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Brain health in young adults

We should promote brain health as an aspirational goal, like fitness

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Early detection and management of risk factors is the best way to prevent the neurodegenerative changes that cause clinical dementia. Despite this, research on risks to brain health continues to focus on middle aged and older adults. Life course models of dementia focus on only one early risk factor—education—with the remaining factors focused on mid-life onwards.[1] As a result, we are faced with a knowledge gap about brain health in young adults spanning over 20 years.

Good brain health is a state of optimal cognitive, sensory, social-emotional, and behavioural functioning.[2] Understanding brain health in young adults is critical as they have the opportunity to make early and long term changes to minimise risk. This is particularly important now, given the widespread and serious consequences of the covid-19 pandemic on young peoples' mental health.[3]

Young adults (born between 1981 and 2004) account for over 30% of the world's population[4] and have unique characteristics and contexts. Young adults are often more technologically enabled than older adults, for example, so they are particularly amenable to health promoting technologies. They have lived through a global recession and face unemployment rates 2-3 times higher than the population average,[5] which has implications for their brain health.

Quantifying the prevalence of risk factors for dementia among young adults is important but neglected. These factors have been studied almost exclusively in children and people over 40; we need more data on adults aged 18 to 39. This will require researchers across multiple disciplines to add measures of brain health (such as cognitive and mental health outcomes) to existing studies, along with relevant lifestyle and environmental exposures. Sustained investment in large interventional trials is also required, potentially lasting decades. Much of our current knowledge comes from cohorts born nearly 100 years ago,[6] so a clearer focus on younger adults might uncover new risk and protective factors.

Characterising cumulative risks to brain health from an early age will inform both primary and secondary prevention of dementia. Many risk factors, including obesity,[7] smoking,[8] and head injuries,[9] begin accumulating in young adulthood. Associations between oestrogen and risk of Azheimer's disease[10] indicate a need for observational data in young adults to explore the effects on brain health of older age at childbirth, increasing use of vitro fertilisation, and early menopause. Emerging evidence of a positive association between the APOE ε2 allele and cognitive performance in adults as young as 23 raises the possibility of protective genetic factors.[11]

Optimising brain health from young adulthood demands a precision public health approach, which considers individual variability in genes, environment, and lifestyle to deliver the right intervention at the right time.[12] Young adults are digitally literate and broadly health conscious, so can be active agents in monitoring their own brain health risks. Mobile phone applications, sensors, and big data analytics enable health monitoring in ways not previously possible.[13] Physical health indices like blood pressure and levels of air pollutants such as nitrogen oxides are now amenable to monitoring by wearable devices, for example.

Community based services for managing brain health provide new opportunities for early risk profiling and communication.[14] In Scotland, for example, such services are open to anyone interested in their brain health and include "light touch" lifestyle assessments and interventions such as dietary advice. This broad approach will generate large amounts of data to advance our understanding of the epidemiology of neurodegenerative diseases and the efficacy of interventions.

Interventions to change behaviour must happen at individual and societal levels. Although no studies explicitly target brain health in young adults, evidence is growing from broader health fields that can inform this work.[1 5 -16] Promising targets for protective interventions include parent-child and peer-to-peer groups promoting mental health, as well as physical activity programmes to increase brain plasticity.[17 18] The recently published World Health Organization position paper on optimising brain health provides several suggestions for policy changes including strengthening road safety legislation, limiting population exposure to neurotoxic chemicals, policies to protect survivors of intimate partner violence, and increasing access to green spaces.[2]

Rather than focusing solely on risk reduction, public health messaging should promote brain health as a valuable goal to aspire to, like physical fitness. Mobile phone applications are being developed that allow people to monitor and potentially protect or improve their brain health.[19] Such applications could eventuallytrack multiple influences simultaneously such as diet, use of substances (alcohol, tobacco, and illicit drugs), physical fitness, mood, and engagement in social activities. Connecting brain health with issues that young adults value, such as climate sustainability, would help amplify messaging about its importance.

Young adults are well placed to lead on optimising brain health throughout life. In so doing, they can help secure benefits that extend beyond

neurodegenerative diseases to better mental and physical health, reduced healthcare costs, higher productivity, and enhanced wellbeing of societies more broadly.[2]

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