

Awareness of People About the Effects of Light Intensity on Blood Pressure and Heartbeats (A Case Study: Yoon Al-Jawa Town)

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Abstract

This study aims to know the awareness of people about the effect of light intensity on blood pressure and heartbeats (A case study: Yoon Al-Jawa town), What is the impact of bright lighting on people's health? and What negative consequences can radiation have on human health? This is done by two methods. First method: taking two samples, the first sample aged between 20 years and 26 years, and the second sample is Children aged between 5-12 years. for the two samples, we change the intensity of light from 3 lux up to 953lux. For the first sample, the blood pressure is varying from 101/85 the hearts beat 81beats for low intensity and 130/89, and the heartbeat is 96 beats for high intensity. For the second sample, the blood pressure varies from 103/65 and the hearts beat 87beats for low intensity and 117/85, and the hearts beat is 99 beats for high intensity. The second method: is a survey of a random sample (362). The survey contained two parts: part one is the effects of light on people's health. The second is about the psychological effect of light. Most agree that light Regulates the biological rhythm, artificial light affects their health, and it is responsible for some diseases such as obesity, diabetes, and depression, there is a link between the level of melatonin and diabetes, and exposure to blue light causes migraines and ultraviolet rays cause skin cancer and direct exposure to orange light helps to attract attention, excitement.

Keywords: Awareness- light intensity-blood pressure - heartbeats – obesity-diabetes.

1. Introduction

Energy that propagates outward while travelling in the form of particles or waves is known as electromagnetic radiation (EM). The Sun is the primary source of electromagnetic radiation that impacts Earth. EM spectrum is the range of all types of EM radiation. The types of EM radiation that make up the electromagnetic spectrum are microwaves, infrared light, ultraviolet light, X-rays and gamma-rays figure[1]. Visible light which is found in many locations such as offices, hospitals, institutions, and schools, is primarily composed of wavelengths between 380 and 780 nm. Natural light plays a major role in organizing our daily lives and providing our bodies with energy that helps us wake up. Lively and carry out our work actively, as light is considered one of the important elements for the continuation of life, and without it, the balance is disturbed [2-5]. What is the impact of high lighting on human health when a cell in the retina detects light that can interfere with the body's melatonin production, a hormone generated by the pineal gland in the brain? It also helps regulate other hormones and maintains the body's circadian rhythm [6-8].

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In this research know the awareness of people about the effect of light intensity on blood pressure and heartbeats (A case study: Yoon Al-Jawa town), What impact does bright lighting have on people's health? and What negative consequences can radiation have on human health.

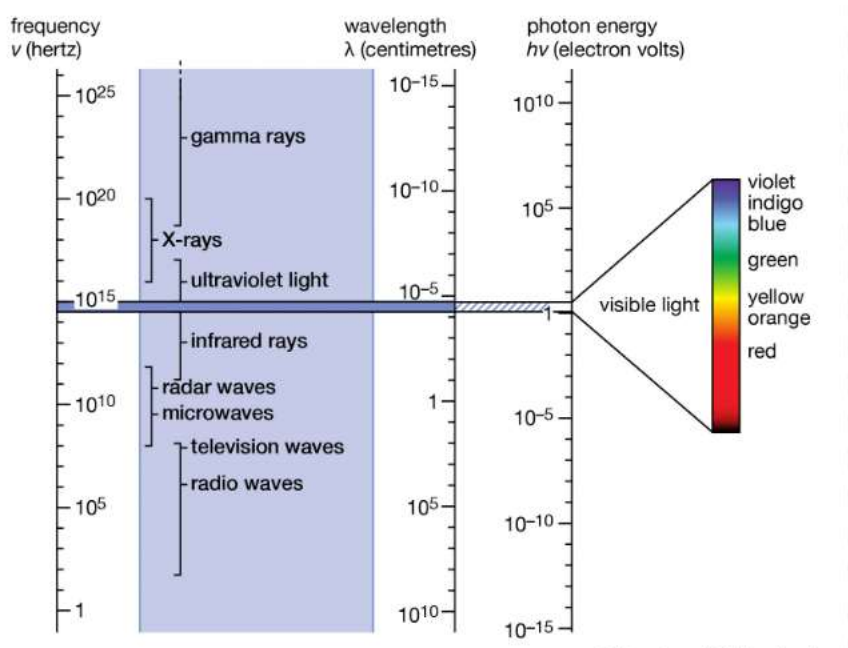


Figure (1): electromagnetic spectrum

2. Physics concepts:

2.1 The behavior and properties of light:

Electromagnetic waves, which act like other waves, make up visible light. As a result, many of the characteristics of light that are important for microscopy may be explained by considering how light behaves as a wave. The wavelength of light waves, or the separation between one wave peak and the next peak, is one of their most significant characteristics. The amplitude is the height of each peak or the depth of each dip [9-10]. On the other hand, a wave's frequency refers to its rate of vibration or the number of wavelengths it passes over in a given amount of time. Materials interact with light waves by transmission, absorption, or reflection.

