



Keeping the Brain Healthy



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Epidemiologic data is clearly demonstrating that brain disease is reaching epidemic proportions (Table 1).¹⁻³ It is already the leading cause of age-adjusted disability worldwide, and is projected to become the leading cause of death by the year 2040.⁴ This is a cause of major concern because while we have successfully reduced mortality from cardiac disease and other major killers, we have had no significant success in reducing the occurrence of either common or uncommon brain disorders.^{5,6} Stroke alone, despite the falling incidence, is still the third leading cause of death.⁷

At a clinical practice level, we should be concerned that we have little to offer, in terms of education and management principles, to patients who are at risk for, or who are developing, brain disorders. We believe that physicians must develop a new perspective on the brain—a perspective that

goes beyond a focus on mere diagnosis of brain pathology and incorporates principles of health promotion and disease prevention specific to the brain. Physicians must also develop new practice skills for brain health, as we will become ever more challenged to not only diagnose and treat brain disease, but also to lower the prevalence of brain disorders.

WHAT ABOUT THE BRAIN?

The '90s was the decade of the brain—a recognition that modern neuroscience has rapidly advanced our knowledge of the structure and function of the brain. Synthesising this information, and translating it into prevention and treatment options, is important for health-care providers and patients. Patients need fundamentally sound advice and practical approaches to improve brain health. Presently, anxious patients are being bombarded by conflicting and competing claims about treatments and procedures being offered to achieve improved brain health and longevity. Unfortunately, this drive for information is taking place in a post-modern, anti-intellectual environment where junk science proliferates and accessible, accurate information is often unavailable.⁸

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WHAT IS THE HEALTHY BRAIN PROGRAM?

The Healthy Brain Program (HBP) is an office/classroom based brain-health approach that draws from evidence-based knowledge, debunks junk science, is user-friendly and patient focused. It is the first program of its kind in Canada. The aim of the HBP is to give people a fresh look at the brain, helping people understand the brain as an organ of the body. The HBP was usually delivered as a short orientation, or series of talks, to consumers, teachers, paramedic professionals, nurses and physicians. Recipients were actively involved and encouraged to take ownership of their brain health by following the precepts and practical procedures provided in the program (www.healthybrain.org).

WHAT ARE THE EIGHT CATEGORIES OF BRAIN HEALTH?

The HBP is based on eight categories of brain health, each of which is supported by sound, empirical research (Figure 1). Whether the audience members were physicians, educators, or consumers, they were introduced to each category and provided with both basic information and practical health strategies to improve their function in each area. The categories and core content are described below:

1. Safety

Even mild head injuries are risk factors for the early



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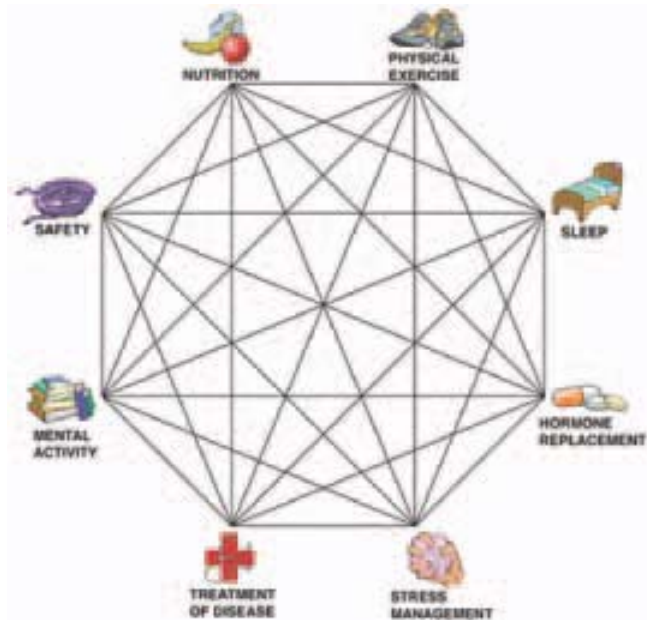


