

## **Lifefrain public lecture-26<sup>th</sup> March, 2019, University of Cambridge**

### **Presentation 3 – Fiona Matthews, Professor, Newcastle University**

*Healthy brain ageing. What we know, what can we do.*

The world is ageing and overpopulated. Life expectancy has changed fundamentally in the world in the past decades, there has been a steady increase. So brain health is becoming vital, especially how we can maximise brain health in an ever increasing old population. We cannot medicate this amount of population, so we need to think of other ways.

*What is healthy brain ageing?*

- Is it just the converse of unhealthy brain ageing?
- Is it a healthy brain compared to others in your own age?
- Is it having a brain of a 25 years old when you are 60 years?

*Dementia* is an umbrella term for a group of neurodegenerative disorders associated with ageing and its one of the biggest policy challenges of our time. There are various types of dementia, for example, Alzheimer`s disease and vascular dementia. If people live as long as possible, half of them probably would get dementia according to projections. So age is the strongest risk factor for dementia, but dementia is not part of normal ageing! Dementia is currently detected only at a late stage of the disease process.

Commercial news often present latest scientific findings with fascinating cover pages about the beneficial impact of one single risk factor, such as "chocolate halts dementia". But luckily, there is more consistency behind these single evidences.

According to the projections of the Alzheimer`s Society UK, 1 000 000 people will be affected by dementia by 2021, and 1 700 000 by 2051. But is that really where we are going? Are there any historical data, which support these projections?

There has been some good news in the past 10 years. Several studies show that among people who aged beyond 65 years old the prevalence of dementia has gone down; in certain periods there was a 20-30% reduction in risk. This reduction was in the number of new people getting dementia. What causes these positive changes? What we have known for a long time is that education has been fairly good for the brain. We still do not know exactly why, but there has been consistent evidence of its positive impact on the reduction of dementia. People are in education for a longer and longer period due to the changes in the past and current education regimes: the current young generations are in education on an average for 14 years!

What is the changing impact of education? According to recent studies, increased education does not necessarily bring along more skilled jobs according to recent studies. But what does education do then? It contributes to building up cognitive reserve in your brain. That means you would be more resistant to changes across time. A person with a cognitive reserve uses its brain network more efficiently or is more capable calling up alternate brain networks or cognitive strategies in response to increased demand.

One can think about cognitive reserve as a motorway structure. If you only got motorways ("M"ways), you might be blocked on the road. But if you use your cognitive reserve, you build "A" roads. In certain cases, you might use a way to go around, but you would still get there. The more you build up the road network, the more you have in terms of where you can go. So even if A10 is blocked, you still have the possibility to go to Ely.

The higher cognitive reserve you have, the more neurons you have and their density is also higher. According to the recent studies, those with a higher cognitive reserve have a higher hippocampus volume, too.

Education is not only for the early years of life. You are sitting here tonight and educating yourselves, whether it's formal education or not; people learn new things all the time. We could not all educate ourselves at an early age. But what else can we do, what other risk or protective factors exist threatening cognitive health?

- Diet
- Genetic factors, such as the ApoE 4 genes which is associated with dementia

- smoking
- diabetes
- depression
- hypertension
- obesity

Through the modifiable risk factors we could prevent about one third of dementia cases.

Vascular factors are basically related to the heart health. Obesity and hypertension is particularly a risk factor for mid-life, meanwhile diabetes, smoking and low physical activity at later life.

Hearing loss has a quite negative impact on the brain. The brain is a social organ, it likes to be stimulated, and it likes to have conversations with people. If hearing loss impairs, that impacts social interaction as well. People with hearing loss experience 30-40% greater decline in their thinking abilities compared to their counterparts without hearing loss.

Depression is also a risk for dementia.

*What else can you do for your brain?*

Avoid saturated fat, as it enhances inflammation in the brain.

Anti-inflammatory diet is good for the brain, so eat more:

- antioxidants
- omega 3

**We do know enough about brain health now, so here are some advice:**

- 1. Start early: take education and widen your skills**
- 2. Maintain your brain health in mid-life: remember, that what is good for your heart is good for your brain**
- 3. Older age: maintain social connectedness and enjoy life!**