Coming soon: Self-guided, computer-based depression treatment

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Self-guided treatment for depression could soon be only a mouse click away. Scientists with the National Space Biomedical Research Institute (NSBRI) are developing an interactive, multi-media program that will assist astronauts in recognizing and effectively managing depression and other psychosocial problems, which can pose a substantial threat to crew safety and mission operations during long-duration spaceflights.

Even though the depression treatment is under development for NASA, project leader Dr. James Cartreine said it could be spun off for use on Earth.

"This project has great potential as a self-guided treatment for many people," said Cartreine, a member of NSBRI's Neurobehavioral and Psychosocial Factors Team. "Depression is the number one cause of disability days in the United States, but it's not only about days lost. Depression also results in presenteeism -- showing up for work but not really working."

The depression treatment is part of the Virtual Space Station, a multi-media program that addresses multiple types of potential psychosocial problems and can be used for training before, and for assistance during, missions. Other problems being addressed via the Virtual Space Station include interpersonal conflict, and stress and anxiety.

Cartreine, a Harvard Medical School research psychologist based in the Division of Clinical Informatics at Beth Israel Deaconess Medical

Center in Boston, said the Virtual Space Station will make effective therapeutic depression treatment more easily accessible to astronauts aboard the International Space Station and proposed missions to the moon and Mars. Currently, astronauts have audio and video access to psychologists only when communication links are available.

Project co-investigator and former astronaut Dr. Jay Buckey said long-duration spaceflight can be tough on astronauts. "While astronauts are not particularly prone to psychological problems, the environment is very demanding," Buckey said. "On a mission, they face a lot of challenges that could lead to depression."

Buckey, a professor and physician at Dartmouth Medical School, said the depression module and other aspects of the Virtual Space Station are based upon proven methods. "These are unique NSBRI products that did not exist before," Buckey said. "The Virtual Space Station is based on proven treatment programs and is a very helpful way to work on problems in general."

The system's multi-media approach for depression includes graphics and video featuring a psychologist who leads the user through a straightforward process called Problem-Solving Treatment. The system provides feedback based upon the information provided when answering a series of questions.

The first step of the process is to make a problem list and select a problem on which to work. The second and third steps are setting goals and brainstorming ways to reach them. The final two steps are assessing the pros and cons of possible solutions and making an action plan to implement them. The program also helps users plan and schedule enjoyable activities, which people who have depression often stop doing. Additionally, the program provides preventative and educational information on depression.

Cartreine and Buckey, who received input from 29 current and former astronauts while designing the Virtual Space Station, said some of the system's other benefits include its portability and privacy. "It can be delivered to the International Space Station on a flash drive and run directly from that drive, so that the astronaut has complete control over his or her data," Cartreine said. "The system is private and secure. The user is the only one who can share the information with others."

An early version of the depression treatment system was beta-tested on research stations in Antarctica, which is used as an analog to long-duration spaceflights due to its isolation from the rest of the world, length of stay and team composition. Cartreine said feedback from that early test run has been positive, and a clinical evaluation of the latest version on 68 Boston-area volunteers is about to begin.

"We plan to study the program's ability to treat depression," he said. "We are looking for people who are similar to astronauts, such as people in the technology industry."

Eventually, the researchers want to adapt the system for use in many different settings, giving people access to treatment they may not have now. For instance, people with depression often seek treatment by going to their primary care physician, so the researchers hope to adapt it for use at the doctor's office or in a person's home.

The system could also be beneficial in rural areas where clinical help is in short supply or nonexistent. Other possible locations for use include schools, social service offices, places of worship, military bases, prisons, commercial ships, oil rigs and underwater research stations.

The self-guided treatment project is part of the NSBRI Neurobehavioral and Psychosocial Factors Team portfolio, which includes studies on and development of countermeasures for stress, anxiety, interpersonal

conflict and fatigue.

Content on stress and anxiety management for the Virtual Space Station is being developed by Dr. Raphael Rose at UCLA. Harvard Medical School and Massachusetts General Hospital researcher Dr. Gary Strangman is studying the depression treatment program's effects on brain activity using infrared imaging.

Source: National Space Biomedical Research Institute