

**ASCORBIC ACID: EFFICACY IN THE PREVENTION OF SYMPTOMS OF RESPIRATORY INFECTION ON A POLARIS SUBMARINE**

B. Elliott

Department of Ophthalmology, Upstate Medical Center,  
State University of New York, Syracuse,  
New York, 13214, U.S.A.

Paper received: 10th April, 1973

**Respiratory System**

*Infections*

(73-5) 12-3-1

**Nutrition**

*Vitamin and Essential Fatty Acids Requirements and Deficiencies*

(73-5) 31-2-2

**Environmental Physiology**

*Military Medicine*

(73-5) 28-22-1

For reprints please quote:

(73-5) 12-3-1

To determine if ascorbic acid (AA) in doses of 2 grams/day has any value in preventing respiratory symptoms a double blind study was initiated on a Polaris submarine. Each ship has two crews and as the one on patrol returns, the off-crew is flown from the United States to meet the ship. When this second crew arrives they are exposed to new respiratory viruses and a large outbreak of colds occurs which has been documented by a review of 360 patrol reports.

Volunteers were asked to participate in a double blind study in which venous blood would be drawn for viral serology studies, and either 500 mgs of AA or a citric acid placebo would be taken four times a day. Seventy out of a 140 man crew volunteered and were randomly placed in treatment or placebo groups. Berthing on the ship was determined by seniority, and non-participants, placebo, and AA groups were intermingled. Both AA and placebo capsules looked identical and when opened the contents were similar in taste and appearance.

The first sample of blood was drawn and the men given their medication one day prior to the crew being flown to Europe. From this time until the end of the study all participants were seen by the author at least weekly so respiratory symptoms could be recorded, and the people reminded to take their capsules regularly. The second set of bloods were drawn three weeks into the study and a final venipuncture was done at the end of the tenth week when the study was terminated.

There were 37 and 33 participants in the AA and placebo groups respectively, and the groups were similar with respect to age and smoking habits. Five dropouts occurred in the placebo group, and in the vitamin group two men did not take the capsules as directed for a short period of time. Data from the drop-outs and above two are included for the weeks they were fully participating in the study.

There was no consistent difference between groups in the incidence of runny nose or sneezing. Man-days of morbidity for hoarseness, sore throats, non-productive coughs, and productive coughs was 36, 107, 42 and 72 in the placebo group with only 37%, 28%, 40% and 31% as much morbidity in the AA group. The Wilcoxon Sequence Test with a one tailed test rejected the null hypothesis of equal effectiveness of the AA and placebo for sore throats and productive coughs ( $P=.0155$  and  $.0327$ ) but not for hoarseness or non-productive coughs. Complement fixing titers for influenza, parainfluenza types 1,2, and 3, M. pneumoniae, and adenovirus antigens did not reveal any difference between groups.

My thanks to the Navy Medical Field Research Laboratory, Camp Le June, N.C., for performing the viral serology studies, Dr. Ian Keaveny from Stanford University for help with the statistics, and Commander Thomas N. Markham, MC, USN from the Submarine Medical Research Laboratory for suggesting and guidance in this study.

1. Wilkens, D. D. (1969), Navy Submarine Medical Center, Groton, Conn., Report #560.