Brain Health Survey (short)

Background Information

Age:_____ years [AGE]

Sex: Male / Female [SEX]

Education: >11 years / 8 to 11 years / <8 years [EDUCATION]

Family history of early dementia[1] or genetic predisposition[2]: Yes / No / Don't know [FAMILY HX]

[1]Before 65 years of age; [2]Positive for the ApoE4 gene or other dementia related genes

Lifestyle Factors

Weight____ kgs

Height____ cm

Calculate BMI
Body Mass Index is a simple **calculation** using a person's height and weight. The **formula** is **BMI** = kg/m^2 where kg is a person's weight in kilograms and m^2 is their height in metres squared.

BMI Categories: [BMI CAT]
Underweight = <18.5
Normal weight = 18.5–24.9
Overweight = 25–29.9
Obesity = BMI of 30 or greater

Healthy Diet:

- How many portions **per day** of raw and/or cooked fruits/vegetables you eat?
  - 1 or more / less than 1 or rarely
- How many portions **per week** of fish you eat?
  - 2 or more / less than 2 or rarely

[HEALTHY DIET CAT]

- If raw and/or cooked fruits/vegetables 1 or more AND fish 2 or more = **Healthy Diet**
- If any less than 1 (or 2) or rarely = **Suboptimal Diet**
- If both less than 1 (or 2) or rarely = **Unhealthy Diet**

Alcohol:

- How much alcohol do you regularly drink **per week**?
  - Abstain or rarely
  - Less than 3 large glasses (175 ml) of 14% wine (or 2 pints of high-strength beer)
  - Between 3-6 large glasses (175 ml) of 14% wine (or 2-5 pints of high-strength beer)
  - More than 6 large glasses (175 ml) of 14% wine (or 5 pints of high-strength beer)

[ALCOHOL CAT]

Abstain or rarely = **Abstinence**

Less than 3 = **Light consumption**
Between 3-6 = **Moderate consumption**
More than 6 = **Heavy consumption**

Smoking: Never / Former (not smoking in the last year) / Currently smoking [SMOKING]

Physical activity:

- Do you regularly engage in physical activity (i.e., exercise) and how often **per week**?
  - Recreational walking less than 1 hour per week or not practicing sport or intensive leisure activity
  - Recreational walking 1-2 hours per week or practicing sport or intensive leisure activity weekly - monthly
  - Recreational walking more than 2 hours per week or practicing sport or intensive leisure activity two or more times per week

[PHYSICAL ACTIVITY CAT]

less than 1 hour per week = **Inadequate**
1-2 hours per week = **Suboptimal**
more than 2 hours per week = **Optimal**

Cognitive activity:

- **About how much time do you spend reading each day (newspapers, magazines or books), including online reading?**

  □None to less than 1 hour [1]/ □1-3 hours [4]/ □ more than 3 hours [6]/ □Don't Know [0]

- **Fort the past year/month how often did you:**

	Every day or almost every day	Several times a week	Several times a month	Several times a year or less	Don't know
Play "brain games"?[1]	[6]	[4]	[2]	[1]	[0]
Write letters or emails?	[6]	[4]	[2]	[1]	[0]
Use online social network activities like facebook/ twitter?	[6]	[4]	[2]	[1]	[0]

[1]Like checkers or other board games, cards, puzzles, word games, mind teasers, or any other similar games (This includes online games)

[COGNITIVE ACTIVITY SCORE]

Add scores of all the above activities = SUM
Display SUM of maximal activity score (24) (i.e., "You scored SUM of 24 max. points")

Sleep:

- Do you have problems initiating sleep, trouble maintaining sleep, or waking up early and not being able to go back to sleep: Yes / No / Don't know

- Do you have sleep-disordered breathing (snoring or sleep apnea): Yes / No / Don't know
- Are you taking any sleeping pills regularly: Yes / No / Don't know

[SLEEP CAT]

If answer to any of the above is "Yes" = **Probable Sleep problems**
If answer to all of the above is "No" = **No apparent sleep problems**
If answer to all of the above is "Don't know" = **Information not available**

Health Factors

Have you ever been diagnosed with the following conditions or are you taking any related meds?

