

Awareness about the Role Of Physiotherapy in Mountaineering Among Indian Mountaineers

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ABSTRACT

Introduction: Mountaineering refers to the sport of climbing mountains. The skill set and level of fitness required for mountaineering is very different from those required for other activities. It is a sport which involves considerable risk of injuries not only because of the technical demands but also because of the challenges posed by high altitude. Mountaineers are aware about the importance of physical fitness required in mountaineering, they may not be fully aware about the minute aspects such as the intensity and level of training from their base fitness levels. Physiotherapy helps narrow this gap and provides subjective levels of training required for a mountaineer and their fitness

Objective: To assess the Awareness about the role of physiotherapy in mountaineering among Indian mountaineers.

Methods: 68 Mountaineers between 16-49 years of age who have completed at least one trek above 12,000 ft participated in the study. A validated online questionnaire was circulated among the participants after taking their consent. The data collected was subjected to descriptive analysis.

Results: The study revealed that most of the mountaineers have considerable knowledge about the role of physiotherapy in treatment of musculoskeletal injuries. However, there is lack of awareness about the role of physiotherapy in the aspects of cardiopulmonary function, injury prevention and prevention of AMS.

Conclusions: This study shows that mountaineers need to be educated about the role of physiotherapy in all aspects of mountaineering and how it can help them perform better.

KEYWORDS: Trekking, Rock Climbing, Ice Climbing, High Altitude, Climbing Sports.

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INTRODUCTION

Mountaineering refers to the art/sport of climbing mountains. Climbing a mountain may involve rock climbing and ice climbing along with walking uphill at high altitudes. The skill set and level of fitness required for mountaineering is very different from those required for other activities.

Himalayan range in India is one of the most majestic mountain ranges in the world. It is

home to hundreds of peaks including the highest peak of India i.e., Kanchenjunga, 8586. The presence of such a majestic range in India inspires people from all over the country and of all the ages to pursue Mountaineering be it as a profession or hobby.

Mountaineering is a sport which involves considerable risk, taking into account the terrain, altitude and the unpredictable weather conditions. Proper conditioning and

training are required for one to be able to scale a peak, without which one invites a variety of health problems once he/she reaches high altitude.

As the altitude increases, temperature and the oxygen concentration in the atmosphere decrease. Both these factors make climbers susceptible to High Altitude Illnesses. These illnesses range from the milder Acute Mountain Sickness to potentially fatal problems High Altitude Cerebral Oedema.

Cold injuries like chilblains, frostbite, trench foot etc. are not uncommon [1]. All these complications can be prevented by training the individuals prior to subjecting them to high altitudes. However, the role of physiotherapy in this sport is less explored in India as compared to the other sport activity.

For the climbers to successfully be able to climb a mountain, they should be physically fit. Cardiorespiratory endurance, muscle strength and endurance along with good balance are important. A lack in any of these can create a lot of problems for the climbers. These may include ligament injuries, fall due to loss of balance, difficulty in acclimatizing to the environment, difficulty in climbing the mountain, aches and pains and Acute Mountain Sickness (AMS). Acute Mountain Sickness is caused by reduced air pressure and lower oxygen levels at high altitudes. Symptoms tend to occur within hours after arrival at high altitude and include headache, nausea, shortness of breath and fatigue [2]. High Altitude Cerebral Oedema (HACO) is a severe and potentially fatal manifestation of high-altitude illness and is often characterized by ataxia, fatigue, and altered mental status. High Altitude Pulmonary Oedema (HAPO) is a non-cardiogenic pulmonary oedema which is a complication of AMS. Early symptoms of HAPO include a non-productive cough, dyspnoea on exertion and reduced exercise performance. Later, dyspnoea occurs at rest. The consequences of any of the above-mentioned injuries can be fatal in the mountains especially at 10,000ft and above. Hence, it is imperative that the climbers be prepared and conditioned for the adverse conditions they might face.

