

# The Effect Of Cool Mist Humidifiers On Nasal Complaints At High Altitude

E Dursun, B Battal

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## Abstract

**Purpose:** The aim of this study was to investigate the effect of cool mist humidifiers on nasal complaints at high altitude. **Materials and Methods:** Study was performed at altitude of 2200 m. A total of 32 patients were included in this prospective study and divided into two groups. In group 1 (n:16) patients with nasal complaints were recommended to use the cool mist humidifiers all night in their sleeping room. In group 2 (n:16) patients were designed as a control group and no treatment was given. After one month the efficiency of humidifier in relieving the nasal obstruction were examined and compared with control group. **Results:** The improvement rate of nasal complaints in group 1 was 68.8 % (n:11). Improvement in the control group was 18.8 % (n:3). Recovery rate in group 1 was higher than that in group 2 ( $p<.05$ ). No side effects were reported. **Conclusions:** Cool mist humidifiers provided only symptomatic improvement. This trial suggests that humidifiers is effective in reducing altitude-related nasal symptoms for long period.

## INTRODUCTION

Nasal complaints affects many visitors to high altitude. Complaints occurs when sea-level residents ascend to high altitude. Nasal complaints include nasal obstruction, nasal bleeding, headache etc. It has been attributed to low atmospheric pressure, hypoxia, dry and cold weather which characterizes the high altitude environment. Patients with nasal complaints often have a reduced quality of life, not only due to the symptoms, but also because of nasal disorders can reduced sleep quality and decrease productivity at work (1).

Environmental humidity relieves the clinical symptoms of respiratory tract diseases. Various types of home humidifiers are available on the market (2). Time, energy and money spent on humidification mechanisms may be better spent on proven therapies such as steroid sprays and topical decongestants.

Although many patients had nasal complaints due to high altitude condition, relatively little research has been performed. This study was designed to compare the efficiency of cool-mist humidifier (CMH) in relieving the nasal symptoms at high altitude.

## MATERIALS AND METHODS

Study was performed at altitude of 2200 m. A total of 32

patients were included in this prospective study and divided into two groups. In group 1 (n:16) patients with nasal complaints were recommended to use CMH all night in their sleeping room. In group 2 (n:16) patients were designed as a control group. Subjects were recommended to clean and disinfect water reservoir of humidifier to avoid possible risks.

All participants were low-altitude residents (lower than 1000 m). They were living at high altitude less then 1 year. Major symptom was nasal obstruction; minor symptoms were crusting, nasal stuffiness, and headache. They had no history of allergy or other rhinologic diseases and none were taking any medication. Patients with endoscopic or radiologic evidence of acute sinusitis, septal deviations or polyps were excluded from the study.

After one month the efficiency of humidifier in relieving the nasal obstruction were examined and compared with control group. On return, patients were each interviewed with their nasal symptoms. They underwent repeat anterior rhinoscopy. Clinical efficacy was evaluated at the end of the study. Clinical success was defined as resolution or improvement in the signs and symptoms. Clinical failure was defined as lack of improvement or worsening of symptoms

### **RESULTS**

All subjects completed the study. The improvement rate of nasal complaints after 4 weeks therapy in the CMH group was 68.8 % (n:11). Five patients (31.2 %) reported that they experienced no benefit from CMH. In group 1, significant improvement began from the first day and continued through the forth week. CMH provided only symptomatic improvement. Improvement in the control group was 18.8 % (n:3). This improvement was attributed to adaptation to high altitude. Thirteen patients (81.2%) reported that they experienced no improvement. Recovery rate in group 1 was higher than that in group 2 ( $p<0.05$ ). No severe side effect were reported by the subjects in both group.

### **DISCUSSION**

Several altitude-related conditions such as low humidity, low oxygen level and low temperature affect nasal mucosa and nasal breathing. In these cases, conservative treatments can be attempted first, such as saline irrigation, nasal decongestant spray, nasal steroid spray and applications of ointments or emollients to moisten and humidify the nasal cavity. The dry, cold, thin air at high altitude has the potential to undermine normal mucociliary function (3). Mucociliary clearance is an important defense mechanism of the entire respiratory tract and a number of combinations are recommended for treatment (4). This trial suggests that humidifiers is also effective in reducing altitude-related nasal symptoms for long period.

Humidifiers add moisture to the air, which helps ease breathing. Warm-mist and CMH's are equally effective in humidifying the air. CMH's are less expensive than warm-mist humidifiers. A humidifier is a device that releases water vapor into the air to raise the humidity level of a room or house. Heating appliances used to warm enclosed spaces can cause humidity levels to drop too low. This dryness causes various health problems such as cough, fever, dry nose, headache, dehydration, sleeping problems etc. If you use a humidifier, be sure to keep it clean to prevent the growth of bacteria and molds (5,6). Many people use portable CMH's to increase moisture levels in the air inside their homes. When used as directed by the manufacturer, portable CMH's are a safe product. However, using one without properly cleaning and disinfecting it on a regular basis could contribute to additional breathing problems for people who have asthma, severe allergies and other respiratory difficulties. Bacteria can collect and multiply in sitting water. A CMH does not boil the water, so it does not kill the bacteria. Re-starting the

CMH could send spores of bacteria into the air in your home (7). These cases demonstrate the potential of ultrasonic humidifying devices to cause illness in the home. In view of their increasing popularity, humidifier lung and humidifier fever should be considered in the differential diagnosis of patients with unexplained pulmonary or flu-like illness with fever (8). In the present study, subjects were recommended to clean and disinfect water reservoir of humidifier to avoid possible risks. No severe side effect were reported by the subjects in both group.

### **CONCLUSION**

CMH promotes mucociliary clearance by moisturizing the nasal cavity and by removing encrusted material. CMH's are effective in reducing altitude-related nasal symptoms for long period. Our findings highlight the fact that active humidification should be considered for conditioning during sleep time. Because humidification with CMH is safe, efficient, simple, and cost-effective. Patients treated with CMH's rely less on other medications and make fewer visits to physicians. CMH's are not likely to cause health problems if users follow the manufacturer's directions.

### **CORRESPONDENCE TO**

Engin Dursun, MD Sarikamis Military Hospital, Department of Otorhinolaryngology 36500, Sarikamis, Kars, Turkey E-mail: drengindursun@yahoo.com Phone: 090 505 8667248 Fax: 090 474 4136264

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**Author Information**

**Engin Dursun, MD**

Department of Otorhinolaryngology, Sarikamis Military Hospital

**Bilal Battal, MD**

Department of Radiology, Sarikamis Military Hospital