Illumination intensity:

The fundamental photometric value that expresses a point light source's ability to illuminate a certain direction is called luminance. Its primary purpose is to determine the direction-dependent distribution of light emitted by a lighted surface. The quotient of the elementary luminous flux by the elementary solid angle in which it is propagated is the mathematical definition of luminous intensity. Candelas (cd) are used to express it [11].

3. Biological concepts:

3.1 vital signs:

Vital indicators are gauges of the most fundamental bodily processes. The following are the four primary vital signs that healthcare providers and medical professionals regularly check:

3.1.1 Body temperature:

Age, activity level, and time of day all affect what constitutes a normal body temperature. It is generally agreed upon that the average normal body temperature is 98.6°F (37°C). According to certain research, the range of "normal" body temperature is 97°F (36.1°C) to 99°F (37.2°C) [12].

3.1.2 Pulse rate:

A normal resting heart rate for adult's ranges from 60 to 100 beats per minute [13]

3.1.3 Respiratory rate (rate of breathing): The number of breaths a person takes in a minute is known as their respiration rate. The rate is often determined when an individual is at rest and is as simple as counting how many times the chest rises in a minute to determine how many breaths the person takes. With fever, disease, and other medical conditions, respiration rates may rise. It's critical to assess respiration and determine whether an individual is experiencing any breathing difficulties [13].

3.1.4 Blood pressure

The force of the blood pressing against the arterial walls when the heart contracts and relaxes is known as blood pressure. The blood pressure rises as the heart contracts because the heart pumps blood into the arteries with each beat against the arterial resistant. Blood pressure decreases when the heart becomes more relaxed. When monitoring blood pressure, two figures are noted. The pressure inside the artery as the heart contracts and pumps blood throughout the body is indicated by the greater value, or systolic pressure. The pressure inside the artery when the heart is at rest and filling with blood is indicated by the lower value, also known as the diastolic pressure. The units of measurement for the systolic and diastolic pressures are "mm Hg" (millimeters of mercury) [13].

4. Methodology:

The research done by two methods. First method: taking two samples, the first sample ages between 20 years and 26 years, and the second sample is Children aged between 5-12years. for the two samples, we change the intensity of light from 3 lux up to 953lux.

The second method: is a survey of a random sample (362). The survey contained two parts: part one is the effects of light on people's health. The second is about the psychological effect of light.

5. Results and discussion:

5.1 the effect of Intensity of illumination on the blood pressure heartbeats:

The experiment here was done on two groups of people first group were aged from 20 to 26-year-old, and the other group were 4 to 10-year-old calculating average blood pressure and heartbeats before and after changing the intensity of the illumination, table (1), and table (2).

Table (1): The effect of people of illumination on the blood pressure heartbeats first group were aged from 20 to 26-year-old.

Intensity of illumination	Age	Beats/min	Average Blood pressure
3	20-26 years	99	117/75
		98	141/122
		110	101/74
		81	106/85
		99	135/101

234	20-26 years	108	126/82
		94	109/86
		77	106/96
639	20-26 years	87	126/98
		104	130/89
		116	107/70
		77	126/110
953	20-26 years	79	116/76
		96	122/82
		96	94/71
		95	110/85

Table (2): The effect of people of illumination on the blood pressure heartbeats second group were aged from 4-5 year-old.

Intensity of illumination	Age	Beats/min	Average Blood pressure
1	4-5 years	123	103/65
		78	82/58
	6-7 years	103	129/73
		97	102/58
	9-10 years	83	114/66
		99	85/32
185	4-5 years	106	101/55
		102	94/45
	6-7 years	106	130/82
		102	81/54
	9-10 years	81	109/61
		92	117/77
295	4-5 years	109	91/40
		66	12/65
	6-8 years	101	114/66
		110	130/45
	8-10 years	65	108/39
		99	129/56

5.2 Discussion:

As shown in table (1) the age group between 20 to 26-year-old prefer to sleep in darker and illumination intensity rooms as the readings shows that the average blood pressure and heartbeats of this group came near the average normal of an adult human being when the illumination intensity is lower, and the average blood pressure and heartbeats kept raising with increasing of illumination.

Nevertheless, the result shown that in younger ages of the second group whom were between 4 and 10 years old prefers to sleep and kept calmer in brighter (higher illumination) rooms than the first group, yet, both of the 3 group subdivisions (4-6,6-8,8-10) still prefer less illumination intensity to sleep thus never mirk. table (2).

6. Conclusions:

Normal light intensity is less than 55 lux, during the period of this study results shows that young adults (group 1) average blood pressure and heartbeats were found raising above normal level when the intensity raises (average was 38.5 lux/1 mm hg) when the lux is 4 times above, above 55 lux. Yet, the same result shows that younger group (group 2) has higher reading of blood pressure and heartbeats, thus, still within the normal range

of both abovementioned readings around the same amount of illumination. That can drive us to think of making rooms darker helps adults (group 1) will help to sleep better than normal or above normal levels of illumination, while keep the room brighter the mirk (we assume here that lux of mirk is 5 lux or less) but less than 4 times above normal makes it more comfortable to calm and sleep.

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