

Nutrition the Prevention and Treatment of Mental Health Disorders

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Objectives of this Presentation

- To discuss the role of exercise and nutrition in aspects of mental health management
- Discuss primary effects of exercise and nutrition on mental health
- Discuss effects of exercise and nutrition on mental health through improvements in physical health
- Discuss econdary or psychological effects on mental health from exercise and nutrition
- Discussion on why persons don't exercise or eat healthily, and what can be done about it



Overview

- Historical and cultural evidence for the utility of both exercise and nutrition in mental health
- Well known benefits of both exercise and diet management in the treatment of physical medical disorders, and the prevention of physical medical conditions
- The rates of chronic non-communicable diseases (NCDs) in Barbados has been a growing concern; strategies to decrease these rates have been looked at.

Overview

- Mental health conditions like physical health conditions have an economic and social cost.
- Costs are related to time away from work; accessing professional health care practitioners; pharmaceutical treatment costs; loss of quality of life
- Exercise and nutrition offer a potentially easier , if not cheaper, way of tackling concerns about both mental health and physical health

Overview

- Mental Health= Brain Health
- Mental Health Conditions are Inflammatory and Degenerative Conditions of the Brain
- Approach to dealing with physical medical conditions in preventing inflammation and oxidative stress in the body to prolong organ functioning should in theory work with the brain
- Exercise and Nutrition are expected to work along with traditional therapies, not necessarily replace them

Definition of Exercise and Nutrition

- bodily [exertion](#) for the sake of developing and maintaining physical fitness
- to use (a body part) repeatedly in order to strengthen or develop
- The provision of food necessary for health and growth

Merriam-Webster



Three types of physical activities



- The *Five Year Forward View for Mental Health* (2016) has once
- again highlighted that people with mental health problems have
- poorer physical health than the general population, often they
- are unable to access the physical healthcare they need and
- experience unnecessary health inequalities

Physical Health and Mental Health

- People with severe mental illness are particularly at risk and die on average 15-20 years earlier than the general population.
- Being in contact with mental health services does not necessarily mean people will have a physical health assessment, have their physical health monitored, or receive the information and support need to adopt a healthier lifestyle.

Physical Health and Mental Health

- Mortality among mental health service users aged 19 and over in England was 3.6 times the rate of the general population in 2010/11.
- People in contact with specialist mental health services per 100,000 service users, compared with 100,000 in the general population, had a higher death rate for most causes of death.

Physical Health and Mental Health

Within these disease areas specific conditions that accounted for a high proportion of deaths among service users (under the age of 75) were:

- diseases of the liver at 7.6% of deaths (1,430 in total)
- ischaemic heart diseases at 9.9% of all deaths (1,880 in total)4.
- The relative difference in mortality rates was largest among people aged 30 to 39: almost five times that of the general population.
- There were 198 deaths of people detained under the Mental Health Act in 2013/14, the majority of which were due to natural causes, including preventable physical ill health.

Physical Health and Mental Health

- nearly four times the rate of deaths from diseases of the respiratory system at 142.2, compared with the general population at 37.3
- just over four times the rate of deaths from diseases of the digestive system at 126.1, compared with the general population at 28.5
- nearly three times the rate of deaths from diseases of the circulatory system at 254, compared with the general population at 101.1.

Exercise as Medicine

- More than half of the physicians trained in the United States receive no formal education in physical activity, according to a 2015 study
- Most money is spent on treatment – not prevention
 - Example – Type 2 Diabetes – preventable disease that costs billions per year
 - Obesity costs \$200 billion annually

