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Morbidity Pattern in the 27th Indian Antarctic Expedition

Abhijeet Bhatia
National Centre for Antarctic and Ocean Research, Goa

ABSTRACT

An analysis of the health disorders faced by the 27th expedition members is discussed. There were no major illnesses. Injuries were the most common mishaps.

Keywords: Antarctica, Expedition, Health Disorders.

1.0 INTRODUCTION

India has had a regular ongoing Antarctic scientific research program since 1981, when the first Indian Antarctic Expedition[1]. The health of the team members is strongly influenced by the unique physical and environmental conditions prevalent in Antarctica and on the journey to Antarctica and the psychological effects thereof.

The members of the 27th expedition were selected after an interview process followed by medical examination consisting of mental and physical health evaluation. The physical health appraisal included a thorough examination by a general physician, surgeon, and ophthalmologist (and gynaecologist in case of women) appointed by a medical board in consultation with the National Centre for Antarctic and Ocean Research (NCAOR). All team members underwent a complete blood count, liver and kidney function tests, blood glucose, serum cholesterol and triglycerides, and urinary examination by routine microscopy. They were also subjected to electrocardiography (with a treadmill test, if indicated) and chest roentgenogram. The team selection was followed by an orientation, acclimatization, and training program at a high altitude camp organized at Auli (3000 m above sea level) in the Indian state of Uttarakhand for a duration of 15 days, well before the launch of expedition.

Healthcare was provided by two medical officers, Dr. Caspar Johnson and Dr. Abhijeet Bhatia. Dr. Johnson was inducted by air in November

2007 and Dr. Bhatia by the expedition vessel, MV Emerald Sea, in January 2008.

The ship sailed from Vasco-da-Gama harbour on 6th Dec 2007 and reached India Bay, East Antarctica on 3rd Jan 2008, via Cape Town, South Africa. The medical facilities on board the expedition vessel consisted of essentially first aid. The ship's medical supplies were available to the team in case of requirement. These consisted of essential surgical and diagnostic facilities.

All the basic medical facilities were available at Maitri station. These consisted of a consultation and treatment room, operation theatre with general surgical instruments, an anesthesia machine, electrocardiography recorder, cardiac defibrillator, and basic radiological, hematological, and biochemical investigation facilities. Emergency evacuation was not possible from March to November, after flights to Antarctica ceased owing to adverse climatic conditions, darkness, and unserviceable runway conditions. An online specialist telemedicine option was not available until 2009, because of limited internet accessibility, although specialist opinion could be sought by e-mail and telephone.

The diet of the expedition team members consists of normal Indian meals. The supplies were brought to the station by winter convoys from the Indian coastal camp. Water is supplied from Priyadarshani Lake, which is a landlocked, glacier-fed freshwater lake, about 100 m from the station. Recreational activities at Maitri included facilities for indoor and outdoor games, gymnasium, Indian and western musical instruments, a well-stocked library for books, and an audio and video library. Maitri also housed a multi-religion place of worship.

2.0 METHODS

The analysis includes all members and medical room consultations. The duration of study corresponded to the entire duration of the expedition, i.e. January 2008 to January 2009. Medical consultation records were retrospectively reviewed. Some team members had pre-existing illnesses, which were detected during the pre-induction medical examination conducted in India. These individuals were already receiving treatment. The pre-existing illnesses have also been considered in the analysis.

The expedition doctors carried out health examination of all team members every 2 months. This included a personal interview, weight

(and basal metabolic rate), blood pressure, pulse, respiratory rate, and general physical examination, including dental hygiene. The author also carried out data collection for a research project being conducted by AIIMS, New Delhi titled *"Assessment of psychological health and morbidity, adaptation and cognitive functioning during Antarctic expedition"*.

On transfer to Maitri, the medical officers were briefed about the medical facilities at the station by Dr. Uday Uthappa and Dr. Ganesh Chaudhary, Medical Officers of the 26th expedition. A stock of the various consumable and non-consumable items was carried out at this stage. At the beginning of the wintering-over period, the medical supplies were organised. Non repairable equipment was identified and placed for back-loading. Expired medicines were discarded. Surgical equipment was sterilized and kept ready for immediate use.

3.0 OBSERVATIONS

A total of 325 medical consultations were recorded during the entire expedition. The expedition vessel carried 35 members on board (all male; 9 for winter and 26 for summer). No significant health disorders were encountered aboard the expedition vessel. There were 18 consultations on board, all of them for sea-sickness.

