

# Medical Care Experiences of the 30<sup>th</sup> Chinese Antarctic Research Expedition: A Retrospective Study

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China has begun Antarctic scientific research expeditions since 1984. The 30<sup>th</sup> Chinese Antarctic expedition summer team boarded the Xuelong vessel at Shanghai, China on November 7, 2013. This expedition team spent more than three months in Antarctica until the offloading of supplies and scientific activities were completed. Effective medical care plays an important role in ensuring scientific research expedition teams to complete their missions.<sup>[1]</sup> However, medical care of Antarctic expeditions is complex because the characteristics of medical conditions in Antarctic expeditions are largely unknown.<sup>[2]</sup> The present study describes the characteristics of medical conditions encountered in the 30<sup>th</sup> Chinese Antarctic summer scientific research expedition. Given this study results, a better and more effective medical care may be provided in future Antarctic scientific research expeditions.

The 30<sup>th</sup> CHINARE summer team included 162 men and seven women between 21 and 59 years old, with a mean age of  $35.2 \pm 10.0$  years. There were five team members with underlying diseases; the others were healthy. Table 1 shows all the underlying diseases, treatments, and results in this expedition.

The team doctor provided medical care for all team members during the period of the expedition. The total number of medical room visits was 195. The most common reason for medical visits was injuries (31.3%). Skin problems (22.6%) were the second most common medical condition. Psychiatric disturbances accounted for 20% visits. Digestive system diseases and ophthalmic diseases constituted 15.4% and 5.6% visits, respectively. Respiratory system diseases accounted for 5.1% visits. Table 2 shows all medical visits in the expedition.

Traumatic injuries occurred in 61 (31.3%) team members in the expedition. These injuries were mild and treated by debridement and oral antibiotics. These team members recovered uneventful. One team member suffered from superficial second-degree burn (1% of the body surface area) by spraying machine oil in the expedition. The burn wound was healed by wound dressing and local usage of ointment for burns. There were no cold injury and ultraviolet ray exposure injury in this expedition.

Skin problems were the second common conditions and occurred in 44 (22.6%) team members in the expedition including fungal infections (14.9%) and seborrheic dermatitis (7.7%). All team members' symptoms were completely relieved by antifungal ointment or symptomatic treatment.

Psychiatric disturbances occurred in 39 (20.0%) team members in the expedition. Sleeping difficulty was the most commonly symptom (38/39), followed by depression (1/39). The team members with psychiatric disturbances did not need medication. They were counseled to form a balanced lifestyle including regular physical exercise and a schedule of work and recreation.

There were 24 (12.3%) team members who diagnosed with functional gastrointestinal disorders. The symptoms included abdominal distension (16/24) and constipation (8/24). Six (3.1%) team members with acute hemorrhoid attack were treated with musky suppository. The clinical severity of bleeding, anal discomfort, pain, and anal discharge diminished after treatment.

There were 11 (5.6%) team members who diagnosed with conjunctivitis. Compound chondroitin sulfate eye drops were very effective in treating this condition.

Epistaxis occurred in nine (4.6%) team members in the expedition. The team doctor added some humidity with

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**Table 1: Underlying diseases in team members of 30<sup>th</sup> CHINARE**

Underlying diseases	Treatment	Results
Primary hypertension	Nifedipine	Stable condition
Primary hypertension	Captopril	Stable condition
Primary hypertension	Captopril	Stable condition
Diabetes mellitus	Diet restriction plus insulin	Stable condition
Gout	Diet restriction	Stable condition

**Table 2: Medical visits in the 30<sup>th</sup> CHINARE (n (%))**

Medical visits	Values
Injuries	61 (31.3)
Traumatic injury	58 (29.7)
Burn injury	3 (1.5)
Skin problems	44 (22.6)
Fungal infections	29 (14.9)
Seborrheic dermatitis	15 (7.7)
Psychiatric disturbances	39 (20.0)
Sleeping difficulty	38 (19.5)
Depression	1 (0.5)
Digestive system diseases	30 (15.4)
Functional gastrointestinal disorders	24 (12.3)
Hemorrhoid	6 (3.1)
Ophthalmic diseases	11 (5.6)
Conjunctivitis	11 (5.6)
Respiratory system diseases	10 (5.1)
Epistaxis	9 (4.6)
Upper respiratory infection	1 (0.5)

a humidifier in the room and solved this problem easily. Only one (0.5%) case with upper respiratory infection was diagnosed in the expedition. Banlangen granules were administered with good response.

This study demonstrated the characteristics of medical conditions in the 30<sup>th</sup> Chinese Antarctic scientific research expedition. Traumatic injuries were the most common emergencies, although there were no fractures in 30<sup>th</sup> CHINARE. Historical data compiled from multiple nations' Antarctic expeditions demonstrated that injuries comprised 16%–40% of the clinical visits and had been observed to occur most commonly during offloading and antagonistic sports like basketball.<sup>[3]</sup> Due to above reasons, antagonistic sports were not encouraged in the 30<sup>th</sup> CHINARE. Furthermore, health educations of injury and illness prevention were conducted before logistic or scientific tasks.

Cold and ultraviolet ray injuries in modern Antarctic expeditions are almost entirely preventable.<sup>[4]</sup> In the 30<sup>th</sup> CHINARE, no case of such injuries occurred, although team members working outdoors regularly. This was because all team members wore full polar gear, including snow goggles, gloves, protective mask, and usage of sunblock lotion (SPF 50).

Although psychiatric disturbances occurred in 39 team members in the expedition, none of severe psychiatric

disturbance was found in our study. There were lots of good recreation facilities on Xuelong vessel. These facilities included books and video library, gymnasium, and regular small party. Our results suggested that the social environment in Antarctic expedition was more important than the physical environment which was consistent with the previous study.<sup>[5]</sup>

There was a relatively high incidence of functional gastrointestinal disorders in the 30<sup>th</sup> CHINARE. Abdominal distension and constipation were noticed mainly in January (the polar day and the stressful period in Antarctica). The incidence of this condition was significantly higher in the ocean expedition team than in other teams. This may be related with sleep disturbance, the strength of stress, and long-time of working outdoors.<sup>[6,7]</sup>

Our data suggested that upper respiratory tract infections were not common in Antarctica. The probable reason for this phenomenon may be that the Antarctica is a relatively sterile continent. This result was in agreement with the previous study.<sup>[4]</sup>

Preventive care was the most cost-effective strategy of medical care because of extremely limited medical resources in Antarctica. For example, blood pressure is known to increase in Antarctic expedition team members,<sup>[8]</sup> and an increased incidence of cardiovascular attack has been noticed in temperate regions.<sup>[9]</sup> Thus, preventive cares like close monitoring of blood pressure were important to avoid acute cardiovascular attack. There was no associated acute attack in this expedition because of the careful preventive cares. Routine physical examinations were performed every month which included personal interviews, weight, blood pressure, pulse, and respiratory rate. By the end of 30<sup>th</sup> CHINARE, none of the team members suffered from any severe injury, disorder, and associated complications directly attributable to their stay in Antarctica.

Our results also suggested that team doctors must receive extensive medical training before expedition because of the characteristics of the disease spectrum and limited medical resources. The training program should include general medicine, surgery, emergency medicine, nursing, and medical psychology.

In conclusion, traumatic injury remains the most common medical condition during the Chinese Antarctic expedition. Preventive care is the most cost-effective strategy of medical care. The team doctors should be well-trained to manage injuries and diseases with limited medical resources.

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