

Cold exposure and thermal comfort among patients in prehospital emergency care -innovation research in nursing

Jonas Aléx

Akademisk avhandling

som med vederbörligt tillstånd av Rektor vid Umeå universitet för
avläggande av medicine doktorsexamen framläggs till offentligt försvar i
Aulan, Vårdvetarhuset fredag den 22 maj, kl. 09:00.
Avhandlingen kommer att försvaras på svenska.

Fakultetsopponent: Professor, Inggard Lereim, Institutt for
nevromedisin, Det medisinske fakultet, Norges Teknisk
Naturvitenskapelige Universitet, Trondheim, Norge



Department of Nursing
Umeå University
Umeå 2015

Organization
Umeå University
Department of Nursing

Document type
Doctoral thesis

Date of publication
30 April 2015

Author
Jonas Aléx

Title
Cold exposure and thermal comfort among patients in prehospital emergency care -innovation research in nursing

Abstract

Background Patients' cold exposure is a neglected problem in prehospital emergency care. Cold stress increases pain and anxiety and contributes to fear and an overall sense of dissatisfaction. When left untreated, cold stress disturbs vital body functions until ultimately reaches hypothermia.

Aim The overall aim was to investigate patients' experiences of thermal comfort and reactions to cold exposure in prehospital emergency care and to evaluate the effects of an intervention using active warming from underneath.

Method Study **I**: Persons (n=20) injured in a cold environment in the north of Sweden were interviewed. Active heat was given to 13 of them. Study **II**: In wintertime, 62 patients were observed during prehospital emergency care. The field study was based on observations, questions about thermal discomfort, vital signs, and temperature measurements. Study **III**: Healthy young persons (n=23) participated in two trials each. Data were collected inside and outside a cold chamber. In one trial, the participants were lying on a regular ambulance stretcher and in a second trial on a stretcher supplied with a heated mattress. Outcomes were the Cold Discomfort Scale (CDS), back, finger, and core body temperature, four statements from the State-Trait-Anxiety-Inventory (STAI), vital signs, and short notes about their experiences of the two stretchers. Study **IV**: A quantitative intervention study was conducted in prehospital emergency care in the north of Sweden. The patients (n=30) in the intervention group were transported in an ambulance supplemented with a heated mattress on the stretcher, whereas only a regular stretcher was used in the ambulance for the patients (n=30) in the control group. Outcomes were the CDS, finger, core body, and air temperature, and questions about cold experiences.

Results Study **I**: Patients suffered more because of the cold than from the pain of their injuries. The patients were in a desperate need of heat. Study **II**: Patients are exposed to cold stress due to cold environments. There was a significant decrease from the first measurement in finger temperature of patients who were indoors when the ambulance arrived, compared to the measurement taken in the ambulance. In the patient compartment of the ambulance, 85% of the patients had a finger temperature below the comfort zone and almost half of them experienced the patient compartment in the ambulance to be cold. The regular mattress surface temperature at the ambulance ranged from -22.3 to 8.4 °C. Study **III**: A statistical increase of the participants' back temperature was found between those lying on the heated mattress compared to those lying on the regular mattress. The heated mattress was experienced as warm, comfortable, providing security, and easy to relax on. Study **IV**: Thermal comfort increased for the patients in the intervention group and decreased in the control group. A significant higher proportion of the participants rated the stretcher as cold to lie on in the control group compared to the intervention group.

Conclusion The ambulance milieu is too cold to provide thermal comfort. Heat supply from underneath increased comfort and might prevent cold stress and hypothermia.

Keywords

Thermal comfort, thermal discomfort, cold exposure, cold stress, hypothermia, patients' experiences, active warming, prehospital emergency care, finger temperature, back temperature.

Language
English

ISBN
978-91-7601-234-5

ISSN
0346-6612 1718

Number of pages
50 + 4 papers