Name of research institute or organization:

Institute of Exercise and Health Sciences, University of Basel

Title of project:

Prevalence of acute mountain sickness at 3450m among children, adolescents and adults

Project leader and team:

PD Dr. med. S. Kriemler
Prof. Dr. med. HP Brunner

Project description:

Background

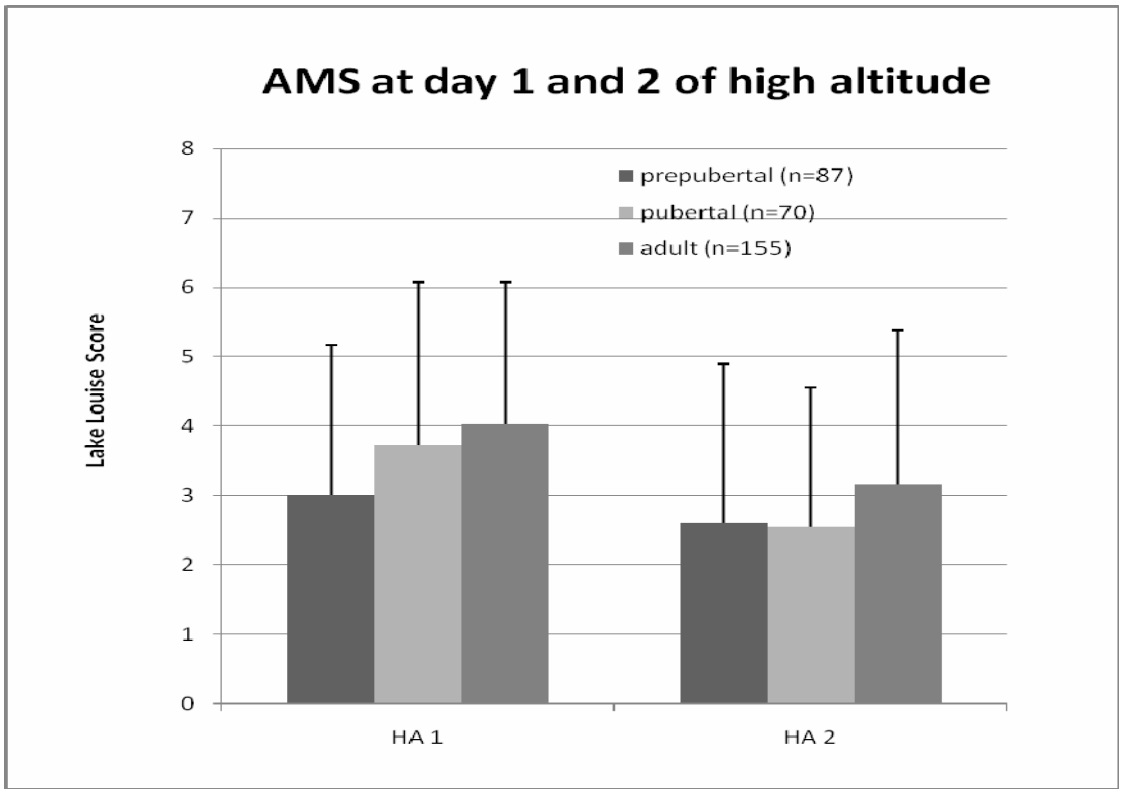
Wordwide, more than 200'000 children travel to high altitude for recreational or professional reasons of the families where acute mountain sickness can affect people of all ages above altitudes of 2500m (Hackett 92). It is a symptom complex comparable to an "alcohol hangover" consisting of symptoms of headache, appetite loss, nausea, vomiting, dizziness, fatigue and sleep disturbance. Its prevalence increases with altitude and speed of ascent ranging from 9% at 2850m, to 34% at 3650m, and 54% at 4550m (Maggiorini 89, Hackett 91) There is only scarce data about AMS in children and adolescents (Bloch 09), which is why we intended to evaluate this question in a large population.

87 prepubertal children, 70 adolescents and at least one biological parent (155 adults) were recruited through announcements in the Swiss Alpine Club journal over the period of four years (2005, 2007, 2009). Because of a too low sample size until 2007, an additional group of families was added in 2009. The participants stayed overnight at the Monchsjoch hut at 3650m after a fast ascent by cablecar to the Jungfraujoch main station at 3450m. A clinical testing and the completion of several questionnaires to measure AMS were performed 8 hours after arrival on day 1 (HA1), and 20 hours after arrival in the morning of day 2 (HA2) after an overnight stay either at the research station or at the Mönchsjoch hut.

Results

There were neither significant differences in the AMS scores nor in prevalence of AMS at either day 1, day 2 or cumulative over the two days between prepubertal children, adolescents or adults. The prevalence was significantly higher on day 1 than day 2. Also the distribution of symptoms was very similar among the groups.

		Lake Louise Score		
	n	**day 1**	**day 2**	**at any time**
prepubertal	87	17 (19.5%)	15 (17.2%)	25 (28.7%)
pubertal	70	24 (34.3%)	13 (18.6%)	27 (38.6%)
adult	155	61 (39.4%)	38 (24.5%)	63 (40.6%)
* day 1=8 hours after arrival, day 2=20 hours after arrival				



This is the first scientific report of this size testing the prevalence and severity of AMS among different age groups in such a large cohort. We are now planning to testing whether there are gender differences in AMS and whether there is a familial predisposition of developing AMS.

Key words:

acute mountain sickness, high altitude, children, adolescents

Scientific publications and public outreach 2009:

Refereed journal articles

Bloch J, Duplain H, Rimoldi SF, Stuber T, Kriemler S, Allemann Y, Sartori C, Scherrer U.Prevalence and time course of acute mountain sickness in older children and adolescents after rapid ascent to 3450 meters. Pediatrics. 2009 Jan;123(1):1-5.

Kriemler S, Jansen C, Linka A, Kessel-Schaefer A, Zehnder M, Schürmann T, Kohler M, Bloch K, Brunner-La Rocca HP. Higher pulmonary artery pressure in children than in adults upon fast ascent to high altitude. Eur Respir J. 2008 Sep;32(3):664-9. Epub 2008 Apr 16.

Kohler M, Kriemler S, Wilhelm EM, Brunner-LaRocca H, Zehnder M, Bloch KE. Children at high altitude have less nocturnal periodic breathing than adults. Eur Respir J. 2008 Jul;32(1):189-97. Epub 2008 Feb 20.

Book sections

Kriemler S. Kinder in der Höhe. In: Brunella A et al (eds). Gebirgsmedizin – ein Wegweiser. Schweiz. Alpenclub Verlag, Bern (in press)

Kriemler S. Frauen in der Höhe. In: Brunella A et al. (eds). Gebirgsmedizin – ein Wegweiser. Schweiz. Alpenclub Verlag, Bern (in press)

Theses

Keller, M., Prevalence and severity of acute mountain sickness at 3450m among children, adolescents and adults. Master thesis, Institute of Exercise and Health Sciences, University of Basel, (ongoing).

Flubacher, M., Gender differences and familial disposition of acute mountain sickness. Master thesis, Institute of Exercise and Health Sciences, University of Basel, (ongoing).

Radio and television

Forschung auf 3650 Meter über Meer. DRS1 Wissen aktuell: 24.9.2009, 14.40-14.45 Uhr, DRS 1.

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