The winter team consisted of 26 expedition team members, all were men, between 27 and 59 years old, with a mean age of 43 years. Nine team members had pre-existing disorders. These were two cases each of diabetes mellitus and hypertension, and one case each of gingival hyperplasia, piles, low backache, poor orodental hygiene and impacted ear wax. There were a total of 93 incidents of illnesses (excluding follow-ups) documented during the winter period, these are given in Table 1.

4.0 DISCUSSION

The pre-existing illnesses reported during the expedition may lead to significant discomfort and morbidity in a remote environment like Antarctica. Thus, a close watch for progression of disease is necessary. Comprehensive pre-induction medical check-ups are mandatory in Antarctic expeditions[2]. Blood pressure is known to increase in Antarctic expeditioners[3].

Traumatic injuries were the most common presentations (n = 25), although there were no fractures. Previous studies have also observed that traumatic injuries were the most common causes of morbidity in

Table 1—Health disorders during the 27th Antarctic Expedition

Disorder	Number of incidents
Dyspepsia	6
Muscular cramps	4
General malaise	4
Fungal infections	4
Constipation	4
Seborrheic dermatitis	3
Urinary tract infection	2
Postural hypotension	1
Upper respiratory infection	1
Headache	1
Rash	1
Hypertension	1
Abrasions and bruises	12
Soft tissue infections	3
Corn	2
Acute appendicitis	2
Chilblain	1
Embedded foreign body	1
Broken toenail	1
Piles	1
Superficial burn	1
Musculoskeletal pain	13
Low backache	2
Oral ulcers	8
Chronic otitis media	1
Dryness of eye	4
Stye	3
Subconjunctival hemorrhage	1
Dental caries	2
Lethargy	1
Loss of appetite	2

Antarctica[4,5]. These have been observed to occur most commonly during recreational outdoor activities[6]. As a preventive measure, such activities are not encouraged at Maitri. During supply convoys to the coastal camp, the convoy team worked for long hours in inhospitable terrain and climate. These activities were a potential source of injury, although no serious injuries were reported during the 27th expedition. One medical officer accompanied all convoys to provide medical support. First aid and resuscitation equipment was available during the convoy.

Gastrointestinal conditions like dyspepsia and constipation were the second most common disorder. These might be attributable to faulty eating and exercise habits and a sedentary lifestyle. Oral ulcers were seen predominantly in the early part of the wintering period. These were all mild in nature.

Three cases of Tinea pedis and one of Tinea capitis were detected during routine health checkups. These were in all probability of a longstanding duration and preceded the expedition.

Cold injuries in Antarctic expeditions are almost entirely preventable. No cold injuries were reported during the 27th expedition owing to good quality clothing, adequate heating arrangements and discouragement of extreme activities. However, accidental frostbite is still known to occur[7].

No case of injury due to UV ray exposure was reported. This is because all the team members wore full polar gear, including snow goggles, owing to the extreme cold, whenever venturing outdoors even for short periods, along with sunblock lotion with UV ray protection.

Psychiatric disturbances are a major morbidity in Antarctica, some of these were recorded in the current study. Most of such disorders do not need medical intervention. For the psychological well-being of the team members, various recreational facilities were available.

During the expedition, one team member had two episodes of clinically suspected acute appendicitis. On both occasions, the disorder was managed medically, with full preparation for immediate surgery at both, Maitri and Novolazarevskaya stations. One team member developed lumbar disc prolapse. He was managed with bed rest.

It was during periodic health checkups that one new case of hypertension and all cases of T pedis were detected. Although most of the

ailments encountered in Antarctica are minor and most expeditioners do not face life-threatening situations, the station doctors should keep the available infrastructure in readiness for any such eventuality. Periodic health checkups are no less important than pre-induction health screening. A general physical examination is usually sufficient.

Health care was also provided to the ship and helicopter crew, members of Russian Antarctic Expedition at Novolazarevkaya and other foreigners visiting the region as and when required.

The data collected from the research project *"Assessment of psychological health and morbidity, adaptation and cognitive functioning during Antarctic expedition"* has been handed over to Dept of Psychiatry, AIIMS, New Delhi for further processing.

5.0 CONCLUSION

Injuries continue to be the most common morbidity among Antarctic expeditioners. Nutritional deficiencies and cold-related injuries are relatively less common. The team doctors should be sensitized and well trained to manage expected and unexpected morbidities within the limited resources on remote sites.

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