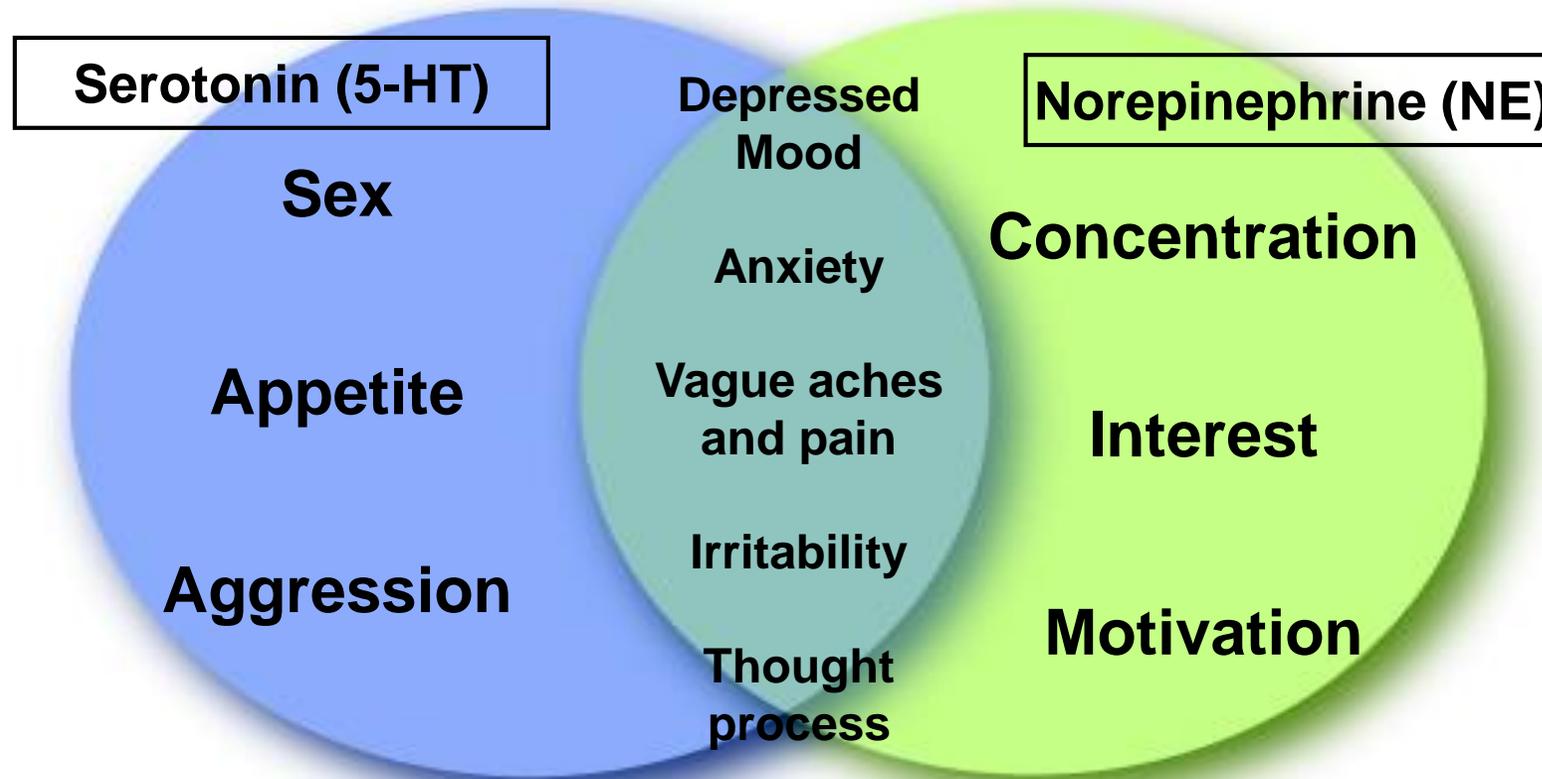
- 374 billion dollars was spent on prescription drugs in 2014. (Reuters)
- 30 million Americans were prescribed antidepressant drugs in 2014 (New York Times)
- The US consumes 80% of prescription painkillers worldwide



Introduction

- The World Health Organization predicts that by 2020 depression will create the greatest burden of disease in European countries (USDHHS, 1999).
- The link between 'healthy mind and body is not new' Hippocrates the Greek philosopher recommended exercise as treatment of mental illnesses.

Physiological Effects of Physical Exercise on Depression (Cont.)





How Exercise Increase the Mood Stabilizers?



1- Sympathetic nervous system is activated.

