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AWARENESS ABOUT HEALTH THREAT FROM COSMIC RAYS AMONG ALLIED HEALTH SCIENCE

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Abstract

Introduction: Natural background radiation (NBR) is an ubiquitous phenomenon, constituting the major source of exposure to ionizing radiation (IR) for most of the world population. (IR) for most of the world population. Three components contribute to 90 % of the effective dose delivered by NBR: radon (222Rn and 220Rn) and its decay products emitted by the disintegration of 238U and 232Th present in soil and building materials, terrestrial gamma rays (TGR) mainly produced by 40K and members of the 238U and 232Th decay chain families, and high-energy cosmic ray particles incident on the atmosphere. Radionuclides naturally present in food and ingested water contribute to the remaining portion (about 10 %) of the effective dose due to NBR. When equivalent doses to specific organs or tissues are considered, however, the relative contribution from each source may differ. **Aim:** This survey was conducted for assessing the awareness about Health threat from Cosmic rays among Allied Health Science students. **Materials and method:** A cross-section research was conducted with a self-administered questionnaire containing ten questions distributed amongst 100 Allied Health Science students. The questionnaire assessed Health threat from Cosmic rays among Allied Health Science Students. The responses were recorded and analysed. **Result:** 89 % of the respondants are aware of health threat from cosmic rays. 77% of the respondants are aware of complications of health threat from cosmic rays. 57% of the respondants are aware of diagnostics methods used to identify the cosmic rays. 77% of the respondants are aware of differential diagnosis of cosmic rays. **Conclusion:** There is a moderate awareness amongst Allied Health Science students about Health threat from Cosmic rays. Enhanced awareness initiatives and educational programmes together with increased importance for curriculum improvements that further promote knowledge and awareness of Health threat from Cosmic rays among Allied Health Science Students.

Keywords: Awareness, Health, Radiation, Cosmic Rays.

INTRODUCTION

Cosmic radiation is an ionizing radiation produced when primary photons and α particles from outside the solar system interact with components of the earth's atmosphere. A second source of cosmic radiation is the release of charged particles from the sun, which become significant during periods of solar flare. Ionizing radiation is a natural part of the environment in which we live, present in the earth, buildings, the food we eat, and even in the bones of our bodies[1].

The other type is nonionizing radiation which includes UV light, radio waves, and microwaves. Humans, animals, and plants have all evolved in an environment with a

background of natural radiation and, with few exceptions, it is not a significant risk to health. The amount of cosmic radiation that reaches the earth from the sun and outer space varies: its energy is effectively absorbed by the atmosphere and is also affected by the earth's magnetic field. The effect on the body will depend on the latitude and altitude at which the individual is exposed, and on the length of time of exposure[2].

Cosmic radiation may be measured directly using sophisticated instruments, as was done routinely in the Concorde supersonic transport, or it can be estimated using a computer program integrating the route, time at each altitude, and phase of the solar cycle to calculate the radiation dose for any given flight. Several research organizations have confirmed actual measurements taken on board an aircraft to verify the computer estimations. Effective doses of cosmic radiation are in fact very low[3].

The International Commission for Radiological Protection (ICRP) recommends maximum mean body effective dose limits of 20 milliSieverts (mSv) per year (averaged over 5 years) for workers exposed to radiation as part of their occupation (including flight crew), and 1 mSv/year for the general population. For typical annual flight schedules, crew members accumulate around 4–5 mSv/year on long-haul operations, and 1–2 mSv/year on European short-haul operations from cosmic radiation[4].

The ICRP also recommends that it is not necessary to treat the exposure of frequent-flyer passengers as occupationally exposed for the purpose of control. Thus essentially they recommend that only aircrew should be considered. Cosmic radiation is of no significance at altitudes <25,000 feet (7620 m) because of the attenuating properties of the earth's atmosphere. There is no evidence from epidemiologic studies of flight crew of any increase in incidence of cancers linked to ionizing radiation exposure, such as leukemia[5].This survey was conducted for assessing the awareness about Health threat from Cosmic rays among Allied Health Science students.

The Salient Questions In The Study:

1. Are you aware of health threat from cosmic rays?
2. Are you aware of complications of health threat from cosmic rays?
3. Are you aware of diagnostics methods used to identify the cosmic rays?
4. Are you aware of differential diagnosis of cosmic rays?
5. Are you aware of management strategy of cosmic rays?

