**SCIENCE 10**

**NERVOUS SYSTEM, ENDOCRINE SYSTEM AND REPRODUCTIVE SYSTEM DISORDERS**

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**SECTION:**

**TOURMALINE**

**NERVOUS SYSTEM**

**EPILEPSY:**

Epilepsy is a neurological disorder characterized by recurrent, unprovoked seizures. A seizure is a sudden surge of electrical activity in the brain, which can lead to a variety of physical and mental symptoms, depending on the area of the brain involved.

**AFFECTED ORGANS:**

The brain is the central organ affected by epilepsy. Seizures occur due to abnormal electrical activity in the brain, leading to a wide variety of symptoms, including motor, sensory, and cognitive disruptions.

**SYMPTOMS:**

**Visual disturbances:** Flashing lights or blurred vision**.**

**Sudden emotional changes:** Fear, euphoria, or a sense of déjà vu

**TREATMENT:**

Sufficient **sleep**, avoiding **triggers**, and **regular exercise**.

Safety measures to prevent injury during seizures.

**PREVENTION:**

Medication Adherence: Consistently taking prescribed antiepileptic drugs (AEDs) can help prevent seizures in individuals with epilepsy.

Managing Triggers: Identify and avoid known seizure triggers (e.g., stress, lack of sleep, flashing lights, certain foods).

**STROKE:**

A stroke is a medical emergency that occurs when there is a disruption of blood flow to the brain, resulting in damage to brain cells

**AFFECTED ORGANS:**

A stroke can lead to complications like heart failure or irregular heart rhythms (arrhythmias) if the stroke is caused by a heart-related issue

**SYMPTOMS:**

Sudden Numbness or Weakness

Sudden **blurred or double vision**

**TREATMENT:**

Thrombolytic Therapy (tPA)

Medications to lower **blood pressure** and control bleeding.

**PREVENTION:**

Medications like ACE inhibitors, diuretics, or beta-blockers may be prescribed to control high blood pressure

**MEMORY LOSS;**

Memory loss refers to the inability to recall information or past experiences, which can affect a person's ability to perform everyday tasks. It can vary in severity, from forgetting small details to the complete loss of long-term memory.

**AFFECTED ORGANS:**

**Hippocampus**: Responsible for forming new memories.

**Prefrontal Cortex**: Plays a key role in short-term memory, decision-making

**SYMPTOMS:**

Difficulty remembering what happened a few minutes or hours ago.

Forgetting appointments, names, or where items were placed.

**TREATMENT:**

**Memantine**: This medication helps regulate glutamate, another neurotransmitter in the brain, and is typically prescribed for moderate to severe Alzheimer's disease.

**PREVENTION:**

**Eat a brain-boosting diet**: Focus on foods that promote brain health,

**Omega-3 fatty acids found in fatty fish (e.g., salmon, mackerel, sardines)**

**FATIGUE:**

Fatigue is a feeling of extreme tiredness or exhaustion that can occur for a variety of reasons, including physical, mental, or emotional causes

**AFFECTED ORGANS:**

**Mental Fatigue (Cognitive Fatigue)**: This involves difficulties in concentration, memory, and decision-making. Mental fatigue can impair your ability to think clearly, process information quickly, and react effectively.

**SYMPTOMS:**

Fatigue can cause muscles to feel sore, heavy, or stiff without physical exertion.

A feeling of physical weakness, where everyday activities may feel more difficult

**TREATMENT:**

**Sleep Hygiene**: Establish a consistent sleep schedule by going to bed and waking up at the same time every day, even on weekends. Create a relaxing bedtime routine, and make sure your bedroom is cool, dark, and quiet.

**PREVENTION:**

**Get 7-9 Hours of Sleep**: Aim for a sufficient amount of rest each night. Sleep is essential for the body to recover and restore energy.