Physiotherapy before an expedition i.e. Prehab, plays a role in improving lung capacity and cardiorespiratory endurance by means of breathing exercises and a well-structured cardio program. Advances in technology like hypoxia mask and hypoxic training make these improvements even more objective and give us specific values for the improvements needed and the ones taking place. Physiotherapy also helps in Balance training, muscle strength and endurance and improving tolerance to cold. Physiotherapists play an important role in the rehab of mountaineers after an injury or illness. In case of musculoskeletal injuries, reduction of pain, improving the mobility of the joint, maintaining and then improving the muscle strength followed by functional training all form a part of the rehabilitation process which is led by the Physiotherapist [3]. In patients with severe mountain illnesses like HAPO, Physiotherapy interventions of breathing exercises, inspiratory muscle training etc help improve the respiratory function in these patients. Following this with complete rehabilitation and functional training will make it easier for the mountaineer to get back to the sport and prevent recurrence of injuries.

Mountaineering has become extremely popular in India in recent years. Mountaineers have grown in number along with this rise in popularity. As a result, the application and significance of physiotherapy in climbing have expanded. There are numerous exercises and interventions that physiotherapists can use to improve the mountaineers' performance and prevent injuries. Hence it is important that physiotherapists be involved in the prehab and rehab of mountaineers. This study aims to evaluate the awareness about physiotherapy among Indian mountaineers in various domains.

METHODS

A questionnaire was prepared and validated by the faculty experts. After obtaining the permission from IRB and Nehru Institute of Mountaineering, the participants chosen by means of convenient sampling were explained about the study. Participant consent was taken and an online questionnaire (Google Form)

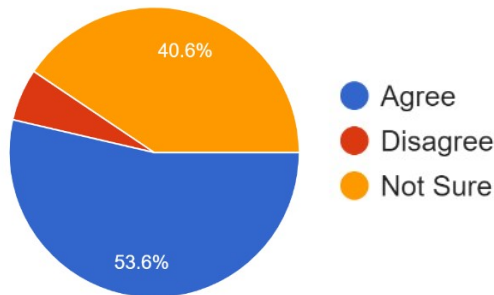
was circulated among the participants. Responses were noted and subjected to descriptive analysis to arrive at a conclusion. The study included 68 participants who have completed at least one trek above 12,000 ft. Participants who have taken formal education in physiotherapy were excluded from the study.

RESULTS

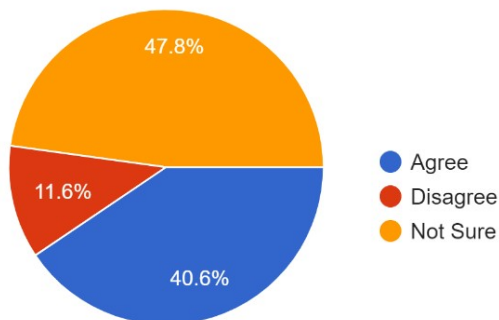
Every statement started with the phrase “do you think” bases on which the participants answered according to their knowledge and awareness.

PREHAB

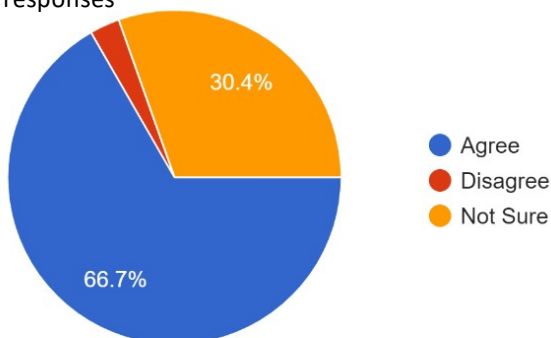
Physiotherapy before an expedition helps improve cardiorespiratory endurance
69 responses



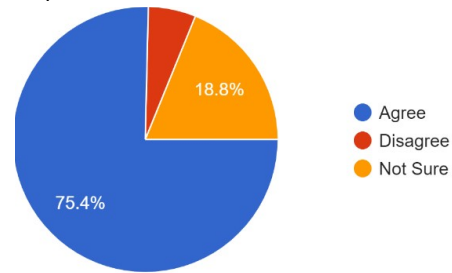
Physiotherapy plays role in improving lung capacity before an expedition
69 responses



