



A REVIEW ARTICLE ON FACTORS AFFECTING COGNITIVE DISORDERS AND ITS TREATMENT AND PREVENTION

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ABSTRACT

Interest in neurodevelopmental disorders study increasing exponentially in the last decades. Over the last decades, research has made significant progress in refining many neurodevelopmental disorders, including cognitive disorder. A person with a cognitive

disorder does not process information correctly within the brain. This results in impaired awareness and judgment, difficulty reasoning and focusing, loss of memory and abnormal mental capacity caused by environmental toxic chemicals exposure, Organ failure, infection, tumor, kidneys and nerves disorder, side effects of medication and drugs etc. Special care is needed when prescribing and managing for people with cognitive impairment. Should discover preventative measures and treatments for patients with Cognitive disease. This review will provide a brief discussion of the factors that causes cognitive disorder and its prevention.

KEYWORDS: discover preventative measures and treatments for patients.

INTRODUCTION

Cognitive impairment is when a person has trouble remembering, learning new things, concentrating, or making decisions that affect their everyday life. Cognitive impairment ranges from mild to severe.

Factors that causes Cognitive disorder

There is no single, overarching cause for cognitive impairment. Various reasons for Cognitive disorder are given below.

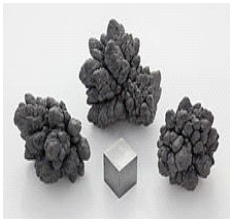








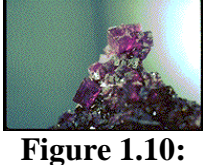
- Environmental factors causes cognitive disorder

- Physical factors causes Cognitive disorder
- Drug induced cognitive disorder
- Foods deficiency Cause Cognitive disorder
- Diseases that affect cognitive function
- Aging of human causes cognitive disorder

Environmental factors causes cognitive disorder

Toxic chemicals that expose in the environment are major cause of Cognitive disorder. A few industrial toxic chemicals e.g. Lead, Aluminum, Iron, Copper, Zinc, Mercury, arsenic, carbon monoxide, solvents, Air pollution, polychlorinated biphenyls [PCBs], Persistent Organic pollutants and toluene are recognized causes of neurodevelopmental disorders and sub clinical brain dysfunction.

Table: 1 Figure of different chemicals that exposure cause Cognitive disorder

 Figure 1.1: Lead	 Figure1.2: Aluminum	 Figure1.3: Iron	 Figure1.4: Copper	 Figure1.5: Zinc
 Figure1.6: Mercury	 Figure1.7: Arsenic	 Figure1.8: Carbon monoxide	 Figure1.9: Manganese	 Figure 1.10: Fluoridated Water

Among them lead toxicity is the most severe because it can affect every organ system. These include lead's ability to inhibit or mimic the actions of calcium (which can affect calcium-dependent or related processes) and to interact with proteins (including those with sulfhydryl, amine, phosphate and carboxyl groups). In adults, lead poisoning is mostly occupation-related. The occupations mainly involved are the smelting, refining, alloying and casting industry, the lead battery industry and the scrap industry.



Figure 3.2: Lead poisoning associated with unsafe recycling in West Africa, Dakar.

In 2008, 18 children died from lead poisoning associated with unsafe recycling of used lead acid batteries in the neighborhood of Thiaroye Sur Mer in Dakar. It was devastating. Aluminium (Al) is clearly a powerful neurotoxicant. Long-term exposure to aluminum can cause cognitive disorders in electrolytic workers and may be one of the risk factors for MCI. Aluminum is the most widely distributed metal on the planet and it's used in the production of many every-day products. Cookware is made from aluminum, soda cans are aluminum, and aluminum foil is found in most kitchens Iron, copper, and zinc are biologically essential and are normally present in the brain, although their levels are fairly tightly regulated through mechanisms that are not well understood. When controls fail, these metals can increase oxidative stress by catalyzing the production of free radicals directly or by binding amyloid-beta and thus catalyzing the production of free radicals.

Mercury is a naturally occurring element that is found in air, water and soil. Mercury exists in various forms: elemental (or metallic) and inorganic (to which people may be exposed through their occupation); and organic (e.g., methyl mercury, to which people may be exposed through their diet).

Arsenic toxicity is a worldwide health concern as several millions of people are exposed to this toxicant via drinking water, and exposure affects almost every organ system in the body including the brain. Exposure to carbon monoxide gas, either low levels over a long period of time or acute poisoning that occurs quickly over a brief period of time, may result in permanent brain damage or other neurological problems, as a result of Cognitive decline.

Abusing organic solvents have been reported in the medical literature for almost four decades to have a variety of neurological abnormalities. Researchers are identifying startling connections between air pollution and decreased cognition and well-being.

