THE OCCURRENCE OF FROSTBITE AND ITS RISK FACTORS IN ADOLESCENTS AND YOUNG ADULTS

Objectives. Frostbite is very common in Finland. Over 60% of persons will experience sustaining blister-degree or deeper frostbite injury with various sequelae. However, there is sparse research evidence regarding the occurrence of frostbite and related risk factors at population level. Concerning young people, even descriptive evidence is absent. Studies on hospital treated frostbites have been narrow in scope. This study aimed 1) to investigate the occurrence of frostbite in adolescents and young adults, 2) to explore frostbite related risk factors in these groups, and 3) to examine the association between frostbite and the thermal regions in Finland.

Study design. The study material was derived from the Finnish Hospital Discharge Register and two different questionnaire surveys. The incidence of frostbite needing hospital care in Finland (data from the Hospital Discharge Register) was studied from 1986 to 1995. The material comprised 1275 patients, aged 0–89 years, with frostbite as the primary or secondary diagnosis. The first questionnaire survey was directed at 5839 male conscripts aged 17–29 years who had entered into military service in the provinces of Lapland and Oulu. They were asked about prior frostbite experience and possible factors affecting their proneness to frostbite. The second questionnaire survey was targeted all 8th and 9th graders, and students of the 2nd year of high school and of the corresponding year class of vocational colleges in the town of Kemi, Finland (65°N). The survey took place in connection with the School Health Survey conducted by Stakes (The National Research and Development Centre for Welfare and Health). The final participants comprised of 907 adolescents aged 14–18 years.
Results. Frostbites treated in hospitals were more common in men, and their frequency increased with age. The annual, age-adjusted occurrence of frostbite in men over the whole country was 2.6 in 10–19-year-olds, and 4.1 in 20–29-year-olds per 100,000 persons, and in women, the figures were 0.6 and 0.3 per 100,000 persons, respectively. In the entire material, the annual incidence of hospital treated frostbite was 2.5/100,000 persons aged 0–89 years. The results show that a large proportion of frostbites in young men occurred during their military service. Nearly half of the frostbite cases in the 15–29-year age group were treated in military hospitals. This is partly explained by the health care practice of the Finnish Defence Forces: conscripts sustaining a severe frostbite always receive treatment in a hospital. It should also be noted that 6-12 months military service is compulsory for men aged 18–29 years in Finland.

Of the young men performing their military service, 2.3% sustained frostbite during the service period. At entry into the service, 44% reported having experienced frostbite at some time during their lifetime, and 12% reported at least a blister-degree frostbite. In the age group of 14–18 years, 18.3% of boys and 11.3% of girls reported having during their lifetime sustained a frostbite evolving into blister, ulcer or gangrene. During the past year, frostbite likewise occurred more frequently among boys: of the boys 4.1% reported having sustained at least a blister-degree frostbite compared to 2.4% among girls.

Factors increasing the risk of frostbite injury in young men were: cold-provoked white finger syndrome, regular smoking, and use of vibrating machinery. Regarding lifetime risk factors for frostbite, the strongest risk factor among girls was white finger syndrome, and among boys smoking and proneness to cold hands/feet in cold environment. The risk factors for frostbites sustained over the past year were: cold urticaria in girls and boys, and physical activities at least once a day in girls. The result indicating that cold urticaria increases the risk of frostbite injury has not been reported before.

Deep frostbites were almost twice as frequent in the northern, as compared to other thermal regions in Finland, mostly due to the high annual number of cold days in the region. Risk of frostbite increases substantially when temperatures fall below –20 °C. The annual incidence of frostbite leading to hospital care rises in temperatures below –15 °C, being highest in temperatures below –20 °C, particularly in Northern Finland. Hospital treated frostbites are likewise more common in Northern Finland. However, when comparing the annual number of frostbites in relation to the annual number of days with temperatures <0 °C in the country, the occurrence of frostbites is the highest in Helsinki.
Conclusions. Overall, the occurrence of frostbite was fairly high, apart from hospital treated cases. In view of the various complications that are often seen in frostbite injuries, their significance to public health should be emphasized. Young people experiencing more than one severe frostbite may have limitations for performing certain jobs in the future. In addition, the possible sequelae of the injury may lead to restrictions of leisure time activities in cold weather. As it is common knowledge that frostbite injuries can to a large extent be prevented with appropriate protection and behaviour, efforts to increase education in this subject should be underpinned. Including frostbite prevention in the curriculum of health classes in schools would offer a way to educate young people in how to behave right in cold conditions and to avoid unnecessary frostbites. The need for such education is further highlighted by the clear evidence that the skill of dressing appropriately for cold weather in young people has weakened, especially in city environments. If adolescents and young adults learn to recognize the cold climate risks and to protect themselves properly from them, it is possible that the skill can be restored and passed along to future generations, the same way it has happened decades ago.

Keywords: frostbite, epidemiology, temperature, questionnaire

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