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Homoeopathic Treatment Perspective for Adverse Effect of Blue Light

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Abstract: ***Human eye is only sensitive to visible spectrum of light. In spectrum of colour Blue light has very short wavelength and produce high amount of energy. The sources of blue light are sunlight, LED and digital devices. Over exposure to blue light can cause damage to eyes, disturbs sleep pattern and may be risk factor for chronic degenerative diseases. There are prospective homeopathic medicines for treatment for such disorders. Homoeopathy can be helpful for management of adverse effect from blue light exposure.***

Key Words: Blue light, retinal damage, age related macular degeneration, circadian rhythm, Homeopathy.

1. Introduction

In the light spectrum colours occupy the position according to their wavelengths. Rays at end of the red part of visible light spectrum has maximum wavelength and have less energy while rays at the end of blue part of spectrum have minimum wavelength have more energy.

Light rays beyond red rays are called infrared rays and shorter rays than blue rays are called ultraviolet rays. But, these two types of rays do not evoke sensation of vision. They are invisible.

Heiting[1] described that the visible spectrum of light is in the range from 380nm to 750nm, in which blue light makes up about one third. Blue light has wavelength from 380 to 500nm in light spectrum. Blue light is called High energy visible light due to short wavelength. The blue light scatters easily than other visible light rays, when they strike on air and water molecules in the atmosphere. This is why cloudless sky seen blue.

Sources of exposure to blue light:
Sunlight is the natural source of blue light and others are indoor sources. The indoor sources includes fluorescent lighting, LED lighting and display screens of smart phones, computers, laptop and screens of television. The amount of indoor blue light is less than the sunlight, butover use of indoor source devices with much proximity lead to high exposure risk to the users. The sunlight or artificial light radiation passes through the anterior parts of the eye and reach to the retina.

Health aspect on exposure to blue light:
Blue light exposure is necessary for good health. Heiting's [1] research has shown that visible light rays with high energy enhances alertness, benefits memory and cognitive functioning and elevates mood. Studies stated that not enough exposure of children to blue light could contribute to increase in myopia. Blue light is very important in regulating our *circadian rhythm*-body's natural sleep/wake cycle.

Adverse effects on health due to blue light exposure are found in some individuals. Exposure of more degree of blue light at night hours through devices and other indoor sources disrupts normal circadian rhythm which leads to poor quality of sleep, difficulty in falling asleep and daytime fatigue [2]. Short sleep can increase the risk for depression as well as obesity, diabetes and cardiovascular problems.

Retinal damage: Constant exposure to blue light over period time can damage retinal cells [3, 4]. Blue light rays cause photochemical type of damage in retina. Study pointed out that light induced retinal damage mimics age related macular degeneration, which may cause vision loss.

The macula in human eye is the functional central part of retina. Light is focused on macula by the structure of the eye like cornea and lens. Photoreceptor nerve cells called cones are present in the macula and are concentrated in the fovea. It function is to give proper vision while doing detail work activity like reading and writing. It also provides a colour vision. The rest of the retina provides peripheral vision.

Symptoms of retinal macular degeneration are characterised by blurred vision, distorted straight line, reading difficulty especially in dim light, black blind spots in the centre of vision, decrease in brightness of colours etc.

Eye Strain: Due to short wavelength, blue light scatters easily and it is not easily focused, while working on the digital devices this unfocused visual disturbances of blue light reduces contrast and can contribute to digital eye strain. Eyestrain symptoms are dry, sore or irritated eyes, double vision, difficulty in concentrating and even nearsightedness. Children are more sensitive to effects blue light because of more transparency of eye lens.

Other extra ocular effects either due to eyestrain or working for long hours on digital device in same posture are of musculoskeletal problems like neck pain, backache, headache and shoulder pains.

Methods to diminish health effects of blue light:
In this modern era we cannot avoid the exposure of blue light, but with changes in work pattern one can modify its impact. Vimont [5] recommended to "Decrease the exposure time on screens and also to take frequent breaks in-between to give eyes a rest". Follow "20-20-20" rule means at every 20 minutes, move eyes to take a glance of an object which is at least at distance of 20 feet for minimum 20 seconds. Avoid exposure to device screens for minimum 2hours before sleep. Have some outdoor light exposure in morning. Limit screen exposure hours for children. Use Screen filters on laptops, tablets, phones and computer screens. Adjust room lighting and try to increase the contrast on device display to reduce eye strain.

