Warmer is better: Research suggests sickle cell-related pain intensifies during seasonably colder weather

January 26 2010, by Sathya Achia Abraham

(PhysOrg.com) -- The debilitating pain experienced by people with sickle cell disease becomes more intense when temperatures drop in the fall and winter months, according to a multi-center study led by a Virginia Commonwealth University School of Medicine researcher.

For years, clinicians have routinely advised patients with sickle cell disease to dress warmly and avoid extremes of temperature, especially cold weather, based on laboratory evidence that more red blood cells undergo sickling with temperature changes.

According to lead author Wally R. Smith, M.D., professor of medicine and chair of the Division of Quality Health Care, the team has found for the first time that pain in adults with sickle cell disease is affected by climate and geographic location.

“This research confirms pain is worse in fall and winter, better in spring and summer, and pain is worse in colder climates. This has public health and policy implications since advice to patients to dress warmly and avoid extremes of cold can now be stronger,” said Smith, who is scientific director of the Center on Health Disparities at VCU.

“Similarly, the fact that cold weather does affect these patients’ health should be disseminated to employees, employers and schools, and could potentially be used in disability determinations for these patients,” he

added.

Sickle cell disease is a genetic blood disorder that affects more than 70,000 Americans, and is characterized by pain. Severe pain related to sickle cell disease is known as a crisis period and typically is treated with fluid, rest and opioid analgesics.

The study included 21 clinical sites in eastern North America and a total of 229 participants who recorded their daily pain intensity - measured on a scale from 1 to 9 - and pain frequency in a diary for a period of four years.

In the study, researchers analyzed the data from these diaries, as well as monthly climatologic data, including temperature and barometric pressure to examine the relationship between climate conditions, geographic location and monthly intensity and frequency of sickle cell pain.

They observed a cyclic pattern of pain intensity and frequency with peaks in late fall and early winter and a trough in the spring. Smith said that higher monthly temperatures were significantly associated with both lower pain intensity and pain frequency, but higher monthly barometric pressures were significantly associated with greater pain intensity and frequency.

Sickle cell disease affects the body's red blood cells. Normal red blood cells carrying hemoglobin are smooth, flexible and donut-shaped and can travel easily throughout blood vessels. However, sickle cell patients have stiff, crescent-shaped red blood cells that do not flow freely through blood vessels. Pain results when the irregular-shaped cells clot together, causing blockages that may lead to potentially dangerous complications that can compromise a patient's organs.

The majority of patients are African-American, but the disease can affect people of Spanish, Portuguese, Italian and Greek decent. About 2.5 million Americans have sickle cell trait, which is the gene that causes the disease.

The findings were reported in the November 2009 issue of the journal *Pain*, the official publication of the International Association for the Study of Pain. The patient sample was taken from a large clinical trial known as the Multicenter Study of Hydroxyurea. Hydroxyurea is the only Food and Drug Administration-approved drug to prevent painful attacks of sickle cell disease and works by preventing cells from sickling.

Provided by Virginia Commonwealth University