2- With more strenuous exercise circulating epinephrine and norepinephrine released from the adrenal medulla. (Prentice, 2005)



Supporting Theories of the Exercise Effects on Depression

There are many theories:

1- Acidosis \rightarrow \uparrow endorphins release.

2- \uparrow Circulation \rightarrow $\uparrow\uparrow$ endorphins.



- Exercise boosts serotonin & dopamine - improves mood and jump starts the attention system.
- Dopamine is associated with motivation and attention.
- Chronic exercise
 - Increases dopamine storage in the brain
 - Creates dopamine receptors in the reward center of the brain.
 - Regulates Serotonin, which is associated with aggression



- 1999 Duke University study - exercise reduces the effects of depression better than Zoloft.

Depression and Chronic Medical Illness

- **Treating comorbid depression could increase adherence to interventions for chronic medical illness**
- Comorbid depression is the existence of a depressive disorder (i.e. major depression, dysthymia or adjustment disorder) along with a physical disease, (infectious, cardiovascular diseases, neurological disorders, diabetes mellitus, or cancer). It is neither a chance phenomenon nor a mere feeling of demoralization or sadness brought on by the hardships of a chronic illness. While the prevalence of major depression in the general population can go from an average 3% up to 10%, it is consistently higher in people affected by chronic disease

Depression and Physical Illness Treatment

- Patients with comorbid depression are less likely to adhere to medical treatment, or recommendations, and are at increased risk of disability and mortality.
- It has been shown that depressed patients are three times more likely not to comply with medical regimens than non-depressed patients.
- there is also evidence that depression predicts the incidence of heart disease.
- In the case of infectious diseases, non-adherence to treatment can lead to drug resistance, and this has profound public health implications concerning resistant infectious agents.
- Illness-associated depression impairs quality of life and several aspects of the functioning of patients with chronic diseases; moreover, it results in higher health care utilization and costs. Clinical trials have consistently demonstrated the efficacy of antidepressant treatment in patients with comorbid depression and chronic medical illness. Such treatment improves their overall medical outcomes

Literature Review

- No definitive exercise recommendation for all elements of mental health promotion.
- No definitive formula of frequency, intensity and duration.
- 30 minutes or more of moderate exercise is recommended.
- Vigorous exercises are effective in treating depression .





Comparative Table of Studies and their Results on Exercise and Depression.

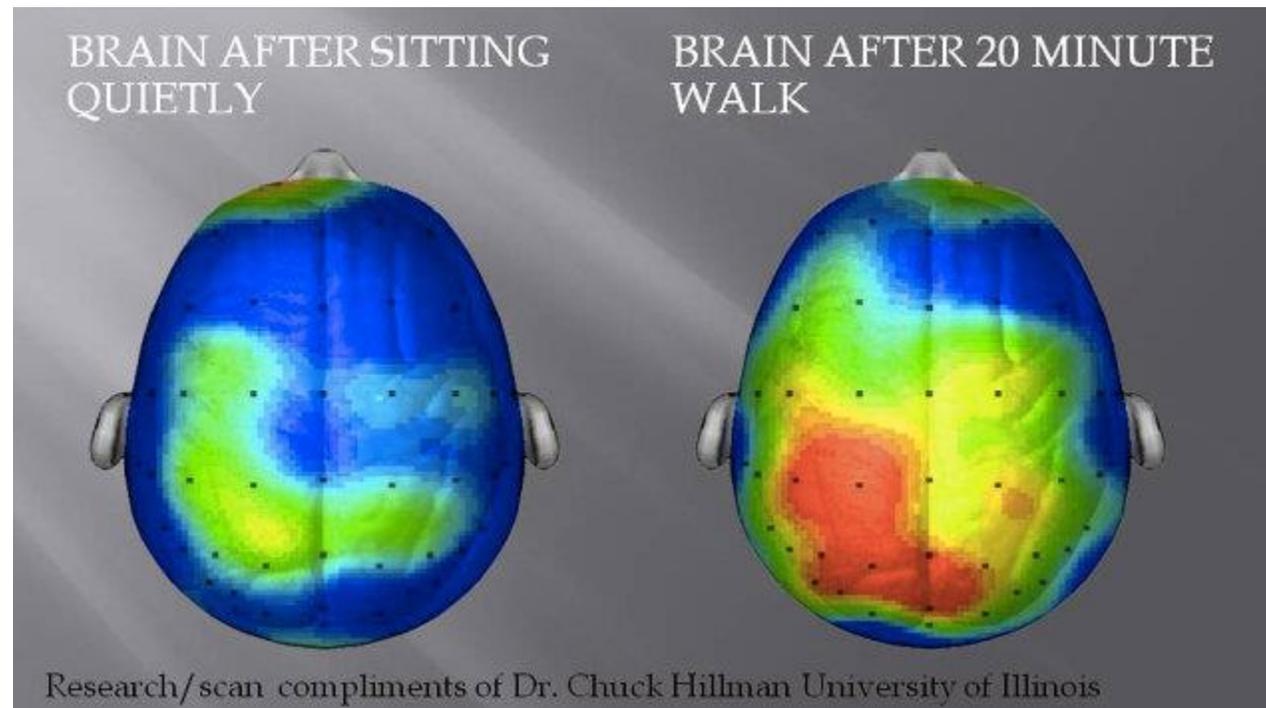
Author	Type of Exercise Program	Results
Craft, 1997	Aerobic exercise program > 9 Ws.	- Exercises produce larger antidepressant effects.
Babyak, Hermana, 2000.	30 mints. of speed walking 3\ w.	- Effective as drug therapy in relieving the symptoms of depression.
Dr. Dimeo, 2001.	Walking on a treadmill for 30 min. / day for 10 days.	- Exercise caused a clinically significant drop of depression symptoms.
Trivvedi, 2005.	Running 30-min. 3-5 time/week	- Depressive symptoms were reduced almost 50 %.