RESULT

89 % of the respondants are aware of health threat from cosmic rays. 77% Of the respondants are aware of complications of health threat from cosmic rays. 57% Of the respondants are aware of diagnostics methods used to identify the cosmic rays. 77% Of the respondants are aware of differential diagnosis of cosmic rays. 77% Of the respondants are aware of management strategy of cosmic rays.(Fig 1-5)

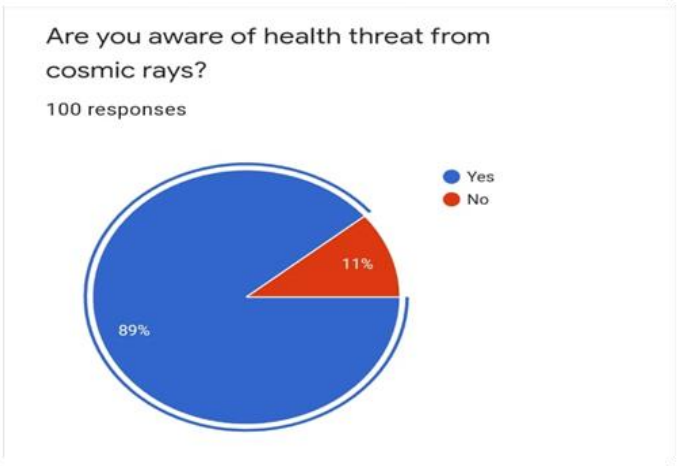

Figure 1: Are you aware of health threat from cosmic rays?

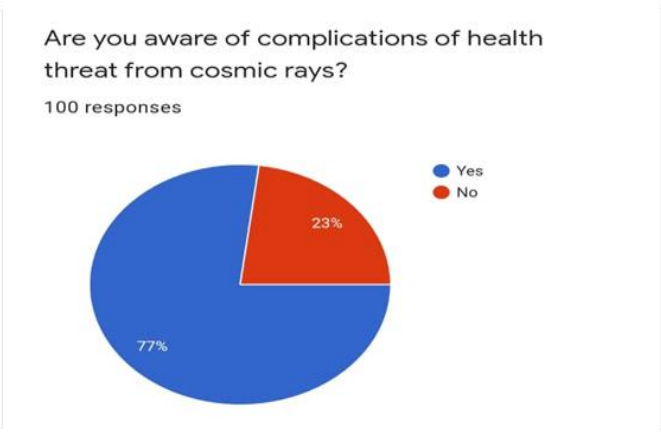

Figure 2: Are you aware of complications of health threat from cosmic rays?

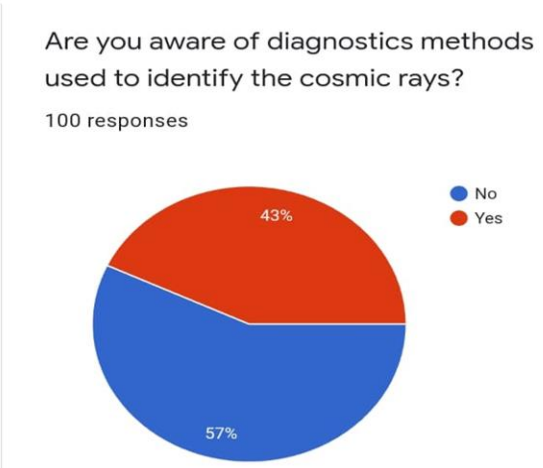

Figure 3: Are you aware of diagnostics methods used to identify the cosmic rays?

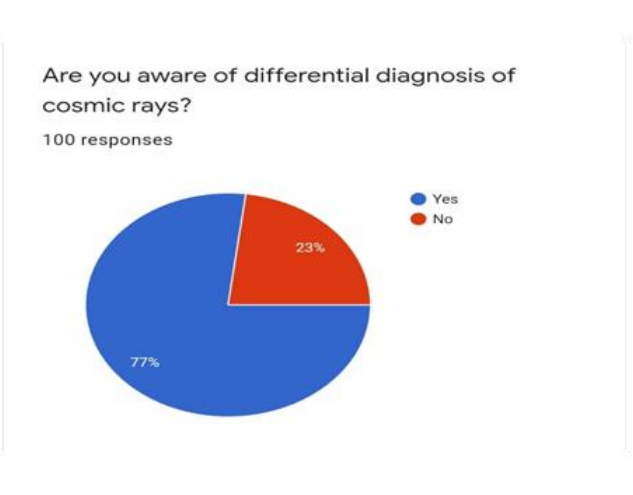

Figure 4 : Are you aware of differential diagnosis of cosmic rays?