- Diabetes (elevated blood sugar): Yes / No / Don't know [DIABETES]
- Elevated Cholesterol (more than 200 mg/dl or taking cholesterol lowering drugs):Yes / No / Don't know [CHOLESTEROL]
- Hypertension (elevated blood pressure or taking blood pressure lowering drugs): Yes / No / Don't know [HYPERTENSION]
- Depression or taking anti-depressant drugs: Yes / No / Don't know [DEPRESSION]
- Coronary Heart disease: Yes / No / Don't know [CHD]
- Cardiovascular disease or Stroke: Yes / No / Don't know [CVD]
- Renal dysfunction (chronic kidney disease): Yes / No / Don't know [CKD]

REPORT TO USER

Background Information

Risk factor	Your Response:	Explanation and References
Age	[AGE]	Age is the strongest known risk factor for dementia. Whilst it is possible to develop the condition earlier, the chances of developing dementia rise significantly as we get older. Above the age of 65, a person's risk of developing Alzheimer's disease or vascular dementia doubles roughly every 5 years. It is estimated that dementia affects one in 14 people over 65 and one in six over 80. By age 85 years and older, between 25% and 50% of people will exhibit signs of Alzheimer's disease. [1]
Sex	[SEX]	Women are more impacted by Alzheimer's disease than men – they are at significantly greater risk of developing Alzheimer's disease, and recent research shows that they also appear to suffer a greater cognitive decline than men at the same age. Explanations have been linked to a variety of factors including differences in cognitive reserve, resilience, as well as genetics (Apolipoprotein e4) and functional and structural brain changes.[2]
Education	[EDUCATION]	Higher education levels provide some preventive benefit against Alzheimer's and dementia. Scientists also believe that more years of education builds a "cognitive reserve" in the brain, which can enable a person to compensate better during the early stages of the disease. [3] In a quantitative analysis, the dementia risk was reduced by 7 % for per year increase in education.[4] This suggests a dose-response relation between education and dementia risk. However, we can still attain higher and further education as we age and learning and acquiring new skills are not limited to the young.
Positive Family history	[FAMILY HX]	Family History of Alzheimer's Having a parent, brother, or sister diagnosed with Alzheimer's increases the risk of developing the disease. **Early onset Alzheimer's** (before age 65) is highly correlated with family genetic factors, but is also extremely rare in the population. [5]
APOE Gene Status		Research indicates that the APOE gene can have a modest effect on the chances of developing **late onset** Alzheimer's (after age 65). There are three variants of this gene: E2, E3, E4. The E3 variant has no influence on Alzheimer's risk, while the E2 variant seems to confer some protection against Alzheimer's. The E4 variant appears to increase the risk of Alzheimer's disease. [6]

Lifestyle Factors

Risk factor	Your Response:	Explanation and References
Weight and Height	**BMI and [BMI CAT]**	Several studies have suggested that overweight and obesity in mid-life are related to a greater risk of cognitive decline and subsequent dementia, although in older adults this has not always been observed. [7] However, both