Figure 1. The eight categories of brain health.

onset of depression and dementia. Care practices should begin at birth. Shaken baby syndrome, for example, carries risk for lifelong vulnerability. Concussion associated with sports injuries and mild traumatic brain injury (MTBI) may initially be asymptomatic, but subsequent impacts carry increasing morbidity. It is also important to suspect MTBI in patients with alterations in cognitive function, mood, energy, and personality. Prevention is the best safety practice. Patients need to be aware of simple safety practices, such as wearing appropriate headgear, avoiding unnecessary risk, and recognising symptoms of traumatic injuries.

2. Nutrition

Contrary to public opinion, there is nothing that a person in a good nutritional state can eat to improve brain health. Common subclinical deficiency states, however, may have neuropsychiatric presentations. In addition, obesity is a risk factor for diabetes and cerebral vascular disorders, both of which can lead to brain problems. As a guideline, we can heed Hippocrates' aphorism—"What is good for the heart is generally good for the brain." There are also

Table 1

Why is brain health important?

- **Life expectancy is steadily increasing.**
- **Brain disease is becoming the leading cause of morbidity and mortality.**
- **The brain remains the weakest link in organ repair and replacement.**
- **Quality of life issues.**
- **Caregiver burden is huge.**
- **Economics—prevention makes sense.**

potential dangers in nutritional supplements and “natural remedies,” such as ginkgo biloba, garlic, ginseng, St. John’s Wort, and others, which can potentially interact with medications.

3. Physical Exercise

The direct and indirect effects of exercise on the brain are so significant that exercise comes closest to what might be the “fountain of youth.” Direct benefits include improved circulation and the production of catecholamines, endorphins, brain derived nerve growth factors, neuropeptides, and immune factors. Endocrine benefits include increased hypothalamic-pituitary adrenal (HPA) axis tone resulting in benefits to thyroid, adrenal, and gonadal systems. Insulin resistance improves. Exercise slows age-related organ deterioration. The indirect effects of regular exercise include reduction in sleep disorders and depressive illness, and delayed placement to nursing home. Patients need to be aware of the direct relationship between exercise and brain health, and be encouraged to participate in regular moderate aerobic exercises.



4. Mental Exercise

When the mind is active, the brain is working. Brain stimulation increases blood flow and metabolism of specific cortical regions and also supports glial cells which feed neurons. Research is now demonstrating direct links between mental activity and brain development, as well as pointing to the prophylactic effect of mental activity on preventing brain dementia. Research also suggests that sensory deprivation, environmental stimulus deprivation, and social deprivation all contribute to cognitive impairment and, in some populations, may even precipitate delirium. Patients should be encouraged to participate in a wide range of brain-stimulating mental activities.

5. Sleep

Sleep is a complex neuroendocrine process that is vital not only for rest, but for the consolidation of learning, optimal cognitive function, mood regulation, and a feeling of well-being. Deep, slow wave sleep is vital to anabolic repair, immune system function, endocrine regulation and stress response normalisation. Natural, healthy sleep entails falling asleep spontaneously, sleeping uninterrupted for eight to nine hours, and awakening spontaneously, feeling refreshed

and alert. This is rare. The average adult requirement is eight to nine hours—more for children and the elderly. Most people, especially adolescents and the elderly, do not get enough sleep. Patients need to be made aware of the profound negative consequences of sleep deprivation and encouraged to develop proper sleep patterns.

6. Stress Management

While stress is ubiquitous, as are the diseases related to it, most patients are unaware of either the mechanisms of stress or the effects of stress on the brain. High levels of cortisol, the stress hormone, have been

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shown to cause brain cell shrinkage and even neuron death. Elevated cortisol levels are causally associated with mood deregulation, cognitive impairment, and insulin resistance, even in healthy adults. Conversely, correction of hypercortisolemic states improves mood, energy, and cognitive function. Clinically useful methods for the normalisation of the HPA axis hyperactivity include: sleep, exercise, meditation, relaxation training, recreation, and selective serotonin reuptake inhibitor antidepressants.

