Biomedicine

New twist to marriage and mortality

Past research has shown that for men, tying the knot can offer a new lease on life — or at least a longer one. But the life-extending advantage in marriage is not just a function of togetherness, a new study indicates. It found that even when they live with someone else, single American men of middle age are twice as likely as married men to die within 10 years.

Maradee A. Davis and her co-workers at the University of California, San Francisco (UCSF) observed that among the 1,011 45- to 54-year-old men they studied, 23 percent of those living with family, "significant others" or other nonrelatives died within 10 years—a rate identical to that in men who lived alone. By contrast, 10.6 percent of the men living with wives died over the same period.

Single men who at the start of the study were in the next age bracket, 55 to 64, also had about twice the premature-death risk of married men the same age, Davis reported on Oct. 4 at the American Public Health Association annual meeting in New York City. She said these findings suggest "it's important, particularly for men who aren't married, to pay attention to healthy lifestyles."

Middle-aged women living with someone besides a spouse also faced double the risk of early death, the team found: 8.7 percent died within 10 years, compared to 4.3 percent of married women in this 45- to 54-year-old group. But above age 54, married and single women died at roughly the same rates.

The study indicates that living alone does not necessarily constitute a risk factor in itself, Davis says; the lack of a spouse appears the critical element. The UCSF group is now looking for socioeconomic, behavioral and medical explanations for its observations. For example, smoking and drinking habits may partially account for the higher early-mortality risk among bachelors, Davis says. Single men also have poor eating habits, she and her colleagues found in an earlier dietary study they conducted. As for the 45- to 54-year-old single women, Davis speculates that their higher risk of early death may result from the stress of their being low-income heads of household.

The UCSF scientists analyzed data collected between 1971 and 1975 by the National Center for Health Statistics in a national health and nutrition survey of 7,651 U.S. adults, with follow-ups from 1982 to 1984.

Tough sledding for children

Coasting down snowy hills is a favorite winter pastime among children. But many parents don't realize the true danger it poses.

Compared to other childhood sports, sledding causes a "very high" incidence of injuries, says pediatrician Robert A. Dershewitz of the Harvard Community Health Plan in Braintree, Mass. Roughly 33,000 U.S. sledding-related injuries occur each year, he says. "I don't think there's an awareness or an appreciation of the danger," he adds.

In the October AMERICAN JOURNAL OF DISEASES OF CHILDREN, Dershewitz and his colleagues report that of 211 sledding injuries involving children and teens treated at 23 Massachusetts hospitals between 1979 and 1982, 192 received care in emergency rooms and 19 required hospitalization. Serious injuries — concussions, fractures and internal damage — occurred in 21 percent of the accidents, often as a result of collisions with trees, fences and other fixed objects. Five- to 9-year-olds were hurt most frequently.

Dershewitz says simple safety precautions can prevent sledding accidents without detracting from the fun of the sport. For example, parents should check that the coasting area is not too steep or icy, and is clear of traffic and large obstacles. He also advises that children wear helmets and protective clothing and ride with their heads at the back of the sled.

Space Sciences

Evidence of elusive ion source in space

In a 1954 book about the formation of planetary systems, Hannes Alfven hypothesized that gas atoms having no electric charge can ionize — acquire an electric charge — by simply speeding through space. Ionized clouds formed by material ejected from a satellite last month now provide the strongest evidence yet for Alfven's much-sought phenomenon.

The Swedish physicist suggested that as an atom in space passes through a magnetic field, it can ionize — provided its speed across a magnetic field "line" produces more than enough kinetic energy to strip an electron off the atom. (Stripping off one or more electrons produces a positively charged ion.) Alfven termed the required speed an atom's "critical ionization velocity" (CIV).

When ionized, gas atoms glow, rendering them visible not only to instruments on the ground and in aircraft, but also, in large numbers, to the naked eye. Unlike electrically neutral atoms, ions are susceptible to capture by Earth's magnetic field and by electric fields in space. Scientists studied the ionization of neutral atoms in space (usually by sunlight) several times during the 1980s. They used gas clouds ejected from sounding rockets — most often as a way to probe the structure of these fields.

But a few tests were conducted expressly to test the phenomenon of critical ionization velocity. Researchers released powdered metals from rockets. Heat from the detonation of explosive charges provided the energy needed both to vaporize the ejected metals into a gas and to accelerate those gases beyond the critical ionization velocity. However, because the explosives' heat might also have induced some ionization, no one ever established how much, if any, of the ionization observed resulted from the proposed process.

Though many sounding rockets propel their clouds of neutral gas into sunlight, because sunlight quickly ionizes the neutral atoms, the rocket-launched CIV experiments attempted to limit ionization from such alternative sources by dispersing their gas clouds into darkness.

Two scientists from the University of Alaska in Fairbanks have for the first time conducted CIV-ionization experiments from an Earth-orbiting satellite. The results now indicate fairly conclusively that Alfven's CIV effect indeed exists, according to Eugene M. Wescott and Hans C. Stenbaek-Nielsen, who directed the tests.

Four canisters of powdered metal for their tests were carried into space aboard the Combined Release and Radiation Effects Satellite (CRRES), launched July 25. As in the sounding-rocket tests, barium, calcium and strontium powders were chosen for their ability to glow at visible wavelengths when ionized.

On Sept. 10, the researchers released canisters of strontium and barium; on Sept. 14, two more with calcium and barium. Each canister was propelled into space by a spring. About 20 minutes later, its powder was vaporized with explosives.

The gases were ejected from the canister when the satellite was in the fastest segment of its orbit, speeding at about 9.5 kilometers per second — well in excess of the CIV for all three metals studied, Wescott observes. He and Stenbaek-Nielsen timed each canister's release so that its gas molecules were ejected in darkness. Free from any solar-induced effect, any glow recorded was probably due to Alfven's CIV effect, the researchers reasoned.

CRRES program scientist David Reasoner of NASA's Marshall Space Flight Center in Huntsville, Ala., is enthusiastic about the results but cautions that scientists may yet discover other explanations — such as collisions with oxygen atoms in Earth's upper atmosphere. Wescott, Stenbaek-Nielsen and others are beginning detailed analyses of the CRRES data for evidence of non-CIV-initiated ionizations.