Why Is Exercise Medicine?

Getting people to be more active may be the ultimate low-cost therapy for achieving improved health outcomes

- Regular physical activity (PA) is associated with health benefits at any body weight including:
 - Reduction in risk for development of chronic diseases
 - Including heart disease, diabetes, high blood pressure and some types of cancer
 - Improved management of heart disease, diabetes and blood pressure
 - Improved bone health and reduced risk for osteoporosis
 - Improved muscular fitness
 - Improved mental health, including lower rates of depression and anxiety
- Regular PA is also associated with better long-term weight management

This is your Brain on Exercise

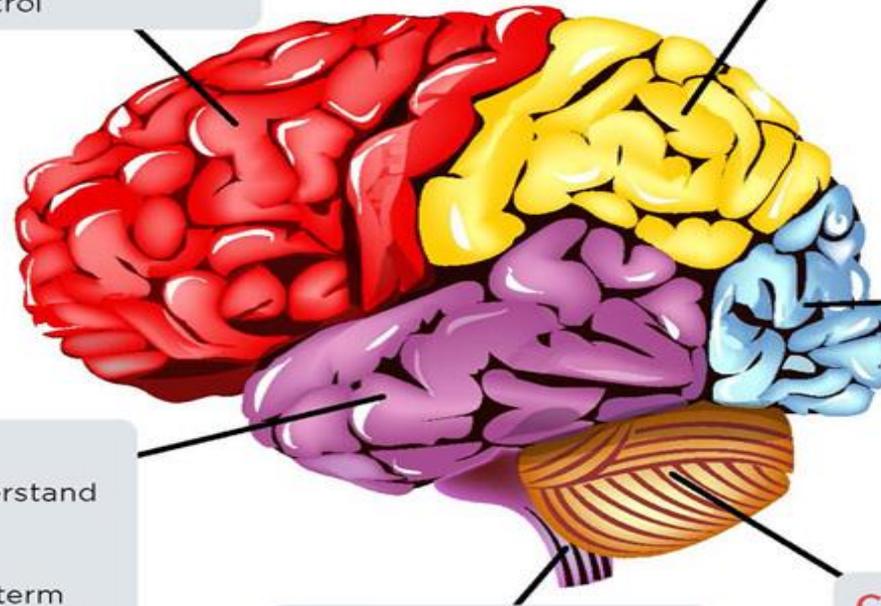


Frontal

- Personality
- Emotions and arousal
- Intelligence
- Ability to concentrate, make decisions, plan, put things in order, solve problems
- Awareness of what is around you
- Voluntary movement
- Ability to speak and write
- Behaviour control

