

HIGH ALTITUDE MEDICAL STUDIES IN JAPAN

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With the popularity of mountain climbing ever increasing, there are many mountaineers, hikers, climbers and trekkers who wish to climb to higher altitudes throughout the world. Consequently, the number of victims of acute mountain sickness (AMS) or high altitude pulmonary edema (HAPE) is on the rise even in Japan which has a few mountains over 3000 metres. Accordingly, we have many studies related to mountain medicine.

1 Japanese Medical Research Related to Expeditions (1-19)

The Japanese High Altitude Medical Study began with the Manaslu Expedition by the Japanese Alpine Club in 1953. Since that time 34 separate medical research studies have been conducted, many from the Himalayan regions. The following 8 reports were outstanding in their content and findings. Of them, the Japanese Alpine Club Mt. Everest Expedition 1970 (JMEE'70) and the Kyoto University Medical Research Expedition to Xixabangma 1990 (KUMREX'90) were two studies of distinguished quality.

1) Manaslu (8,125m), Nepal, 1953-56

2) Mt. Everest (8,848m), Nepal, 1970'

JMEE'70 was the first Japanese expedition equipped with a large scale medical research team. Some results of these physiological, hematological and biochemical research works were presented at The 7th International Congress of Biometeorology at Nordwijk, Netherlands in 1971.

3) Pik Kommnizma (7,595m), Pamir, 1976

Dr. Asano observed a very high incidence of high altitude retinal hemorrhage (HARH) among climbers of this expedition. He took retinophotograms of climbers at the base-camp before and after the ascent. He found 15 HARH cases out of 16 (94%) climbers after the ascent.

4) Ganesh Himal V (6,750m), Nepal, 1980

5) Kangchenjunga (8,595m), Nepal, 1984

6) Mt. Everest (8,848m), Nepal-Tibet, 1988

7) Xixabangma (8,012m), Tibet, 1990

KUMREX'90 was the first and largest scale medical research expedition in the history of Japanese mountaineering. Some of their works from various fields, including analysis of erythropoietic drive, echocardiographic assessment, brain glucose metabolism, sleep studies, high altitude retinal hemorrhage. These were presented at the 7th International Hypoxia Symposium, Lake Louise, in 1991, and 8 abstracts of which were printed in *Hypoxia and Mountain Medicine*, J.R. Sutton, G. Coates and C.S. Houston ed. Queen City Print-ers Inc. Burlington, Vt. 1992.

8) Cho Oyu (8,201m), Tibet, 1991

Tokyo Medical College groups constructed the Everest High Altitude Medical Institute and Clinic at Pheriche in Nepal in 1975 and equipped the hyperbaric chamber to treat patients with AMS and HAPE.

2 The Japanese Society of Mountain Medicine (JSMM) and the Japanese Journal of Mountain Medicine (JJMM)

The Japanese Society of Mountain Medicine was founded in June, 1981 by doctors and climbing experts who became interested in both the scientific aspects of and practical applications of Mountain Medicine. The Society has organized the Japanese Symposium of Mountain Medicine with its annual general assembly. In 1997 of this year, the 17th Japanese Symposium was held in Tokyo chaired by Dr. Noriyasu Sekiguchi. The Japanese/English hybrid medical journal "Japanese Journal of Mountain Medicine" is published annually, then the volume number became 17 in 1997. Some 400 members are consisted of medical doctors/researchers, mountain/trekking guides, rescue specialists and mountain climbers interested in this fields. The Society has had firm collaboration with the major mountaineering organizations in Japan such as the Japanese Alpine Club and the Japanese Mountaineering Association, then medical assistant of numerous Himalayan Expeditions from Japan have been supplied by the Society.

3 AMS and HAPE study in Japan (20- 26)

The highest peak in Japan is Mt. Fuji (3,776m). More than 100,000 people ascend this mountain every summer, but the incidence of severe AMS is rare because Mt. Fuji is a single peak and easy to approach. However, in the Japan Alps, some mountaineers stay at altitudes higher than 2,400m for several days, and often suffer from AMS, and HAPE. The first case of Japanese HAPE was reported in 1962. Since then, more than 80 cases have been reported. The altitude of onset of HAPE is between 2,680m and 3,190m. A clinical study has been actively done by The Shinshu University Group. They reported the clinical features of HAPE in Japan, the individual susceptibility to pulmonary pressor response to hypoxia and exercise, CT findings in patients with HAPE, cytokines of bronchoalveolar lavage fluid, and HLA analysis in patients with HAPE. Recently they have cooperated with the Institute of Qinghai High Altitude Medical Science and conducted the high altitude adaption study of Tibetan in Qinghai province. Furthermore, Ueda and others of the Shinshu University group organized the Matsumoto International Symposium on High-altitude Medical Science in 1987 and 1991, both with great response.

4 Exercise Physiology and Sports medicine at high altitude (27)

Physiological studies by using decompression chamber simulated altitudes are also carried out in Tsukuba University and Shinshu University. Some successful trials for climbers to get acclimatization or increasing performance abilities by using a hypobaric chamber have been reported from Tsukuba University.

5 The Mountain Rescue System in Japan

The Mountain Rescue System in Japan is staffed by regional police offices in 47 prefectures in conjunction with non-governmental volunteer groups. Three separate prefectural police offices are responsible for all mountain rescue activities in the

Japan Alps. Of them, Nagano Prefectural Rescue Squad consists of 25 police staff and 1000 volunteers. They have the use of two Nagano Police helicopters and one helicopter by a private company in case of emergencies. Temporary rescue stations are open during summer season at four camp sites in the area. The Rescue Squad conducts regular patrols to help guide hikers and to prevent accidents. One week rescue training programs are scheduled to help improve mountain rescue techniques. Temporary clinic for climbers and trekkers are open in summer season in the 15 summit of mountains by many medical college and University.

6 Mountain Accidents in Japan

Data received from the Japanese Police Department reveals that there were a total of 896 cases of mountain rescue in 1996. The number of death cases with accidents is 183 and those of missing persons is 14.

The specific details are broken down below:

Accidents while climbing	121
Accidents while trekking	8
Accidents due to eating wild foods and mushrooms	47
Accidents due to fishing in fast moving streams	7
Accidents by other means	14

Cause of death is broken down as follows:

Falls and Slips	124
Avalanches	6
Hit by lightning	1
Missing a way and wandering	6
Various diseases	30
Other accidents	30

Age Distribution of Accident Cases

40 Years old or younger	40
41 to 60 years old	80
61 years or older	77

7 The distinguished doctors and climbers

1) M. Horii , Cardiologist, Kedarnath Dome (1980), verest (1988), Cho Oyu (1991) She reported women climbers cardiovascular function, menstrual change, and the relation VO₂max and performance ability at high altitude.

2) S. Masuyama , Pneumologist Kangchenjunga (1984), Kunlun Peak 7167m (1986), Everest (1988) He reported ventilatory response to hypoxia at high altitude.

3) K. Matsubayashi, Neurologist He is the first ascenter of Gang Ben Cheng (7281m, 1982), and Naimonanyi (7695m, 1984), Masakong (7200m, 1985) and summit of

Xixabangma (8012m, 1990) He investigated cerebral blood flow, EEG, HACE, HARH.

4) A. Saito, Surgeon, and The president of Japanese Alpine Club. The first ascender of Salto Kangri (7742m, 1962) and summiter of Xixabangma and also the chief leader of Yalung Kang (1973), Everest 1980, 1988), Naimonanyi (1984), and Namcha Barwa 1992)

8 Information about Japanese mountain medicine Societies

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