A polychlorinated biphenyl (PCB) is a synthetic organic chemical compound used for many years in a variety of applications, including as paint additives, lubricants, plasticizers in paints and cements, stabilizing additives in flexible PVC coatings of electrical wiring and electronic components, pesticide extenders, cutting oils, reactive flame retardants, lubricating oils, hydraulic fluids, and sealants (for caulking in schools and commercial buildings), adhesives, wood floor finishes, paints, de-dusting agents, waterproofing compounds, vacuum pump fluids, fixatives in microscopy, surgical implants, and in carbonless copy ("NCR") paper and insulators in electrical equipment. PCBs continues to contaminate the general environment because they are persistent and not easily broken down. Animal studies as well have shown that exposure to various forms of PCBs reduced learning ability and spatial discrimination among other cognitive impairments. Inhalation of toluene, which is an organic solvent, causes toxic encephalopathy characterized by cognitive impairment. Manganese is a metal that's a useful dietary ingredient at low doses but large concentrations showed diminished intellectual function and impaired motor skills. In larger amounts, and apparently with far greater activity by inhalation, it can cause a poisoning syndrome in mammals, with neurological damage which is sometimes irreversible.

Fluoridated Water

Researchers from the Harvard School of Public Health (HSPH) and the Icahn School of Medicine at Mount Sinai (ISMMS) say that along with these numerous environmental toxins, fluoridated water is adding to the higher incident of both cognitive and behavioral disorders.

- **Physical factors causes Cognitive disorder**

Blood group

People with blood type AB, which includes about 4 percent of the population, appear to have an increased risk for memory problems as they age. Including blood group physical deterioration may perform cognitive decline.

Oxidative Stress

The brain is particularly susceptible to oxidative damage. This damage leads to the death of neurons.

Genetic factor

In recent years, mental health professionals have become increasingly aware of the importance of genetic factors in the etiology (causes) of mental disorders. Genetic factors in mental disorders interact with a person's family and cultural environment.

Oxidative Stress

The brain is particularly susceptible to oxidative damage. This damage leads to the death of neurons. As a result of mild Cognitive impairment.

Inflammation

Systemic inflammatory stimuli elevated amyloidogenesis through activation of β - and γ -secretases accompanied with inhibition of α -secretase leading to elevated A β 1–42 levels in vivo and in vitro. This co-elevated inflammation and amyloido-genesis resulted in neuronal cell death, and thus memory impairment.

Hormonal Imbalance

Hormones regulate a variety of body functions and have a significant impact on brain function in humans: Estrogen, Testosterone, Dehydroepiandrosterone (DHEA), Pregnenolone, Thyroid hormones. When hormonal imbalances or deficiencies disrupt receptor activation, cognitive deficits and emotional turmoil are the result.

Drug induced cognitive disorder

All medicines have benefits and risks. The risks of medicines are the chances that something unwanted or unexpected could happen in human body.

The drugs involve in Cognitive decline are given below:

2.3.1 Anticholinergic Drug

Cognitive decline that is due to anticholinergic medications are: Alprazolam, Amitriptyline, Atenolol, Belladonna, Atropine, Carbamazepine, Carbidopa, Cetirizine, Desipramine, Dextromethorphan, Diazepam, Diphenhydramine, Morphine, Fexofenadine, Ranitidine etc.

2.3.2 Other drugs that can cause cognitive disorder

Few other notable classes of drugs cause Cognitive decline include corticosteroids, fluoroquinolone antibiotics, H₂-receptor antagonists, anticonvulsants, Menopausal hormone therapy (MHT).

Foods deficiency cause Cognitive disorder

Proper blood supply to the brain is necessary to deliver oxygen, glucose, and macronutrients, as well as micronutrients, for normal cognitive function.

2.4.1 Nutrients deficiency cause Cognitive disorder Nutrients Needed for Memory Development and Cognitive function. Essential nutrients such as.

2.4.1.1 Choline

Choline is a precursor molecule to the neurotransmitter Acetylcholine which serves a wide range of functions including motor control and memory. A study conducted on rats who like humans, the results showed that rats had a chronic low-choline diet showed greater memory loss than their same-age control counterparts.

2.4.1.2 Glutamate

Glutamate is an amino acid it acts as a source of fuel for various cellular functions and as a neurotransmitter, it plays an important role in both learning and memory.

2.5 B-Vitamins Deficiency cause Cognitive disorder

B vitamins are not synthesized in the body, and thus need to be obtained from food. The complex consists of: thiamine (B₁), riboflavin (B₂), niacin (B₃), pantothenic acid (B₅), pyridoxin (B₆), folic acid (B₉), cobalamin (B₁₂), and biotin. It is possible to identify broad cognitive effects of certain B vitamins, as they are involved in many significant metabolic processes within the brain.