Parietal

- Sensations: pain, touch, temperature
- Understanding and interpreting sensory information, such as size, colour and shape
- Understanding space and distance
- Math calculations



Occipital

- Vision
- Interpreting what you see

Temporal

- Ability to understand language
- Hearing
- Memory, long-term storage of memories
- Organization and planning
- Behaviour and emotions

Brain stem

- Breathing
- Heart rate control
- Consciousness, alertness, wakefulness
- Swallowing
- Blood pressure
- Sweating

Cerebellum

- Balance
- Motor (movement) coordination
- Posture
- Fine motor skills

Physical Activity & the Brain

Physical activity enhances brain function

- Chronic (long term) effects:
 - Lifetime exercise is associated with enhanced brain function and a decreased risk of developing neurodegenerative diseases such as Alzheimer's.
- Acute (short term) effects:
 - A 30 minute session of physical activity can help improve memory for studying and critical thinking for assignments.

Kramer AF & Erickson KI. Capitalizing on cortical plasticity: influence of physical activity on cognition and brain function. *TRENDS in Cognitive Sciences*. 11 (8): 342-348.



Physical Activity & Mood



Physical activity releases hormones to decrease depression and feelings of anxiety.

- **Chronic (long term) effects:**
 - Regular physical activity decreases feelings of chronic anxiety.
- **Acute (short term) effects:**
 - One session of physical activity reduces feelings of anxiety and creates calmness.
 - One session of moderate to vigorous activity decreases feelings of depression.

Exercising with Anxiety and Depression:

http://exerciseismedicine.org/assets/page_documents/EIM%20Rx%20series_Exercising%20with%20Anxiety%20and%20Depression_2.pdf



Exercise & Learning

- BDNF – Brain Derived Neurotropic Factor
 - Protein developed as a result of chronic aerobic exercise
 - Stimulates Neurogenesis – Miracle Grow for the brain
 - Hippocampus – responsible for learning and memory



- Brain loses plasticity with chronic depression - exercise-induced BDNF production reverses this.
- Chronic stress causes increased secretion of Cortisol - increases fat deposits in the mid-section.
- Abdominal fat is more “metabolically mobile”, - greater risk for high cholesterol, heart attacks and stroke.
- Chronic stress = increased cortisol = damage to neurons = reduce ability to learn = reduce memory.
- Exercise decreases the level of circulating cortisol



Fitness Testing – Texas Study

- Fitness Gram utilized for 2.4 million students in Texas public schools
- Higher levels of fitness are associated with better academic performance (TAKS)
- Higher levels of fitness are associated with better school attendance
- Higher levels of fitness are associated with fewer behavioral incidents
- Cardio fitness is most associated with academic performance
 - Schools with the highest and lowest academic performance also have highest and lowest cardio fitness
- Fitness levels tend to decline with each passing grade



Exercise and Aging

Exercise slows brain aging by 10 years
Sitting Too Much Ages You by 8 Years



Exercise

- Used as a treatment aid in psychiatric in-patients in Burlington, Vermont. Sessions were of 60 minute duration
- Exercise reduced anxiety, depression, anger, psychomotor agitation, muscle tension
- Patients reported more feelings of well-being after exercise. 95% reported an improvement in mood, and 63% reported feeling happy

Exercise

- Individuals who exercise regularly have superior mental health compared to those who do not exercise, new research suggests.
- Investigators studied data for 1.2 million US adults and found that those who exercised had 1.5 fewer days of poor mental health during the past month than their physically inactive matched counterparts.
- Amid the wide range of activity included in the study, team sports, cycling, aerobics, and going to the gym were associated with the largest reductions.
- The regimen associated with the greatest benefits was exercising for 45 minutes three to five times a week. (Yasgur et al)

- Mid-life women with weak upper and lower body fitness may be more prone to depression and anxiety, a study from Singapore suggests.
- In particular, poor handgrip strength and needing a long time to stand from a chair were associated with higher depression or anxiety symptoms, the study authors reported online June 3 in *Menopause*.
- "Mid-life women globally are in an incredibly difficult position: sandwiched between children, aging parents, husband and work commitments," said senior study author Eu-Leong Yong of the National University of Singapore.
- "They sacrifice themselves in face of all these demands, and sometimes neglect their own needs," he told Reuters Health by email. "Anxiety and depression may go unrecognized."

