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Fish Oil and Their Benefits to Human Health

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Abstract-
Fish oils come from fatty fish, also known as oily fish; specifically the tissue of fish such as trout, mackerel, tuna, herring, sardines, and salmon, liver of cod and the blubber of marine mammals such as seals and whales. Fish oils are rich in omega-3 fatty acids. Numerous investigation carried out reveal the health benefits of omega-3 fatty acids as a nutritional supplement against various life threatening diseases like cardiovascular diseases, cancers, skin diseases and many inflammatory diseases etc. They also play a significant role for the proper growth and development of the foetus. National and International health authorities have set up recommendations of daily fish oil intake due to the immense health potential, it carries and it is necessary to create an awareness in the society on its importance, as the modern world has become a hub of various lifestyle diseases.
Keywords- Fish oil, Benefits, Human health, Omega-3 fatty acid.

Introduction-

Life has become fast and convenient on account of the latest developments in technology but at the same time it has welcomed various health hazards also. Life style diseases are mainly associated with poor eating habits like the consumption of junk and processed foods rich in saturated fat, dietary deficiencies, over consumption of certain foods etc. Other reasons causing health risks include lack of physical activity, work stress, disturbed biological cycle and other factors which affect human beings of all generation.

Fish is considered as a cheap source of many essential nutrients especially fat and protein and hence is of value in human diet. It is highly recommended in the human diet due to its richness in two main fatty acids, Eicosapentaenoic acid (EPA) and Docossahexaenoic acid (DHA). These two fatty acids are polyunsaturated fatty acids and are classified as omega-3 fatty acids. The main sources of these Omega-3 PUFA rich oils are the meat of fatty fish such as sardine, herring, mackerel, menhaden, salmon, the liver of cod and the blubber of marine mammals such as seals and whales(Swanson*et al* .,2012)

What are omega-3 fatty acids?

Omega-3 fatty acids are types of fat commonly found in plant and marine life. There are two types that are plentiful in fatty fish.

Eicosapentaenoic acid (EPA)Omega-3 fatty acid that is found in fatty fish. When people refer to Omega-3 fatty acids in fish, they are usually referring to EPA. It is a precursor to chemicals involved in blood clotting and inflammation (Prostaglandin-3, thromboxane-2, and leukotriene-5).Fish do not produce EPA, they obtain it from the algae that they eat.

Docosahexaenoic acid (DHA)Omega-3 fatty acid that is a major component of the human retina (in the eye), sperm, and cerebral cortex (in the brain).Forty percent of all the polyunsaturated fatty acids (PUFAs) in the brain consist of DHA. DHA also makes up 60 percent of the PUFAs in the retina and half of the neuron's plasma membrane weight. Additionally, breast milk is rich in DHA.

Omega-3 fatty acids are dietary fibers having an array of health benefits. They are essential for various metabolic processes, form structural components to the cell membrane, essential for foetal development and are found abundant in brain and retina. Recent investigations conducted on omega-3 fatty acids has gained more recognition to seafood on account of the health benefit they provide and this is regarded to be one of the most promising development in human nutrition. EPA and DHA are precursors for several metabolites which are essential mediators beneficial for the prevention and treatment of numerous diseases. Studies revealed the role of long chain omega-3 PUFAs in the treatment of cardiovascular diseases, hypertension, diabetes, arthritis, depression, migraines, and skin diseases like psoriasis, eczema and other inflammatory and autoimmune disorders as well as cancer. (Sherief, 1994)

Possible health benefits of fish oils

1. Multiple sclerosis (MS)

Fish oils are said to help people with MS. However, a study carried out by researchers from University Hospital in Bergen, Norway, found that omega-3 fatty acids do not help people with MS.

2. Cancer

Cancer is one of most threatening lifestyle disease having wide spread occurrence

intespctive of the generation. Several studies have reported possible anticancer effect of omega-3 fatty acids particularly in breast, colon and prostate cancer. Omega-3 fatty acids were found to reduce the tumour growth as well as slowed histopathological progression. Experimental and epidemiological studies suggested anti-tumour effects of n-3 fatty acids during the initiation and post initiation stages of colon carcinoma. Studies carried out in Sweden showed an inverse association between fatty fish consumption and prostate cancer. Similarly studies conducted in American population also revealed that long-term consumption o fish meat and omega-3 fatty acids slowed down the progression of prostate cancer. Few epidemiological studies assessed on the effect of dietary n-3 fatty acids and breast cancer showed their protective effects against breast cancer risk by inhibiting breast carcinoma development by influencing the biochemical events that follow tumour initiation. (Mehta *et al*, 2011).

3. Post-natal (Post-partum) depression

Fish oils consumed during pregnancy may help protect mothers from post-partum depression. According to Dr. Michelle Price Judge of the University Of Connecticut School Of Nursing, "DHA consumption during pregnancy at levels that are reasonably attained from foods has the potential to decrease symptoms of postpartum depression."

4. Mental health benefits

A pilot study carried out in 2007 suggested that fish oils may help young people with behavioral problems, especially those with attention deficit hyperactivity disorder (ADHD).

