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STUDY ON THE DEVELOPMENT OF A PHARMACEUTICAL KIT FOR LONG-DURATION DEEP-SPACE HUMAN SPACEFLIGHT

Abstract

Because of restrictions imposed by its very nature, spaceflight studies are developed with just a few test subjects at a time, resulting in a small cumulative database. Pharmaceutical matters in terms of traceable effects or major changes on population after the administration of medicines remain unanswered. Spaceflight analog studies on Earth appear as an option for scientists around the world to acquire more information and medical data about the action of pharmaceuticals on altered physiology by a simulated spaceflight environment, including confinement and isolation. In this work, via data mining, reports from crews of current space analog missions such as the ones performed at the Mars Desert Research Station (MDRS) were collected and analyzed in order to identify common incidents and affections during an analog mission. Some of the conditions reported were fatigue after Extra Vehicular Activities, skin problems due to environmental conditions, minor infections, and minor injuries due to EVA suits. Consequently, the data acquired was filtered depending on the description of the medical problem; however there was an evident lack of information in terms of several parameters such as treatment, the number of crew members affected or outcome of treatment. Stability of pharmaceuticals reported as treatment was reviewed and natural therapeutic alternatives, as well as possible adverse effects, were examined and presented. Based on the mentioned analysis, this work presents a suggestion for medicine availability. This includes commercial pharmaceuticals and in situ generation to be considered for use on future analog missions and as a base for long-duration human exploration where resupply missions cannot be provided at a fast pace. The development of a standardized kit of medications along with an improvement of the knowledge base spaceflight pharmaceuticals should be pursued, in order to detect significant differences between earth and space physiology requirements. Parameters such as the shelf life of common medications and the prescription regime should be taken into account for the medical kit composition, and the possibility of in situ generation for treatments of the most common affections.