- In a new study,^[1] investigators wondered whether [exercise can prevent new-onset depression or anxiety.](#)
- To find out, a cohort of about 33,000 people with no mental health conditions were followed for an average of 11 years. Those who reported no exercise at baseline had 44% higher odds of developing depression compared with those who were exercising 1-2 hours a week (Harvey et al 2017)
- The researchers concluded that if everyone exercised at least 1 hour a week, 12% of the cases of depression that occurred could have been prevented. (Kraepelien et al 2015)

These findings are supported by another recent study^[2] of more than 600 patients with mild to moderate depression. After 12 weeks, exercise of any intensity was linked with lower severity of depression, and the benefits were sustained at 1 year.

Reasons for People NOT Exercising

- Cost-travel, equipment, clothing, gym, sports club dues
- Fear of joining an existing group/gym esp women
- Childcare
- Accessibility of facilities/safety considerations
- Time constraints
- Lack of enjoyment
- Weather
- Mental health issues- stress, depression, chronic medical or psychiatric disorders



How To Get People to Exercise

- Clearly Branded Beginner's Groups, with graduation schedules in gyms, running or walking clubs etc.
- Focus on the fun and socialising aspects, and less so on the health benefits
- Encourage persons to find an activity that they like
- Find a friend to exercise with
- Time management and scheduling and involve relatives and friends to help



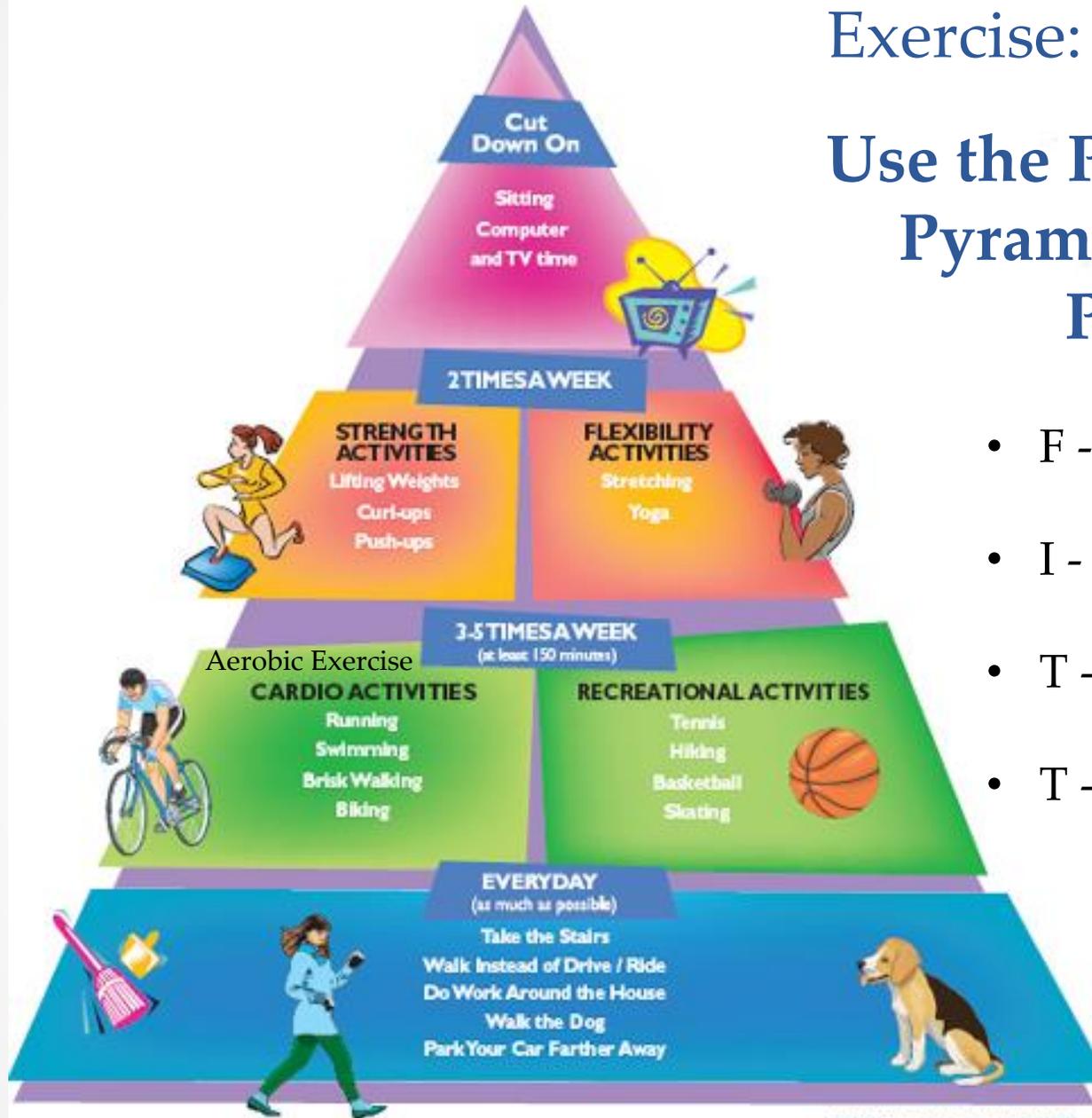
Secondary Gains to Mental Health from Exercising