The 8-week study demonstrated that children who consumed 8-16 grams of EPA and DHA per day, showed significant improvements in their behavior (rated by both their parents and the psychiatrist working with them). The Canadian Government has reported that DHA have a biological role supporting the normal development of brain, eyes and nerves.

5. Memory benefits

Omega-3 fatty acid intake can help improve working memory in healthy young adults, researchers reported in the journal PLOS One. However, the benefits of fish oils for cognitive function in older populations may be less impressive. A study by researchers at the University of Lowa suggested that high levels of omega-3 are of no benefit to cognitive decline in older women.

6. Cardio-vascular benefits

Omega-3 fatty acids found in fish oils may protect the heart from mental stress.A study published in the American Journal of Physiology revealed that people who took fish oil supplements for longer than 1 month had improved cardiovascular function during mentally stressful tests.Omega-3 fatty acid intake also results in changes in blood lipid levels. It was observed to reduce the serum triglyceride concentration by 30% with associated increase in HDL (Good Cholesterol). This HDL increase reduces the risk of heart diseases (Giri *et al.* 2010). American Heart Association recommends one gram of EPA/DHA perday for patients with coronary heart disease (American Heart Association, 2010).

7. Protection From Alzheimer's disease

Claims were made for many years that regular fish oil consumption would help prevent people from developing Alzheimer's disease.

However, a major study in 2010 found that fish oils were no better than placebo at preventing Alzheimer's.In contrast, a study published in Neurology in 2007 reported that a diet high in fish, omega-3 oils, fruit, and vegetables reduced dementia and Alzheimer's risk.

8. Protection from vision loss

Adequate dietary consumption of DHA protects people from age-related vision loss, Canadian researchers reported in the journal Investigative Ophthalmology and Visual Science. (Kremer*et al.,* 2000)

9. Epilepsy

A 2014 study published in the Journal of Neurology, Neurosurgery & Psychiatry claims epilepsy patients could reduce seizure frequency by consuming low doses of omega-3 fish oil every day.The research team at the University of California-Los Angeles (UCLA) School of Medicine, says their findings may be particularly useful to epilepsy patients who no longer respond to medication(Surendran*et al.,* 2003)

10. Schizophrenia and psychotic disorders

In what was believed to be the first study of its kind, researchers revealed the omega - 3 fatty acids found in fish oil may be effective for reducing the risk of psychosis.

The study, published in Nature Communications, details how a 12-week intervention with omega-3 supplements substantially reduced the long term risk of developing psychotic disorders. (Boelsma*et al.,* 2001)

11. Benefits for the foetus

Omega-3 consumption may help boost foetal cognitive and motor development.In a study published in 2008, scientists found that omega-3 consumption by the mother during the last 3 months of pregnancy improved the baby's sensory, cognitive, and motor development. Some other reports suggest that mothers using amega-3 fatty acid rich diets during pregnancy and breast feeding may protect their children against allergies which may be due to the fact that fish oil supplementation leads to decreased levels of body cell associated with inflammation and immune responses. (Swanson *et al,* 2012).

12. Inflammatory diseases

EPA and DHA have anti-inflammatory effect and a role in oxidative stress and to improve cellular function through changes in gene expression. Inflammatory Bowel Disease (IBD) is a general term for chronic inflammatory disease of the GI tract which includes ulcerative colitis and Crohn disease. Crohn's disease can affect the small intestine and large intestine, mouth, oesophagus, stomach and the anus whereas ulcerative colitis primarily affects the colon and the rectum. Studies using animal models provide strong evidence for the protective effects of omega-3 fatty acids against induced IBD. Similarly individuals having lower intake of omega-6/omega 3 ratios were 32% less likely of suffer from Crohn disease.In vitro and human suggest that omega-3 fatty acids serve as effective therapeutic agents for the management of inflammatory arthritic diseases. Comparative studies carried out between population having different fish oil consumption pattern revealed that diet rich in fish oil have an improvement in the number of tender joints when examined physically while some reports revealed improvement in Ritchie Articular Index (Measure of joint tenderness) and in morning stiffness. (Mehta*et al.*,2011).

Table 1 : Marine sources rich in Omega-3 fatty acids (g/100g meat)[1].

Marine Sources	**Omegs-3 fatty acids (EPA and DHA) (g/100g Fish meat)**
Sardine/Herring	1.5-2.4
Salmon	1.3-2.2
Spanish Mackerel, Atlantic and Pacific	1.3-2.0
Halibut	0.7-1.3
Tuna	0.3-1.3
Sward Fish	1.14
Green Shell/ Lipped mussels	1.12
Tile Fish	1.06
Shark	0.98

CONCLUSION

Present life style demands more attention towards health foods on account of the aggravating health problems being generated. The ill effects of chronic diseases like cardiovascular diseases, inflammatory conditions etc can be reduced by regular consumption of seafood's which are rich sources of omega-3 fatty acids like EPA and DHA. Hence more awareness on the importance of this healthy diet needs to be created for the betterment of the society.

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