**AIZHEIMER:**

Alzheimer's disease is a progressive neurological disorder that affects memory, thinking, and behavior. It is the most common cause of dementia, a general term for the decline in cognitive ability severe enough to interfere with daily life

**AFFECTED ORGANS:**

Neurons (Brain Cells): In Alzheimer's, there is progressive damage to neurons (nerve cells), leading to their death. This causes the brain to shrink, particularly in areas related to memory, thinking, and behavior

**SYMPTOMS:**

**Aphasia**: Difficulty understanding or using spoken or written language.

**Mood Swings**: Becoming unusually anxious, suspicious, depressed, or fearful.

**TREATMENT:**

**There are medications to help manage symptoms, particularly in the early to middle stages of Alzheimer’s. These drugs aim to improve cognitive function and reduce certain behavioral symptoms.**

**PREVENTION:**

**Fruits and Vegetables: Rich in antioxidants, vitamins, to Protect The Brain**

**Whole Grains: High in fiber and important for overall brain and heart health.**

**AUTISM:**

Autism, or Autism Spectrum Disorder (ASD), is a neurodevelopmental disorder that affects an individual's ability to communicate, interact with others, and engage in repetitive behaviors or interests.

**AFFECTED ORGANS:**

Prefrontal Cortex: This area is important for decision-making, social behavior, and impulse control, and may show differences in individuals with autism.

**SYMPTOMS:**

**Verbal communication**: Some individuals with autism may not use verbal language at all or may struggle with sentence formation.

**TREATMENT:**

ABA is one of the most widely used and researched therapeutic approaches for individuals with autism. It focuses on improving specific behaviors and teaching new skills through reinforcement techniques.

**PREVENTION:**

Family History: Autism tends to run in families, indicating a genetic predisposition. However, there are currently no genetic tests available that can predict whether a child will have autism.

**ENDOCRINE SYSTEM**

**DIABETES:**

Diabetes is a chronic medical condition that affects how your body uses blood sugar (glucose). Glucose is an essential source of energy for your body’s cells, but for it to enter your cells, your body needs insulin, a hormone produced by the pancreas.

**AFFECTED ORGANS:**

Heart: People with diabetes are at an increased risk of heart disease, heart attacks, stroke, and atherosclerosis (narrowing and hardening of the arteries) due to high blood sugar and high blood pressure

**SYMPTOMS:**

Excessive thirst is a common symptom, as the body tries to flush out excess glucose through urination, leading to dehydration

**TREATMENT:**

People with Type 1 diabetes require **insulin injections** or an **insulin pump** to provide the insulin their body is unable to produce

**PREVENTION:**

**Obesity** is a major risk factor for Type 2 diabetes. Maintaining a healthy weight through balanced diet and regular exercise is one of the most effective ways to prevent Type 2 diabetes.

**Thyroid Cancer:**

Thyroid cancer occurs when cells in the thyroid gland grow uncontrollably and form a tumor. The thyroid is a small, butterfly-shaped gland located at the base of the neck.

**AFFECTED ORGANS:**

Thyroid: The thyroid gland is the primary organ affected by thyroid cancer. It is responsible for producing hormones that regulate metabolism. The cancer develops in the thyroid cells, which may lead to the formation of a nodule or lump.

**SYMPTOMS:**

One of the most common symptoms is a painless lump or swelling in the neck, which is often felt during a routine physical exam.

**TREATMENT:**

Total Thyroidectomy: The complete removal of the thyroid gland. This is the most common surgery for thyroid cancer, especially in cases of papillary and follicular thyroid cancer.

**PREVENTION:**

Avoiding Radiation Exposure:

Regular Monitoring and Early Detection:

**PCOS:**

Polycystic Ovary Syndrome (PCOS) is a common hormonal disorder that affects individuals with ovaries, typically during their reproductive years (teenagers to early 30s). It is characterized by a combination of symptoms related to hormonal imbalances, irregular periods, and cysts on the ovaries.

**AFFECTED ORGANS:**

Primary organ affected: The ovaries are the main site where the symptoms of PCOS manifest.

**SYMPTOMS:**

Acne: Oily skin and acne, especially around the face, chest, back, and shoulders, are common due to elevated androgen levels.

