoor workers with similar skin types (Trakatelli et al., 2016; EU-OSHA, 2024). Continuous sun exposure can lead to skin irritation and sensitivity, especially on exposed areas such as the face, neck, and hands. Heat stroke is a serious condition that occurs when the body cannot cool itself fast enough. This can result in confusion, dizziness, nausea, and even unconsciousness. In severe cases, heat stroke can damage the central nervous system, with lasting effects on mental and cognitive motor health, raising the risk of injury (Piil et al., 2020; EU-OSHA, 2024).

WORKING IN WINTER CONDITIONS

During winter, loggers face health risks due to extremely low temperatures. Exposure to severe cold increases the risks of hypothermia and frostbite. Working in subzero temperatures impacts blood circulation and can strain the immune system, making workers more vulnerable to respiratory infections. Prolonged exposure to cold prompts the body to restrict blood flow to extremities to conserve heat around vital organs. This reaction can place stress on the cardiovascular system, raising the risk of high blood pressure and other heart conditions, especially for loggers engaging in intense physical activity in the cold. Frostbite is also a common issue for outdoor workers in freezing conditions; skin exposed to extreme cold can suffer severe damage, and in severe cases, there is a risk of numbness and infections. Frequent cold exposure can lead to excessive skin dryness, causing painful cracks, especially on the hands.

Repeatedly inhaling cold, dry air can irritate the respiratory tract and worsen preexisting conditions like bronchitis or asthma. For loggers who are also exposed to wood dust and other particles during work, respiratory health risks are heightened in the cold season. Physical labor in freezing temperatures affects joints and muscles, making them more prone to stiffness, pain, and inflammation. Cold temperatures reduce muscle flexibility and can exacerbate existing joint issues, such as tendinitis or arthritis, which loggers commonly experience after prolonged winter work. Long-term exposure to cold can weaken the immune system, leaving loggers more vulnerable to infections like colds, flu, and other respiratory illnesses. The immune system expends extra energy to maintain body temperature in cold conditions, which can impair its ability to fight

off pathogens, increasing the risk of chronic conditions, including rheumatism, over time.

Winter cold requires the body to expend more energy to stay warm, which can lead to pronounced fatigue. For loggers, the physical effort combined with the need to generate warmth can lead to quicker exhaustion and reduced productivity. Chronic fatigue can impair reflexes and focus, raising the risk of accidents. Working in extreme cold and the isolation typical of forested environments can also significantly impact loggers' mental health. Continuous exposure to harsh conditions, along with fatigue and isolation, can lead to stress, anxiety, and, in severe cases, seasonal depression.

WORKING THROUGHOUT THE SEASONS

Separate factors encountered in both summer and winter include humidity and precipitation in various forms. During both seasons, increased humidity due to precipitation can cause thermal discomfort for loggers. In summer, high humidity combined with heat can exacerbate issues of dehydration and heat exhaustion. In winter, humidity can lead to hypothermia more quickly, given that wet clothing loses body heat faster.

Precipitation, such as rain or snow, can make the terrain where loggers work unstable and slippery, increasing the risks of accidents, such as falls or slips. These challenging conditions can lead to injuries like sprains or fractures. Additionally, large amounts of precipitation can affect the efficient functioning of the tools used by loggers. For example, chainsaws or other equipment may become more difficult to use or may malfunction due to excessive moisture. This not only affects productivity but can also create additional injury risks.

Prolonged exposure to wet conditions can promote the development of allergens, which can worsen respiratory problems such as asthma or allergies. Loggers working in consistently damp conditions may be more susceptible to respiratory infections. Furthermore, challenging working conditions during rain or snowfall can lead to mental fatigue and decreased morale. A damp and cold working atmosphere can contribute to feelings of isolation and increased stress, negatively affecting the well-being of loggers. Increased humidity can influence how the body regulates temperature. In cold and damp weather, blood circulation can be affected, leading to inefficient

thermoregulation and increasing the risk of hypothermia among loggers.

In addition to the challenges posed by humidity and precipitation, the cold season brings with it additional risks related to freezing. Freezing conditions can cause tools to become stiff and more difficult to handle, thereby increasing the effort required for their use. Furthermore, working under these conditions can affect motor coordination, increasing the likelihood of accidents. Loggers may also be exposed to electrical hazards, especially when working near electrical cables or equipment that can become wet and thus dangerous. These situations underscore the importance of training in safety practices and the correct use of equipment in adverse weather conditions.

Additionally, the impact of humidity and precipitation on personal protective equipment is noteworthy. The materials used to make clothing and footwear can become ineffective in the face of moisture, reducing the protection offered against cold and wind. Inadequate or damaged protective equipment can compromise the safety of loggers and lead to decreased work performance. Therefore, it is essential for employers to ensure that all workers have the appropriate equipment to cope with varied weather conditions and to prevent potential health and safety issues.

CONCLUSIONS

Repetitive work in extreme conditions, whether hot or cold, can have cumulative effects on the health of loggers. In the long term, loggers may face an increased risk of chronic diseases, such as hypertension, cardiovascular conditions, and rheumatism. Exposure to cold can lead to accelerated wear on the joints, while excessive heat can accelerate chronic fatigue and respiratory problems. The human body attempts to adapt to extreme temperatures through mechanisms such as sweating, dilation or constriction of blood vessels, and modifications in heart rate. Intense physical work in extreme temperatures significantly increases energy requirements. During summer, loggers need food that prevents fatigue, while in winter, caloric needs increase even more, as the body expends extra energy to stay warm. An energy imbalance can lead to weakness, dizziness, and constant fatigue. These mechanisms are challenged daily, and continuous exposure can reduce the long-term

adaptive efficiency of the body, leading to exhaustion and health deterioration.

Adaptation to excessive heat during summer, as a preventive measure, can be achieved by implementing periods of lower work intensity and reducing working hours, especially during the first days of exposure to heat. To mitigate the negative effects of climatic factors, modifying the work schedule to avoid the hottest periods of the day may be necessary. An important factor that can support the health of loggers is the existence of a sense of community among colleagues. Working in extreme conditions, especially in isolated areas, can be psychologically challenging; however, social support among workers helps to increase resilience. Encouraging a work environment where employees support each other can reduce stress and create a trustworthy atmosphere. In areas with isolated forestry operations, where access to resources is limited, psychological support for managing stress and extreme conditions is often insufficient. Furthermore, in many physically demanding environments, including forestry operations, mental health is often underestimated. This attitude can lead to the stigmatization of psychological issues such as anxiety and depression, and to workers' reluctance to seek support.

As environmental conditions become more variable due to climate change, innovations in protective equipment and improvements in ergonomics become essential. Today, materials and equipment are being developed that are more resilient to extreme temperature changes, allowing for better air circulation or thermal protection, depending on the season. These improvements can reduce the impact of extreme temperatures on the health of loggers.

In the future, it is anticipated that workplace hazards sensitive to climate change may increase significantly. Periodic monitoring of loggers' health can help identify health issues related to exposure to extreme conditions. Regular medical visits and routine tests to assess cardiac function, respiratory health, and muscular health can prevent the exacerbation of conditions and allow workers to take preventive measures before problems become severe. A deeper understanding of threats to occupational safety and health is necessary to accurately assess and manage risks appropriately. For all preventive measures or action plans, employers must consult their

workers and train them in the implementation of these measures.

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