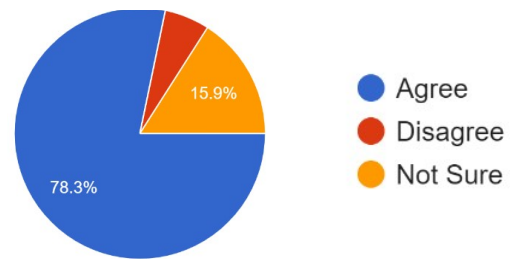
Physiotherapy before an expedition helps prevent loss of balance and falls.
69 responses



Physiotherapy before an expedition helps prevent ligment injuries and fractures.
69 responses



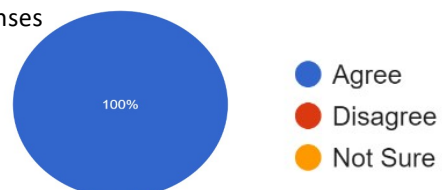
Physiotherapy before an expedition helps improve muscle strength and endurance.
69 responses



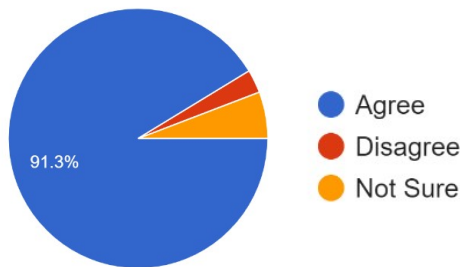
41.2% participants were not sure if physiotherapy helps in improving cardiorespiratory endurance before an expedition while 52.9% of them agreed to it. Almost 60% of the participants were unsure or disagreed that physiotherapy intervention before an expedition can help improve lung capacity. Relatively better awareness was seen in prevention of balance and falls where 66.2% participants were aware that physiotherapy can help prevent loss of balance and falls whereas 30.9% were not sure about the same. More than 50% of the participants were either unsure or disagreed that physiotherapy helps in rehabilitation after a head injury. When it came to the role of physiotherapy in prevention of recurrence of injuries 67.6% participants agreed to its usefulness whereas 11.8 % of them disagreed to it and 20.6% of the participants were not sure. All the participants agreed that physiotherapy is helpful in rehabilitation after an injury to the ligaments and muscles.

REHAB

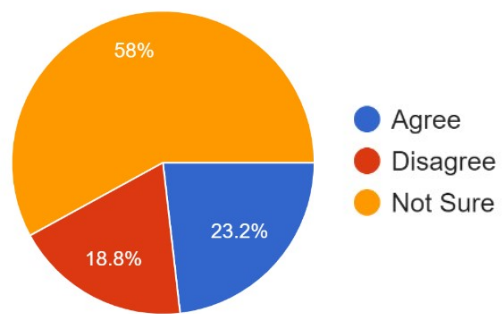
Physiotherapy plays role in rehabilitation of mountaineers after an injury to the ligaments & muscles
69 responses



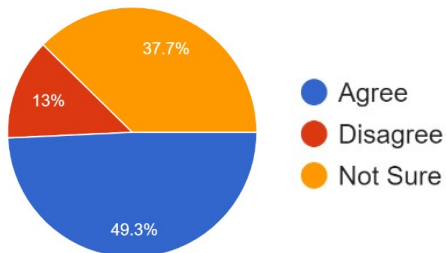
Physiotherapy plays role in rehabilitation of mountaineers after fracture
69 responses



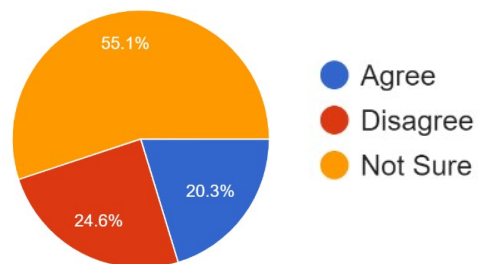
Physiotherapy help in the prevent on of complications resulting from HACO & HAPO.
69 responses