Some other foods such as Alcohol, Stimulants, Heavily processed foods (fast food, canned food), Foods Blocking Serotonin & Selenium, Junk Food (chocolates, refined grains, high-fat dairy products), Modern foods (containing high levels of omega-6) trigger depression so indirectly decrease Cognitive function.

Diseases that affect Cognitive function

Cognitive problems are related to other disease characteristics include: Depression, Alzheimer's Disease (AD), Parkinson's disease, Hypertension, Diabetes and Insulin Resistance, Obesity, Vascular disease, HIV Disease, Huntington's disease (HD), Creutzfeldt-Jakob disease, Cancer disease, Stroke.

Aging of human causes cognitive disorder

Cognitive function decrease with aging of humans. Data indicates that deterioration of the biological framework that underlies the ability to think. Cognitive decline does not affect all individuals equally. A variety of factors Cognitive decline including oxidative stress and free radical damage, chronic low-level inflammation, declining hormone levels, endothelial dysfunction, excess body weight, suboptimal nutrition, lifestyle, social network, other medical conditions, and various biomarkers.

Treatment

Table 2: Summary of the effects of some drugs frequently used in cognitive disorder:

Drug class	Example	Function
Antipsychotic	Perphenazine, clozapine, amisulpride, , iloperidone, paliperidone, quetiapine, Risperidone, olanzapine and catechol-O-methyltransferase.	Used to predict working memory improvement.
Serotonin Selective Reuptake Inhibitors (SSRIs)	Citalopram, Fluoxetine and venlafaxine.	Decrease irritability, fear and restlessness in Alzheimer's patients.
ACE inhibitor (ACEI)	Donepezil, galantamine, rivastigmine, Memantine.	Improve episodic memory, attention by block enzymatic breakdown of acetylcholine.
Angiotensin II receptor blockers (ARBs)	Losartan, Valsartan, Telmisartan, Irbesartan, Olmesartan, Candesartan.	Appeared to improve some important aspects of quality of life, particularly memory recall, in very elderly patients.
Cholinesterase inhibitors	Tacrine HCl, Donepezil, Rivastigmine, Galantamine	Used to treat symptoms related to memory, thinking, language, judgment and other thought processes.
B-blockers	Atenolol, propranolol, Metoprolol, Pindolol	Neurons that affect the state of arousal associated with stress, these action is blocked by the drug. Stress inhibits a person's ability to access mental resources to solve problems in a flexible manner under stressful circumstances.
Hormone replacement therapy	Testosterone, estrogen, Dehydroepiandrosterone, Ginkgo	Promising new treatment for MCI in both men (testosterone) and women (estrogen).

Table 3: Summary of the effects of some Supplements frequently used in preventing cognitive disorder.

Supplement	Source	Functions	Interactions with Medications
Citicoline	Liver and brain tissue	(I)Helps prevent memory impairment resulting from poor environmental conditions. (II)Citicoline enhances neurological and functional recovery.	Drug interaction with DOPA decarboxylase inhibitor (DDCI) such as Levodopa and carbidopa.
Folate	Rice, white, medium-grain, Broccoli, Mustard greens, Avocado, Orange, Papaya, Babana, Yeast egg fish,milk.	Decrease serum homocysteine levels and associated risk of dementia.	Methotrexate,phenytoin, carbamazepine, and valproate
Selenium	Tuna fish, Beef liver,Chicken,cheese, Rice, brown, long-grain, egg, Oatmeal, Baked beans, canned, plain or vegetarian,yogurt,potato,carrot, Lettuce, Corn flakes.	Serum selenium concentrations prevent age-related declines and brain function.	
Omega-3 fatty acids	Fatty fish and shellfish, vegetable oil.	(I)Take important for brain development and function. (II)Help in preventing advanced cancer, Crohn's disease, diabetes, obesity.	Interact with drugs that affect blood clotting.
Iron	Breakfast cereals, White beans, Chocolate, Tomatoes, Rice, brown, long or medium grain, Cheese, Mushrooms, Milk, Broccoli,egg, Nuts, Bread, white, Lentils,	Decrease risk of neurotoxicity and cardiovascular disease so indirectly prevent Cognitive decline.	Levodopa, Levothyroxine, lansoprazole, omeprazole
Vitamin C	Orange,lemon,papaya,pineapple,grapefruit, apricot,Watermelon,tomato, Broccoli,blackberry,mango onion,cabbage,beans,cauliflower,guavas,	Significantly lower risk of developing AD and AD	Acetaminophen (Tylenol), Barbiturates (phenobarbital), Chemotherapy drugs --