		are associated with the metabolic syndrome, diabetes and cardiovascular disease and other conditions which increase the risk of dementia. A recent study using data from more than 5,000 people has found that a higher percentage of belly fat (high waist to hip ratio) was associated with reduced cognitive function in Irish adults older than 60. [8]
Diet and Nutrition	[HEALTHY DIET CAT]	A diet rich in fish, fresh vegetables, fruit, nuts, and light on saturated fats, processed sugar, and red meat is good for heart health and brain health.[9] Several studies show that adherence to a Mediterranean diet (low in meat and dairy products, high in fruits, vegetables, legumes, cereals, and fish) is associated with a lower risk of dementia, but this also has been shown for the DASH and MIND diets.[10] Researchers from Rush University in Chicago have combined elements from both the Mediterranean Diet and the Dietary Approaches to Stop Hypertension (DASH) diets to create the Mediterranean-DASH Intervention for Neurodegenerative Delay (MIND) Diet. [11]
Alcohol consumption	[ALCOHOL CAT]	The association of alcohol with cognitive outcomes appears to be J-shaped or U-shaped, with harmful effects of both abstinence and excessive alcohol consumption. [12] **Moderate** alcohol use (about 1 drink per day) is associated with a lower risk of ischemic stroke and dementia. A key point is the definition of “moderate” alcohol intake, which is between **10 grams and 20 grams** of pure alcohol each day. A glass of wine contains about 12 grams of alcohol, as a reference point. [13]
Smoking	[SMOKING]	Current and former (to a lesser degree) cigarette smoking is a risk factor for Alzheimer’s, cardiovascular disease and related dementias.[14] A recent meta-analysis of 34 follow-up studies showed that smokers show an increased risk of dementia, and smoking cessation decreases the risk to that of never smokers. The increased risk of AD from smoking is more pronounced in apolipoprotein E ε4 non-carriers. [15]
Physical activity	[PHYSICAL ACTIVITY CAT]	Regular physical exercise improves memory, attention, and decision-making skills in both children and adults. Physical exercise also supports cardiovascular health, which is important for brain health. [16] Physical activity is one of the most feasible interventions that people can take as a preventative practice against dementia. Leisure time physical activity (eg, sports, exercises and recreational activities) has been shown by numerous prospective studies to decrease the incidence of dementia and Alzheimer’s in a dose-response fashion.[17]
Cognitive activity	[COGNITIVE ACTIVITY SCORE]	The brain grows new connections between neurons all the time, especially when we are learning something new or are exposed to a novel environment. Cognitive stimulation is good for a healthy brain.[18] In a large cohort of older adults who were free of dementia, researchers found that late-life participation in intellectual activities was associated with lower risk of dementia several years later. This association was not fully

		explained by other health lifestyle practices (regular physical exercise, adequate fruit and vegetable intake, and not smoking) nor by a wide range of physical health problems and limitations (cardiovascular risk factors, depression, sensory impairments, and poor mobility).[19]
Sleep	[SLEEP CAT]	Chronically restricted & disrupted sleep elevates stress hormones, which can lead to cardiovascular disease risk and stress related brain disorders. [20] New research findings have demonstrated that sleep is an important brain health factor at all ages. It appears that during sleep, particularly deep and REM sleep, the brain clears its waste products. It is suggested that poor sleep hygiene contributes to the accumulation of proteins that eventually can lead to dementia. Also, many follow up studies have shown that sleep disturbances, including insomnia, sleep disordered breathing (snoring with irregular breathing) and nonspecific sleep problems, are associated with a higher risk of all-cause dementia and both AD and vascular dementia subtypes. [21]

Health Factors

Risk factor	**Your Response:**	**Explanation and References**
Diabetes	[DIABETES]	Elevated blood glucose readings are consistently linked to higher rates of Alzheimer's & dementia.[22] However, it seems that among diabetics treatment and normalization of glucose levels reduce the risk of dementia.
Elevated Cholesterol	[CHOLESTEROL]	High cholesterol levels in midlife are associated with an increased risk of Alzheimer's & dementia.[23] Prospective studies have found an association of lipid-lowering drugs, and in particular statins, with decreased risk for mild cognitive impairment (MCI) and dementia.[24]
Hypertension	[HYPERTENSION]	High blood pressure in midlife is associated with an increased risk of Alzheimer's & dementia.[25] For years, we thought 140/70 or 140/80 was normal blood pressure. However, new guidelines, even in the cardiovascular literature, are showing that lower may be better. Tighter control of optimal blood pressure in the 120s may not only improve cognitive decline and progression towards dementia, but also reduce brain white matter lesions. This has been recently confirmed by SPRINT MIND trial, which may be the strongest evidence to date that it really is possible to delay or possibly prevent the onset of mild cognitive impairment and dementia.[26]
Depression or use of anti-depressant	[DEPRESSION]	Social isolation and depression can negatively affect brain health.[27] Studies show that any depressive symptoms increase the risk of cognitive decline and dementia. This is probably because patients with depression are inclined to do less physical activity, cognitive activity and have less purpose in life, which are all correlated with AD risk.[28] The role of pharmacological and nonpharmacological antidepressant

