Is ARUK’s Think Brain Health Check-In – fit for purpose?

When the BBC announced Alzheimer’s Research UK’s online Think Brain health Check questionnaire ARUK’s website crashed from the demand. It is composed of three questions on staying sharp, three on staying connected and seven on ’love your heart’. Why not ‘love your brain?’

There’s a question on alcohol, ranging from none to 5 of more drinks a day. 130ml of wine a day has been shown to reduce, not increase dementia risk. At this level alcohol does not predict risk. There’s two questions on smoking, which is a risk factor but only 8% of people over 65 smoke.

There’s one on diet and one on exercise. The diet question says “It should include plenty of fruit and vegetables, starchy foods like potatoes and brown rice, some protein like beans, fish or lean meat, and a small amount of dairy or dairy alternatives. Foods that are high in fat or sugar should be limited.” But how much fish, how much starchy foods, and how much sugar is too much? Why dairy? There’s no evidence that dairy or starchy foods protect your brain – only that refined and processed foods and sugar shrink it and make cognition worse.

There is no mention of the importance of oily fish or omega-3 fish oil supplements. People who eat three servings a week have 36% less dementia risk. People who take fish oil supplements have 9% less risk for dementia. But you don’t get told this. There’s also no mention of B vitamins, despite having the best evidence for dementia prevention in those with raised homocysteine – roughly half of people over 65. These two risk factors account for over a third of total Alzheimer’s risk, yet are completely ignored.

Then there are three questions that essentially drive you to your doctor to get drugs either to lower cholesterol, lower blood pressure or treat diabetes, none of which have been shown to reduce dementia risk. In fact, having too **low cholesterol** [https://onlinelibrary.wiley.com/doi/full/10.1002/brb3.2236 ](below 4mmol/l) by inappropriate use of statins, is a strong risk factor for dementia. In a **recent study**[https://pubmed.ncbi.nlm.nih.gov/30688979/] hypertensive medication, given to a thousand people, prevented one case of dementia and created 380 ‘serious adverse events’ meaning death or hospitalisation!

The New Scientist gave ARUK’s Think Brain Health Check a damning review in an article headed **‘the extent to which lifestyle affects dementia risk is exaggerated’** [file:///Users/patrickholford/Desktop/NEW%20SCIENTIST/Dementia%20snd%20lifestyle%20New%20Scientist%20scepticalt.htm]

They rightly point out that ‘risk’ is not the same as ‘reversing risk’. “The tool also glosses over the fact that all the risk factors it highlights have emerged from observational research, not higher-quality randomised trials, the best kind of medical evidence. Observational studies can only show correlations between a lifestyle factor and a medical condition, they can’t discover if the former causes the latter.” They say. For example, having a high blood pressure does predict risk, but lowering it with drugs doesn’t reverse that risk. [read https://foodforthebrain.org/does-lowering-blood-pressure-reduce-dementia-risk/]

The New Scientist also say “They didn’t mention that some of our propensity to dementia is down to lifestyle – “up to 40 per cent”, [according to the 2020 estimate](https://www.thelancet.com/article/S0140-6736%2820%2930367-6/fulltext).

[ https://www.thelancet.com/article/S0140-6736(20)30367-6/fulltext] The rest of our risk comes down to which versions we have of many genes, which are obviously immutable.”

On this basis they say that prevention power is over-estimated. But they are wrong. Three of our Scientific Advisory Board members namely Professor David Smith from Oxford University, Professor Jin-Tai Yu from Shanghai’a Fudan University and Patrick Holford wrote to the New Scientist to set the science straight. Here’s their letter:

**Dementia risk modification from diet may be underestimated**

Your article suggesting lifestyle modification may be overestimated for the prevention of dementia quite rightly points out that most risk for dementia allocated to lifestyle factors is derived from observational studies, not more robust interventions. A weakness in the Alzheimer’s Research UK’s ‘think brain health’ tool is the exclusion of two risk factors with good evidence and the simplest to change, that is high homocysteine and low omega-3 fats, both easily remedied with inexpensive dietary supplements. Strong evidence for the possibility of prevention of Alzheimer’s disease (AD) comes from a meta-analysis (Yu2020) including 153 randomised controlled trials. Of all risk factors, it concludes, ‘homocysteine-lowering treatment [with B vitamin supplements] seems the most promising intervention for AD prevention’. Another meta-analysis shows that high homocysteine adds 3.7 % of dementia risk, and roughly 66% of AD might be prevented (Xu 2015).

Assessment of risk, made by National Institutes of Health (Beydoun2014) researchers attributes 22% of the risk to homocysteine and a further 22% to a lack of seafood/omega-3 fats. Oxford University’s VITACOG randomised controlled trial shows 73% less brain shrinkage in elderly with mild cognitive impairment in those with sufficient omega-3 who were given a B vitamin supplement to lower homocysteine (Jerneren 2015). This group also had much reduced cognitive decline (Oulhaj 2016). A trial in China showed reduction in cognitive decline when both B vitamins and omega-3 are administered (Li 2021). UK Bio Bank data (Huang2022) shows a 9% reduced risk of all-cause dementia in those supplementing fish oils.

The estimate of 40% modifiable risk comes from the Lancet Commission (Livingston 2020) which did not consider these two highly modifiable risk factors. In fact, the Lancet Commission (Livingston 2017) mentioned the limitation that they “have not incorporated other potential risk factors”. We may therefore be underestimating, not overestimating the possible risk reduction for developing dementia.

Although less easy to change, last month the observational study in the British Medical Journal (Jia2023) of 29,000 people followed for a decade showed that those adopting a healthy lifestyle, of which eating a healthy diet was the most important, were about seven times less likely to have age-related cognitive decline or dementia than those with an ‘average’ lifestyle and about nine times less likely to develop dementia than those with an unfavourable lifestyle. Eating a healthy diet as part of a healthy lifestyle was about twice as important as exercise, another important factor, in preventing cognitive decline. This is consistent with the first large multidomain RCT, the Finnish Geriatric Intervention Study to Prevent Cognitive Impairment and Disability (FINGER), tested the efficacy of a 2-year multidomain lifestyle intervention comprising nutritional guidance, exercise, cognitive training, social activity and intensive monitoring and management of metabolic and vascular risk factors. The multidomain lifestyle intervention benefited cognition in elderly people with an elevated risk of dementia (Ngandu 2015), even in carriers of ApoEε4 (Solomon 2018).

There is a false assumption that, if 40% of risk is modifiable, the rest is down to genes. In the case of Alzheimer’s less than 1% of risk is attributed to causative genes. All other genetic risk is in principle modifiable, with one’s nutrient intake being one way of influencing gene expression. The ApoE4 gene variant, the presence of which is considered to add about 7% to risk (Ritchie 2010), is an example. In both the Oxford University study and the recent BMJ study having, or not having, the ApoE4 gene made no difference to the risk reduction conferred by either B vitamins or a healthy lifestyle.

All these risk factors are included in the foodforthebrain.org online Dementia Risk Index, which also includes a validated cognitive function test and a follow-on programme, COGNITION, which targets a person’s specific risk factors and helps them to make simple changes to reduce them. This kind of interactive online education may be one way forward to put prevention into practice.

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