- Feelings of autonomy
- Feelings of accomplishment- goal setting and achievement
- Improved physical ability and appearance evident to others
- Effect is improvement in confidence and self-esteem



Exercise: Where to Begin?

Use the Physical Activity Pyramid & the FITT Principle



- F - Frequency (How often)
- I - Intensity (How hard)
- T - Time (How long)
- T - Type (What type)

NUTRITION

Healthy Nutrients

- Omega-3 fatty Acids
- B Vitamins
- Minerals
- Amino acids

Healthy Nutrients

- Omega-3 polyunsaturated fatty acids
- These are anti-inflammatory and decrease oxidative stress i.e. they are antioxidants

Healthy Nutrients

- Omega 3 Fatty Acids
- Found in oily fish such as salmon, mackerel, tuna, herring, and sardines
- Recommended dosage of 500mg of combined EPA and DHA, where the ratio of EPA: DHA is 3: 1

Healthy Nutrients

- B Complex
- There are eight (8) B vitamins in total
- Thiamine (B1), riboflavin (B2); Niacin (B3); pantothenic acid (B5); pyridoxine (B6); Biotin (B7); folate (B9); cobalamin (B12)
- B1 is important in memory preservation
- B2 and B3 are linked to increased mood
- Lack of B6 and B9 are linked to depression and mood swings
- Lack of B12 is associated with depression, confusion, and dementia

Desired Nutrients

- Foods containing a high quantity of the B vitamins are red meat, poultry, eggs, avocado, whole grains, legumes, dairy and fruits
- Carbohydrates are important in the production of neurotransmitters (serotonin) and tryptophan which affect mood. Carbohydrates should be taken with foods that cause a gradual increase in blood sugar such as pasta, vegetables, and brown rice.
- Proteins are needed for building of neurotransmitters and are found in meat, poultry, fish , eggs, dairy, peas, soy, and grains.

Mediterranean Diet

- Oily Fish such as salmon, mackerel, tuna, sardines
- Fruits
- Vegetables
- Nuts
- Legumes
- Olive Oil
- Plant based, non-processed foods

Mediterranean Diet (cont.)