		strategies in preventing dementia onset is still not clear.
Coronary Heart disease	[CHD]	Cardiometabolic diseases such as hypertension, coronary artery disease (CAD) and diabetes have been shown to associate with impaired cognitive function in many cross-sectional studies. Impaired cardiovascular function may cause cognitive decline by inhibiting cerebral blood flow, possibly leading to hypoperfusion and the amyloid beta plaques that characterize Alzheimer's disease (AD).[29] This may explain the association between atrial fibrillation, coronary artery disease, heart failure and other cardiac diseases and dementia.
Cardiovascular disease or Stroke	[CVD]	Cardiovascular disease increases the risk of stroke, Alzheimer's & dementia.[30] Several lines of evidence suggest that improved control of cardiovascular risk factors is a substantial contributor to declines in dementia rates.[31]
Renal dysfunction	[CKD]	Chronic kidney disease (CKD) has evolved as a possible new determinant of cognitive decline and dementia.[32]

Summary

Background Information

Age: [AGE] years

Sex: [SEX]

Education: [EDUCATION]years

Family history of early dementia[1] or genetic predisposition: [FAMILY HX]

Lifestyle Factors

BMI=_____ [BMI CAT]

Healthy Diet: [HEALTHY DIET CAT]

Alcohol: [ALCOHOL CAT]

Smoking: [SMOKING]

Physical activity: [PHYSICAL ACTIVITY CAT]

Cognitive activity: [COGNITIVE ACTIVITY SCORE] of 24 maximal points

Sleep: [SLEEP CAT]

Health Factors

- Diabetes (elevated blood sugar) DISPLAY ONLY IF [DIABETES]= Yes
- Elevated Cholesterol (more than 200 mg/dl or taking cholesterol lowering drugs) DISPLAY ONLY IF [CHOLESTEROL]=Yes
- Hypertension (elevated blood pressure or taking blood pressure lowering drugs) DISPLAY ONLY IF [HYPERTENSION]=Yes

- Depression or taking anti-depressant drugs DISPLAY ONLY IF [DEPRESSION]=Yes
- Coronary Heart disease DISPLAY ONLY IF [CHD]=Yes
- Cardiovascular disease or Stroke DISPLAY ONLY IF [CVD]=Yes
- Renal dysfunction (chronic kidney disease) DISPLAY ONLY IF [CKD]=Yes

Medical Notice: This report provides general information only, and is not an intent to practice medicine. This report cannot substitute for professional medical advice or clinical diagnosis of Alzheimer's disease, memory loss, dementia, mild cognitive impairment (MCI), or any other medical condition.

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LEGEND

Red font: variables, categories, scores and calculations

[VARIABLE]
– input value by user from the survey (i.e., [AGE], [SEX], [EDUCATION]…)

[VARIABLE CAT]
– a category assigned based on response(s) by user (i.e., [BMI CAT], [HEALTHY DIET CAT], [ALCOHOL CAT], [PHYSICAL ACTIVITY CAT]…)

[VARIABLE SCORE]
– a numeric score which sums values assigned to each response of the user (i.e., [COGNITIVE ACTIVITY SCORE])

Calculate BMI
– a calculation based on user input values