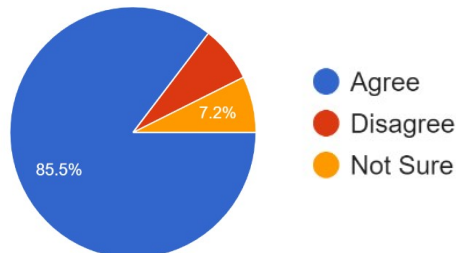
Physiotherapy plays role in rehabilitation of mountaineers after a head injury.
69 responses



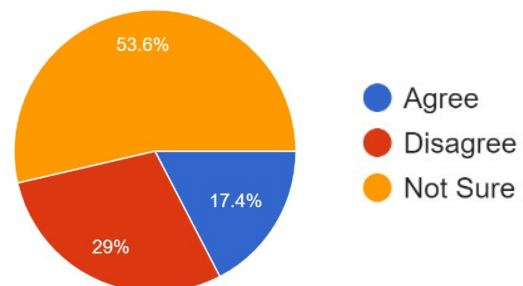
Physiotherapy can help prevent symptoms and complications of AMS Like HACO & HAPO.
69 responses



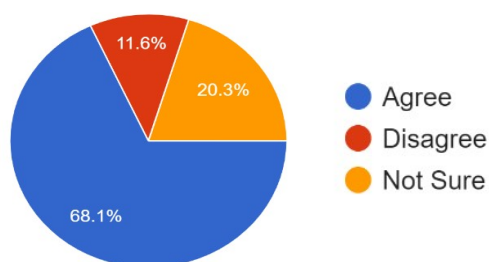
Physiotherapy helps reduce the amount of time it takes to return to mountaineering after an injury
69 responses



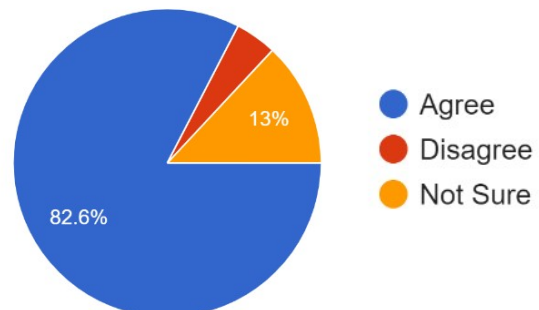
Physiotherapy helps in improving the tolerance to cold before an expedition.
69 responses



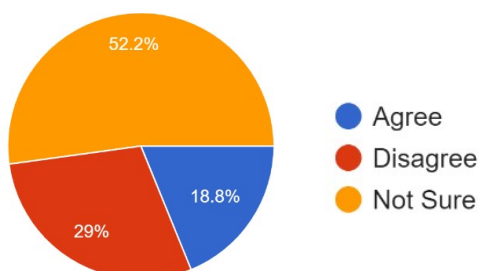
Physiotherapy plays a role in prevrnting recurrence of injuries
69 responses



Physiotherapy plays role in improving the overall performance of a mountaineer.
69 responses



Physiotherapy can help in the tratment of HACO & HAPO.
69 responses



DISCUSSION

Mountaineering is gaining a tremendous increase in popularity among the Indians. India is home to 5 mountaineering institutes located in the Great Himalayan Range and are

regarded as some of the best mountaineering institutes in the world. This is a first of its kind study undertaken to assess the awareness about the role of physiotherapy in mountaineering among Indian mountaineers. It was conducted among the 68 participants both male and female between 16-49 years of age. Mountaineering is a physically demanding sport in terms of both muscular strength & endurance and cardiorespiratory endurance. The climber is exposed to a wide spectrum of musculoskeletal injuries when on an expedition which could have occurred because of rock climbing, ice climbing, loss of balance while walking on an uneven surface etc. [1]

The study showed that the participants were well aware about the role of physiotherapy in musculoskeletal injuries and their rehabilitation. Musculoskeletal physiotherapy is one of the largest branches of physiotherapy and commonly sought for in case of injuries like fractures, ligament sprains, muscle strains etc which could be one of the reasons for better awareness in the participants.