Role of Homoeopathy
The adverse effects due to over exposure of blue light like eyestrain, blurred vision, sleep disorder and damage to eye structure before it reach to irreversible state can be treated with homoeopathic remedy.

Homoeopathy is the therapeutics system of medicine based on principle of "Similia Similibus Curentur" meaning let likes to be cured by like. In this therapeutic system patient is treated by medicine that has the ability to produce similar disease in a healthy human being which it can cure in sick person. Medicine's curative action is get known by proving it on healthy human beings and is recorded in symptomatic form in Homoeopathic materia medica. Homoeopathic material medica is store house of many such provings. Symptoms totality of patient is constructed by seeing subjective and objective symptoms. For treatment medicine is selected on the basis of symptoms similarity.

Indication of Homoeopathic medicines [6, 7]for treatment of adverse effects due to blue light

Argentum Nitricum Medicine is indicated for diseases occurs due to unusual or continuous mental exertion. Eyestrain especially of those who are doing minute works. Vision is blurred, sees black spots. Complaint of Asthenopia due to weakness in power of accommodation. Patient have Eye complaints with gastric sufferings like flatulence, abdominal pain, heartburns.

Carboneum Sulphuratum
This medicine has special affinity for eyes. It is useful for progressive loss of vision with central scotoma. Impaired central vision, sees blind spots. Colour blindness for red and blue colour but not for white. Spots and spider web like vision before eyes. Vision improves after eating, fasting aggravates.

Cyclamen:
This medicine is indicated for eyestrain. Eyes looks dull, hollow as if lie deep in orbits and surrounded by dark circles. Burning in eyes is aggravated while reading. Sight as if looking through clouds, sees glittering spots before eyes.

Gelsemium
It is indicated for eye strain and sleep disorders. Bruised pain in eyes, heavy eyelids with drooping. Personal has double vision. It is useful for detachment of retina. Pain in eyes with headache and vertigo.

Natrum Muriaticum
Useful for complaints of dry eyes and eyestrains. Eye strain with headache specially on waking. Pulsating type of headache due to long working on screen. Exhausted and tired feeling at neck. Affection of sight, cloudiness while writing or reading. Black spots and sparks before eyes. Sensation like sand in eyes, lachrymation.

Onosmodium
Specially indicated for eyestrain associated with headache. Migraine headache after eye strains which is aggravated by lying down. Pain in occipital region as if screwed extend to shoulder which is increased by exertion. Eye complaints after night work. Vision impaired and is blurred. Colour blindness for green and red. Sleep is interrupted and unrefreshed.

Ruta Graveolens
Eyes complaints due to overstrain of ocular muscles. Ill effects from overstaining eyes specially doing fine work at night. Eye strain is followed by headache. Sight confused with complete cloudiness at distance. Retinal detachment. It is useful for myopia.

Senega
It is useful for dryness of eyes and aching pain in it due to working under light especially in evening. Weakness of sight with flickering before eyes has to wipe them often or feels better by rubbing it. All objects look shaded.

Tabacum
It is indicated for loss of vision even without any lesion afterwards there is atrophy of optic nerve. Complaint of Colour Central scotoma means impaired central vision for colour. Pain in the eyes as from much weeping, redness and smarting in eyes. Dim sight, sees as if through fog.

Other indicated medicines are like for,
Myopia – Physostigma, Carbun Sulph, Euphrasia, Pilocarpus
Weak vision – Agaricus, Causticum, Cina, Cyclamen, Lilium tig, Mormordica, Phosphorus, Pulsatilla, Sepia.
Eye strain – Agaricus, Causticum, Cimicifuga, Cina, Jaborandi, Kalmia, Nux vomica, Phosphorus, Physostigma, Santoninum, Sepia.

2. Conclusion

Advanced technology is a part of human life, it is integrated in routine to make complicated work more easy and perfect. Smart phone and electronic devices are essential to have pace with modern era. But all people may not be aware about consequent effect on health due to indiscriminate usage of devices and of blue light exposure. Many studies have also reported increase in prevalence of digital eye strain. From all ages children could be the worse sufferer of its ill effects. Precautions taken during early age to protect eyes against over exposure of blue light can reduce the risk of degenerative changes in eyes and blindness at later age. Homoeopathy can be helpful for treatment in morbidities

incident to blue light exposure by use suitable Homoeopathic medicine clinically. In Homoeopathy holistic approach for therapy can provides benefit in treatment of ocular as well as non-ocular adverse effects of blue light. Even this problems are treated in Homoeopathic clinical practice, on review less research papers are available. Further Scientific Research in this area can provide guideline for its management.

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