**TREATMENT:**

Exercise: Regular physical activity can help with weight management, improve insulin sensitivity, and reduce the risk of developing type 2 diabetes. Aim for at least 150 minutes of moderate-intensity exercise per week, including both aerobic and strength-training exercises.

**PREVENTION**

**Balanced diet**: Eating a diet rich in fruits, vegetables, whole grains, lean proteins, and healthy fats can help regulate hormones and improve overall well-being. A healthy diet can also assist in managing weight, which is important in reducing the risk of insulin resistance and related complications

**HYPOGLYCEMIA:**

Hypoglycemia refers to a condition where a person's blood sugar (glucose) levels drop too low. It can be a serious condition if not treated promptly, as glucose is the body's primary source of energy, particularly for the brain.

**AFFECTED ORGANS:**

The heart depends on glucose to fuel its muscles, and it may experience disruptions during hypoglycemia.

**SYMPTOMS:**

Sweating (often cold sweat)

Dizziness or lightheadedness

**TREATMENT:**

Glucose tablets (usually 3–4 tablets, depending on the brand)

1/2 cup (120 ml) of fruit juice (such as orange juice)

**PREVENTION:**

Monitor Blood Sugar Levels Regularly

Avoid Excessive Alcohol

**PITUITARY GLAND:**

The pituitary gland is a small but crucial organ located at the base of the brain, just beneath the hypothalamus. Often referred to as the "master gland," it plays a central role in regulating various hormonal functions in the body by controlling the activity of other glands.

**AFFECTED ORGANS:**

Thyroid Gland:

Gonads (Ovaries/Testes)

Bones and Muscles:

**SYMPTOMS:**

Enlargement of hands and feet (swelling of extremities

Thickened skin and coarse facial features (such as enlarged nose, jaw

**TREATMENT:**

Surgery: The first-line treatment is often the removal of pituitary tumors (if present) through a procedure called transsphenoidal surgery, which is done through the nose and sinuses.

**PREVENTION:**

Screening: For individuals at higher genetic risk, regular medical check-ups with brain scans (MRI) may help detect tumors early**.**

**HORMONES:**

Hormones are chemical messengers produced by various glands in the endocrine system. They travel through the bloodstream to regulate various functions in the body, including growth, metabolism, immune function, and mood

**AFFECTED ORGANS:**

Affects: The thyroid produces T3 (triiodothyronine) and T4 (thyroxine) hormones, which regulate metabolism, energy production, and growth.

**SYMPTOMS:**

Dry skin and hair

Slow heart rate

**TREATMENT:**

Purpose: To relieve symptoms associated with menopause (such as hot flashes, night sweats, mood swings, vaginal dryness, etc.) caused by a decrease in estrogen and progesterone levels

**PREVENTION:**

Avoid Processed Foods: Processed and packaged foods often contain chemicals and preservatives that can disrupt the endocrine system

**REPRODUCTIVE SYSTEM**

**CERVICAL CANCER:**

Cervical cancer is a type of cancer that begins in the cervix, which is the lower part of the uterus (womb) that connects to the vagina. It most commonly occurs when abnormal cells in the cervix grow uncontrollably, often due to infection with certain strains of the human papillomavirus (HPV).

**AFFECTED ORGANS:**

The cervix is the most affected organ in cervical cancer. The cancer usually begins in the cells of the cervix, specifically in the squamous cells

**SYMPTOMS:**

Postcoital bleeding: Bleeding after sexual intercourse is a common symptom.

Postmenopausal bleeding: Any bleeding after menopause should be taken

**TREATMENT:**

Conization (Cone Biopsy): This is a surgical procedure where a cone-shaped portion of the cervix, containing abnormal cells, is removed.

**PREVENTION:**

Vaccination against HPV is the most effective method of preventing cervical cancer. The HPV vaccine protects against the most common high-risk strains of the virus that cause cervical cancer.