7. Hormone Management

The brain is exquisitely sensitive to hormones and neuropeptides. Brain effects precede somatic manifestations of most endocrinopathies. Unfortunately, there are overlapping and nonspecific manifestations that are too confounding to permit diagnosis by mental status. Diagnosis and hormone replacement should be based on clinical presentation and free hormone assays, and the replacement of missing components should be undertaken, if indicated. Hormone replacement is here to stay and newer techniques will become more accurate and safer as inexpensive serial salivary assaying replaces blood sampling. Hormone replacement is already widely used for a variety of disorders (e.g., hypothy-

roidism). Patients need to be presented with accurate information on the relationship between hormones and brain function. The aim is to avoid “hormone hazards” and “hormone hysteria” and to encourage medically supervised hormone replacement therapy when indicated. Patients also need to be aware of the problems associated with indiscriminate and unmonitored use of hormones or abuse to produce euphoria, energy, and anabolic effects.

8. Treatment of Disease

The family physician (FP) sees many patients who have common ailments, which are risk factors for early onset dementia and other brain pathologies. The most common causes for a visit to the FP are now depression, hypertension, and diabetes, in that order. Each one is an independent risk factor for early onset dementia. Stress-related disorders, anxiety disorders, sleep disorders, and endocrine disorders are also very common and are associated with depressive illness. Unfortunately, as physicians, we are not as effective as we think; non-adherence to treatment is far too common. When these conditions are present, even in prodromal stages, it behoves the FP to be more assertive to educate and treat because evidence indicates that treatment will not only delay somatic end stage manifestations, but what is more important, treatment will delay the premature deterioration of quality of life that accompanies the early onset of brain pathology.

Practice Pointer

The obstacles to brain health are:

- **Lack of general knowledge about brain function.**
- **Overwhelming scientific information leads to confusion.**
- **Psychological factors: anxiety, denial, resistance to change.**
- **Social factors, shame, and stigmatisation.**
- **Cultural and lifestyle factors.**

WHY THE HBP?

First, the HBP has good content validity. The concept of brain health and the information base for each pillar clearly represents current knowledge and practice levels.

Second, there is collateral evidence for the efficacy of this type of health promotion. Healthy Heart

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Programs have been thoroughly studied, with results generally indicating that these programs have a positive impact on management of health risk factors and health-care costs.⁹⁻¹³ The decline in mortality from acute myocardial infarction is due as much to primary and secondary prevention, as to improved therapeutic intervention.¹⁴ We uphold that the same principle applies to the brain.

Third, the HBP has been generally very well received. The practical tips for brain health improvement are easy to carry out and often yield immediate results.

Finally, there are clinical benefits that may be realised by using the HBP to stabilise neuropsychiatric, cognitive, and neuroendocrine (brain) functions prior to psychiatric assessment. Depression and dementia, the most common brain disorders, remain underdiagnosed and overtreated. Many patients go without timely treatment, despite the fact that the number of patients on antidepressants and other psychotropic drugs has been escalating. Treatment adherence is generally very poor. Using the precepts of brain health to stabilise brain function (and symptoms) would yield more accurate diagnosis and better treatment outcome. It has been our clinical experience that if we stabilise nutritional status, stressors, sleep pattern, patterns of mental activity and physical activity, the psychiatric diagnosis and concomitant treatments undergo a shift. CME

Take-home message

- Caring for the brain is no different from caring for other parts of the body.
- The Healthy Brain Program teaches people about caring for the brain. The program can help to improve our health-care practices regarding the brain and its disorders and reduce the occurrence of such disorders in at-risk populations.

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