- Allows for moderate consumption of fish, poultry, and alcohol
- Avoidance of red meat, and sugar
- Diet contains high levels of B12 and folate, and antioxidants

DASH (Diet Approaches to Stop Hypertension)

Dash Diet

- Designed to reduce the risk of stroke
- Low in Sodium
- Contain potassium, magnesium, zinc
- Conflicting evidence with regards effects of depression. One study however shows one is 11% less likely to get depressed if on this diet

Mediterranean Diet

- Investigators in Hellenic Open University in Patras, Greece noted that older persons who adhered to the Mediterranean diet had a decreased likelihood of developing depression
- 20% of older adults (average age of 70 years) will have at least one episode of major depression
- There was also decrease in age-related cognitive decline
- DASH Diet also caused less likelihood of dementia in older population

Foods Causing Inflammation

- High in trans-fat
- High in Saturated Fat
- Refined Sugar
- Processed food

DASH Diet

- Will protect against cardiovascular disease and help to boost mood
- This is especially important in post-stroke depression

Gut-Brain Microbiome System

- Stress and Emotions affect gastrointestinal functioning
- Nausea, bloating, abdominal pain, diarrhea which occur with psychological distress are examples of this.
- It is estimated that there are about 100 trillion organisms living in our gut.
- Research has shown there is a relationship with gut organisms and mood
- Variations in gut organisms are associated with a range of neurological and psychiatric conditions including epilepsy, AUTISM, schizophrenia, bipolar disorder, Alzheimers, and Parkinsons

Gut-Microbiome System

- Theory that increases in depression which are being seen are being caused by over-use of antibiotics and processed food affecting gut organisms (Brietzlle)
- Role of Probiotic (organisms) Therapy- still largely experimental. Shown to improve mental health of lab animals.
- Study in Iran where probiotics consisting of *Lactobacillus helveticus* and *Bifidobacterium longum* caused a significant decrease in anxiety symptoms over placebo

Gut Microbiome System

- Flemish Gut Flora Project- coprococcus and Dialister, which are two groups of bacteria are consistently depleted in people diagnosed with depression regardless of antidepressant treatment
- There are organisms which produce (3,4, dihydroxyphenylacetic acid) which is a metabolite of the human neurotransmitter dopamine.

Depression Treatment

- SMILES Study (Felice Jacka et al, Australia 2018)
- Patients with depression who followed the Mediterranean diet for twelve (12) weeks improved significantly than those who received social support only
- Brain Food Clinic –Eat to Beat Depression e- course.

Brain Health

- Aging causes a shrinking of the brain structure called the hippocampus
- A healthy diet in mid-life is associated with a larger hippocampus
- This larger hippocampus is important in protecting against mental illness and cognitive decline (Alcbaraly et al, Montpellier, France)
- Also demonstrates that low alcohol intake is also important in preserving size of the hippocampus

Brain Health

- In Australia it was shown that persons with a first episode of psychosis had low levels of folate (folic) acid and Vitamin D.
- There was also a low level of vitamin C found with these individuals but it was not as much
- Low levels of folate and B12 have often been found in patients with schizophrenia for a long time. Schizophrenia has also been found to be associated with low levels of Vitamin C, E, and D.
- Low levels of Vit B12 and folate have been shown to increase the risk of depression.

Brain Health

- It has been found that taking of B12 can prevent depression in some populations
- Persons who are vegetarian who get too little B12 will get depressed

Brain Health

- A large study in the UK showed that increases in fruit and vegetable intake will increase short-term mental well-being. This was also seen in a large study in Australia
- Blanchflower et al in 2013 reported psychological well-being occurring with the eating of fruits and vegetables
- Neel Ocean et al concluded that “ when it comes to improving mental health, policies aimed at increasing fruit and vegetable consumption among the general population may provide a relatively low-cost public health intervention that supplements current approaches:

Brain Health

- Positive effect of fruits and vegetables on mood swings associated with menopause, as well as other physical symptoms.
- In Iran, a study showed that women who consumed the most greens in their diets tolerated menopause better
- Fruits and vegetables increase fibre, which is thought to modify estrogen metabolism, which decreases the fluctuations which occur with estrogen levels in menopause, thus leading to less symptoms.

Barriers to Health Eating

- Cost and Availability of Fruits and Vegetables
- Taste preferences
- Convenience Factor of Fast Food

Recommendations

- Price Reductions on Healthy Foods
- Provide Incentives for Commercial farming
- Encourage Home Gardening
- Greater exposure and education about the benefits of local healthy food.

THANK YOU!