	Strawberries.	associated Cognitive disease.	As an antioxidant, Oral contraceptives, Aluminum-containing antacids, Warfarin.
Vitamin D	Cod Liver Oil ,Oily Fish ,Mushrooms ,Fortified Cereals ,Tofu ,Eggs, _Pork (Extra Lean Ham),Dairy Products.	Reduce risk of demensia and Cognitive decline.	Hormone replacement therapy (estrogen), Antacids, Phenobarbital, phenytoin, Weight loss products(Orlistat).
VitaminE	Tofu, Spinach,Nuts,Sunflower Seeds, Avocados, _Shellfish (Shrimp),Fish (Rainbow Trout),Plant Oils (Olive Oil), Broccoli,Squash & Pumpkin	(I)Decrease oxidative DNA damage and prevent oxidative damage to neurons (II)Prevent aging so indirectly delay cognitive decline.	Antidepressant (desimpramine), Aspirin, Beta-blockers, Hormone replacement therapy, Warfarin
Epigallocatechin gallate EGCG	White tea, green tea and, in smaller quantities, black tea;	Cognitive impairment improved by green tea polyphenol supplementation	Anti-cancer drug Velcade.

Management

Special care is needed when prescribing and managing for people with cognitive impairment. Cognitive disorder has an impact not only on the patients but on all those around them, especially when the patient is being cared for at home.

- Should discover preventative measures and treatments for patients with Cognitive disease.
- Should recognize medications that can cause cognitive decline and how to decrease their side effects.

In case of Environmental factor causes cognitive disorder

- ❖ Working Industry should be placed outside the living area to prevent the toxic chemical exposure.
- ❖ The industrial workers should wear protective clothes, goggles, hand gloves and foot ware to prevent themselves from toxic chemical exposure from industry.
- ❖ Protect environment by using effluent treatment plant.

- ❖ Should avoid flu vaccinations as most contain both mercury and aluminum.
- ❖ Should avoid and remove mercury from our body. Dental amalgam fillings are one of the major sources of mercury, however anyone should be healthy prior to having them removed.

In case of Physical factors causes Cognitive disorder

- ❖ Should need to learn the role that stress plays in memory loss and new therapies to help the patient manage stress.
- ❖ Patients and relatives with a suspected genetic cause for dementia should be offered genetic counselling by the regional genetic services.
- ❖ Should need to learn brain exercises to maintain and improve memory.
- ❖ Need to exercise regularly. Exercise can lower our blood pressure, increase our level of HDL or “good” cholesterol, and improve the health of our blood Vessels and heart. It also helps to lose weight and controls diabetes.

In case of Drugs induced Cognitive Impairment

- ❖ Should need to avoid sleeping pills, like zaleplon (Sonata) and zolpidem (Ambien); antihistamines such as diphenhydramine (Benadryl) and chlorpheniramine (AllerChlor, Chlor-Trimeton) and muscle relaxants.
- ❖ Drug-induced confusion can be prevented by avoiding polypharmacy and adhering to the saying 'start low and go slow'. Special care is needed when prescribing for people with cognitive impairment.

In case of Foods deficiency cause Cognitive disorder

- ❖ Should eat a nutritious diet, rich in folate.
- ❖ Should take foods rich in choline.
- ❖ Should need to take fatty fish and shellfish that contain Omega-3 fatty acids.
- ❖ Should need to take vitamins and nutrients rich food everyday.

In case of Diseases that affect cognitive function

- ❖ Mental stimulation, especially learning something new, such as learning to play an instrument or a new language, is associated with a decreased risk of Alzheimer's.
- ❖ Should take time to get regular checkups, and be aware of what our body is telling us. Pay attention to any exhaustion, stress, sleeplessness or changes in appetite or behavior. Ignoring symptoms can cause our physical and mental health to decline.

- ❖ Should take treatment in case of Alzheimer's disease, Parkinson's disease, Diabetes and Insulin Resistance, excess obesity, vascular disease. Because these disease cause cognitive disorder.

In case of Aging of human causes cognitive disorder

- ❖ Cognitive decline does not affect all individuals equally. So should live without stress and positive thinking is essential in every human.
- ❖ Lifestyle changes, cognitive training, and nutritional interventions have been shown to decrease the rate of intellectual decay and potentially reverse age-related cognitive decline.

CONCLUSION

Cognitive disorders affect thinking and perceptual processes and the acquisition of knowledge and new information. There are the dangers that someone who has a cognitive disorder will get lost and be unable to find their way home or even remember who they are. When left untreated, these types of disorders can get bad enough that constant supervision is needed. Focuses should be arisen on this sector and further researches should be carried on. The Government should consider establishment of adequate facilities and utility services as well as provision of necessary information, education and effective training programs for better livelihood.

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