Trinity research finds open fires could pose substantial hazard to older people's health

Collaborative research from scientists at the Irish Longitudinal Study on Ageing (TILDA) at Trinity College Dublin, and the University of Lancaster in the UK, examines the risk factors associated with open fire use, revealing a variety of potentially negative consequences for health.

Research findings show open fire usage negatively impacts cognitive health, with adverse association largest and strongest among women – a consequence of women typically spending more time at home, with greater exposure to open fires in the home.

Cognitive decline was estimated in the study by widely-used cognitive tests including word recall and verbal fluency. The study follows government regulations implemented earlier this year, which banned the use of smoky coal in all Irish towns with populations over 10,000 people. The regulations were signed into law in July of this year, in an attempt to reduce air pollution in the country, promote public health and improve health outcomes.

How can air pollution affect health?

Indoor air pollution can form when dust, dirt or gases linger in the air inside a building (such as a home or workplace), polluting the air that is inhaled into the lungs. It is known that exposure to indoor air pollution affects both respiratory and cardiovascular health, but little is known about how it affects cognitive function in older adults.

Previous studies have shown that air pollution is linked to harmful health outcomes such as stroke, heart disease and lung cancer, as well as chronic and acute respiratory diseases like asthma.

A growing body of scientific evidence indicates that exposure to indoor particulate matter (PM) is associated with damage to neurodevelopment and cognitive function, contributing to neurodegenerative diseases around the world. Coal fires are one of the largest sources of fine particulate matter (PM2.5), small particles of air pollution which find their way into the lungs and blood.

Particulate matter is a type of pollutant caused by industrial, domestic and traffic sources.

The study sampled close to 7,000 older people from the TILDA dataset, and examined concentrations and magnetite content of airborne particulate matter (PM) that arise from burning peat, wood, or coal in open fires in the home.

What does the study show?

- Peat-fuelled open fires emit higher particulate matter (PM) concentrations than coal and wood fires.
- Magnetic content in particulate matter emitted from open fires is similar to that of roadside particulate matter.
- Exposure to particulate matter from indoor open fire usage is similar to outdoor commuting exposure.
- There was a negative association between open fire usage and cognition among older Irish people.

Professor Rose Anne Kenny, Principal Investigator of TILDA and head of Medical Gerontology at Trinity College Dublin said:

"TILDA is delighted to continue further collaboration with our US and UK colleagues in this new initiative, to better understand brain ageing and expand our resources and deepen our understanding of Alzheimer's disease and related dementias. Trinity and TILDA provide unique insights and expertise into cardiovascular determinants of brain health and possible modifiable vascular risk factors. Cognitive decline and dementia related diseases remain a significant challenge for the individual, families, governments and policymakers. We look forward to contributing our expertise alongside our international counterparts, to harmonising and strengthening analytical measures, and acquiring a better understanding of dementia risk factors. This will provide us with new approaches for prevention and possibly treatment."

Dr Vincent O'Sullivan, researcher at Lancaster University said:

This collaborative study has found strong evidence of the health risks that open fire usage poses not just to older adults, but to people of all ages. We provide evidence that outlines the health risks open fires pose to cognitive function, and supports policies banning or restricting the use of open fires as a heat source, for example the UK government's announcement earlier this year to phase out coal and wet wood use in 2021. Traditionally, public health concerns about air pollution have been raised in relation to its negative effect on the heart and lungs; our research however demonstrates why cognitive function should be a key concern for policymakers to address, especially in Ireland, where open fire use is common.

To view the full paper, 'Indoor particulate air pollution from open fires and the cognitive function of older people', visit here.