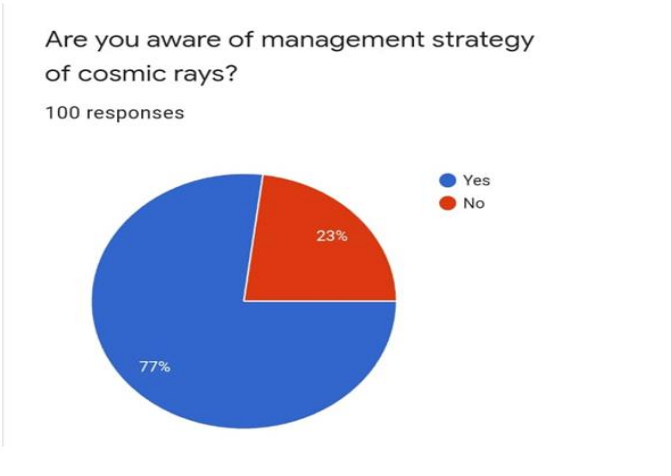

Figure 5: Are you aware of management strategy of cosmic rays?

DISCUSSION

Galactic Cosmic Radiation (GCR) is a dominant source of radiation that must be dealt with aboard current spacecraft and future space missions within solar system. GCR comes from outside the solar system but primarily from within Milky Way galaxy. GCR is composed of the nuclei of atoms that have had their surrounding electrons stripped away and are traveling at nearly the speed of light[6]. 89 % of the respondants are aware of health threat from cosmic rays.

GCR would be to imagine the nucleus of any element in the periodic table from hydrogen to uranium. These particles were probably accelerated within the last few million years by magnetic fields of supernova remnants. GCR are heavy, high-energy ions of elements that have had all their electrons stripped away as they journeyed through the galaxy at nearly the speed of light. They can cause atoms they pass through to ionize. They can pass practically unimpeded through a typical spacecraft or the skin of an astronaut[7].77% Of the respondants are aware of complications of health threat from cosmic rays.

Cosmic radiation consists of high-energy charged particles, x-rays and gamma rays produced in space. Charged particles react with the earth's atmosphere to produce

secondary radiation which reaches the earth. Cosmic radiation is produced by the stars, including the sun. Another form of radiation that comes from our sun is ultraviolet (UV) radiation. UV radiation is not considered cosmic radiation. Unlike cosmic radiation, UV radiation is lower in energy and is considered non-ionizing radiation[8].57% Of the respondants are aware of diagnostics methods used to identify the cosmic rays

Health threats from cosmic rays are the dangers posed by cosmic rays to astronauts on interplanetary missions or any missions that venture through the Van-Allen Belts or outside the Earth's magnetosphere. They are one of the greatest barriers standing in the way of plans for interplanetary travel by crewed spacecraft, but space radiation health risks also occur for missions in low Earth orbit such as the International Space Station (ISS)[9].77% Of the respondants are aware of management strategy of cosmic ray

Galactic cosmic rays (GCRs) consist of high energy protons (85%), alpha particles (14%) and other high energy nuclei (HZE ions). Solar energetic particles consist primarily of protons accelerated by the Sun to high energies via proximity to solar flares and coronal mass ejections. Heavy ions and low energy protons and helium particles are highly ionizing forms of radiation, which produce distinct biological damage compared to X-rays and gamma-rays. Microscopic energy deposition from highly ionizing particles consists of a core radiation track due to direct ionizations by the particle and low energy electrons produced in ionization, and a penumbra of higher energy electrons that may extend hundreds of microns from the particles path in tissue. The core track produces extremely large clusters of ionizations within a few nanometres, which is qualitatively distinct from energy deposition by X-rays and gamma rays; hence human epidemiology data which only exists for these latter forms of radiation is limited in predicting the health risks from space radiation to astronauts[10].77% Of the respondants are aware of differential diagnosis of cosmic rays

CONCLUSIONS

There is a good awareness about health threats from cosmic rays among allied health Sciences. Enhanced awareness initiatives and educational programmes together with increased importance for curriculum improvements that further promote knowledge and awareness about health threat from cosmic rays among allied health Sciences.

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