Relatively less awareness was demonstrated by the participants in the fields of cardiorespiratory physiotherapy and prehabilitation. Prehabilitation stands for Preventive Rehabilitation. It is not a performance enhancement program, but rather a system of evaluating and educating athletes, to reduce the risk of injury. It includes both static and dynamic assessment of flexibility, strength, and biomechanics, in addition to education in the principles of basic training and injury prevention [4].

There is evidence within the literature that it may be possible to reduce the incidence of the most common injuries by the systematic targeting of vulnerable areas of the body [5].

A study conducted by Rudi Meir and colleagues outlined a prehabilitation model developed as part of the strength and conditioning program in an English professional rugby union club [6].

A similar evaluation can be done in mountaineers based on the demands of the sport and depending on the mountaineer's evaluation, an individualized program can be developed

to strengthen the vulnerable areas and avoid injuries while on an expedition.

According to researchers, while physiotherapy does not play a role in the immediate treatment of HAPO, it plays a vital role in the improvement of lung capacity and cardiorespiratory fitness after an episode of high-altitude pulmonary oedema [7][8]. Lack of awareness of cardiorespiratory physiotherapy in general could be one of the contributing factors in the lack of awareness about the role of physiotherapy in cardiorespiratory conditions.

A large number of mountaineers in India are from the outskirts -mountainous regions of the country. The availability of physiotherapy in these regions compared to that in cities differs largely. A study was conducted to compare the awareness of physiotherapy among health professionals and non-health professionals in Dharwad District (a rural town), Karnataka, India which also compared the awareness of physiotherapy among urban and rural non health professionals[9]. It concluded that awareness of physiotherapy was better among urban non health professionals as compared to rural non health professionals.

There also exists a huge gap in the number of physiotherapists working in the field of conventional sports than the number of physiotherapists working in the field of mountaineering. A physiotherapist from Cardiff University was the performance director for Project Everest Cynllun an Everest Expedition in 2016[10]. She developed a programme for the climber which focused on three phases: a strength phase, a conversion phase [converting strength into muscular endurance and power] and a cardiovascular phase. This programme helped the climber climb faster and with relatively little effort. The climber also experienced faster recovery on level surface making him ready for the vertical ascends. A similar involvement of physiotherapists in the expeditions undertaken by Indian Mountaineers would not only help in training the mountaineers but also help in reducing the chances of injuries, reducing the morbidity and mortality of the mountaineers and thereby the success of an expedition.

Mountaineering is a sport which imposes very high physical demands on the body and is therefore associated with a wide spectrum of injuries. Apart from the musculoskeletal injuries, the altitude also poses a risk for Acute Mountain Sickness and its complications which can be fatal.

Limitations of the study: small sample size, questionnaire was not translated into regional languages

CONCLUSION

The study revealed that the maximum number of mountaineers have considerable knowledge about the role of physiotherapy in treatment of musculoskeletal injuries. However, there is lack of awareness about the role of physiotherapy in the following aspects:

- i. Improving cardiopulmonary function,
- ii. Prevention of injuries
- iii. Prevention and treatment of AMS, HAPO & HACO

This study shows that mountaineers need to be educated about the role of physiotherapy in all aspects of mountaineering and how it can help them perform better. The study also indicates that there is an increased need for physiotherapists in the field of mountaineering not only for rehabilitation but also in the preparation phase before expeditions to ensure the best performance of the mountaineers and more importantly to avoid injuries.

ABBREVIATIONS

AMS – Acute Mountain Sickness
HAPO – High Altitude Pulmonary Oedema
HACO – High Altitude Cerebral oedema
IRB – Institutional Review Board

Conflicts of interest: None

Author Contributions

Dhvani Nirmal - Conception and design, acquisition of data, analysis and interpretation of data, drafting the manuscript, approval of final manuscript

Siddhi Ghodge - analysis and interpretation of data, critical revision of manuscript, approval of final manuscript

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Disclosures: None

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