**BREAST CANCER:**

Breast cancer is a type of cancer that originates in the cells of the breast. It is one of the most common types of cancer, affecting both women and men, though it is much more common in women**.**

**AFFECTED ORGANS:**

**Breast Tissue (Primary Site)**

**SYMPTOMS:**

A new lump or mass in the breast is one of the most common signs of breast cancer. The lump is often hard, uneven in shape, and painless

**TREATMENT:**

Lumpectomy (Breast-Conserving Surgery):

Radiation Therapy

**PREVENTION:**

Clinical Breast Exam (CBE): A healthcare provider may perform a manual exam of the breasts to detect any changes or lumps.

**INFERTILITY:**

Infertility refers to the inability to conceive after a year or more of regular, unprotected sexual intercourse. It can affect both men and women and can be due to a variety of factors, often involving problems with the reproductive system, hormones, or overall health.

**AFFECTED ORGANS:**

The ovaries are responsible for producing eggs (ova) and releasing them during ovulation. Disorders in the ovaries can lead to anovulation (lack of ovulation) or irregular ovulation, which are common causes of infertility**.**

**SYMPTOMS:**

Heavy or painful periods (dysmenorrhea), which could indicate underlying conditions like endometriosis or fibroids**.**

**TREATMENT:**

Metformin: Often used in combination with Clomid or other fertility treatments to help manage insulin resistance in women with PCOS.

**PREVENTION:**

Being **overweight** or **underweight** can affect hormonal balance and ovulation. Maintaining a healthy body mass index (BMI) is important for regular menstrual cycles and fertility.

**OVARIAN CANCER:**

Ovarian cancer is a type of cancer that begins in the ovaries (the reproductive glands in women that produce eggs, estrogen, and progesterone).

**AFFECTED ORGANS:**

The cancer originates in the ovaries, which are the primary reproductive organs that produce eggs and hormones (estrogen and progesterone). In most cases, ovarian cancer begins in the epithelial cells that cover the outer surface of the ovaries

**SYMPTOMS:**

Abdominal Bloating or Fullness

Pelvic or Abdominal Pain

**TREATMENT:**

**Surgery** is usually the first step in the treatment of ovarian cancer, especially if the cancer is confined to the ovaries. The primary goal of surgery is to remove as much of the cancer as possible. The extent of surgery depends on the stage of the cancer and the patient’s overall health.

**PREVENTION:**

Oral Contraceptives (Birth Control Pills)

Prophylactic Oophorectomy (Preventive Removal of Ovaries)

**PROSTATE CANCER:**

Prostate cancer is a type of cancer that occurs in the prostate, a small gland that produces seminal fluid and is part of the male reproductive system

**AFFECTED ORGANS:**

The prostate is the main organ affected by prostate cancer. The cancer usually begins in the glandular cells of the prostate, specifically in the part of the prostate responsible for producing seminal fluid.

**SYMPTOMS:**

Difficulty urinating: This may include trouble starting or stopping urination

Frequent urination: Particularly at night (nocturia), where a person feels the need to urinate more often, including during sleep.

**TREATMENT:**

**Active surveillance** is an option for men with **low-risk, slow-growing** prostate cancer, especially if it is confined to the prostate and not causing symptoms.

**PREVENTION:**

Diet and Nutrition

Limit Alcohol Consumption

**ECTOPIC PREGNANCY:**

An ectopic pregnancy occurs when a fertilized egg implants and grows outside the main cavity of the uterus, most commonly in one of the fallopian tubes

**AFFECTED ORGANS:**

Fallopian Tubes (Most Common)

Ovaries

**SYMPTOMS:**

Abdominal Pain

Painful Urination or Bowel Movements

**TREATMENT:**

The treatment for ectopic pregnancy involves either medication (methotrexate) or surgery, depending on the severity and progression of the pregnancy.

**PREVENTION:**

**Pelvic Examinations**: Regular pelvic exams and screenings can help detect reproductive health issues such as **infections**, **scarring**, or abnormalities in the fallopian tubes.