

## AWARENESS ABOUT RADIATION HORMESIS AMONG ALLIED HEALTH SCIENCE STUDENTS

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### Abstract

**Introduction:** Radiation hormesis is the stimulation, often considered to be beneficial, from low doses of ionizing radiation. Large doses are harmful. The difference is quite clear in those dose-response curves which involve both biopositive and bionegative effects. At any given rate, the physiologic response to ionizing radiation is directly proportional to the logarithm of the dose. **Aim:** This survey was conducted for assessing the awareness about Radiation Hormesis 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 Radiation Hormesis among Allied Health Science Students. The responses were recorded and analyzed. **Result:** 77.1% of the respondents were aware about radiation hormesis. 90.5% of the respondents were aware about examples of hormesis. 81.9% of respondents were aware about the types of radiation. 76.2% of the respondents were aware about the causes of radiation hormesis. 77.1% believed it was real. **Conclusion:** There is a moderate awareness amongst Allied Health Science students about Radiation Hormesis Enhanced awareness initiatives and educational programmes together with increased importance for curriculum improvements that further promote knowledge and awareness about Radiation Hormesis among Allied Health Science Students.

### INTRODUCTION

Radiation hormesis is the stimulation, often considered to be beneficial, from low doses of ionizing radiation. Large doses are harmful. The difference is quite clear in those dose-response curves which involve both biopositive and bionegative effects. At any given rate, the physiologic response to ionizing radiation is directly proportional to the logarithm of the dose.[1]

The fact that high doses of ionizing radiation are detrimental, substantial data from both humans and experimental animals show that biologic functions are stimulated by low dose radiation. The word "hormesis" is derived from the Greek word "hormaein" which means "to excite". It has long been known that many popular substances such as alcohol and caffeine have mild stimulating effects in low doses but are detrimental or even lethal in high doses. [2]

High concentrations of Oak bark extract inhibited fungi growth, low doses of this agent stimulated fungi growth. They modified starling's word "hormone" to "hormesis" to describe stimulation induced by low doses of agents which are harmful or even lethal

at high doses. Generally, hormesis is any stimulatory or beneficial effect, induced by low doses of an agent, that can not be predicted by the extrapolation of detrimental or lethal effects induced by high doses of the same agent.[3]

Hormesis could be induced effectively by low doses of ionizing radiation. The concept of radiation hormesis is usually applied to physiological benefits from low LET radiation in the range of 1-50 cGy total absorbed dose . It is widely believed that radiation biology in the future will be focused on biomolecular and genetic implications, problems of damage and repair and connected problems such as radiation hormesis and radioadaptive response.[4,5]

## MATERIALS AND METHOD

This cross-sectional research was conducted with a self-administered questionnaire containing ten questions distributed amongst 100 Allied Health science students. The students were randomly selected across various disciplines of Allied Health Sciences. The study setting was designated in the university campus. The survey instrument was a questionnaire pre tested and evaluated for validity and reliability concerns.

The questionnaire included ten questions eliciting the demographic data through open ended responses and multiple choice questions for the other responses. The study was approved by the Institutional Ethical Committee and informed consent was obtained from the participants. The questionnaire was posted on an online platform and the identity of the respondents were kept confidential.

The questionnaire assessed the Awareness about RADIATION HORMESIS among Allied Health Science Students. The responses were recorded and analyzed. There were no incomplete responses and no dropouts from the study. The final data obtained was organized, tabulated and subjected to statistical analysis

The salient questions in the study are:

1. Are you aware about the examples of hormesis?
2. Are you aware about radiation hormesis?
3. Are you aware about the types of radiation?
4. Are you aware about the causes of radiation hormesis?
5. Is hormesis caused due to radiation?

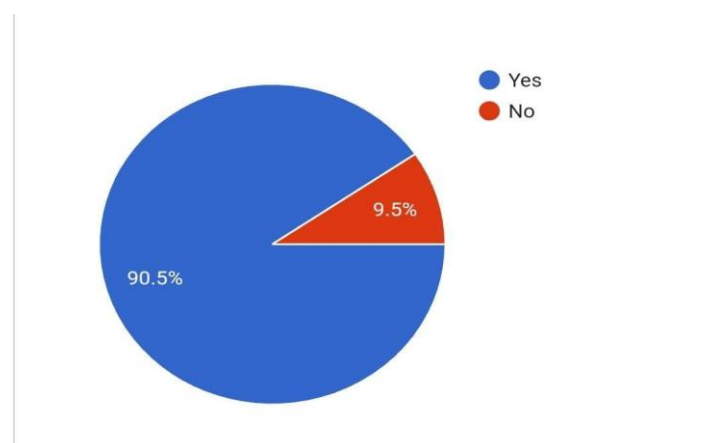
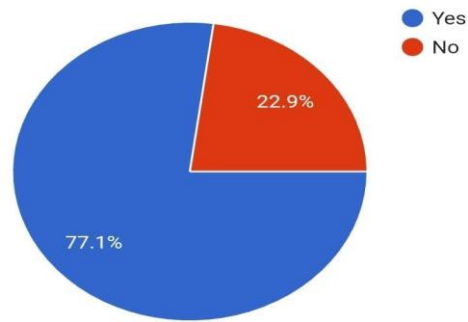
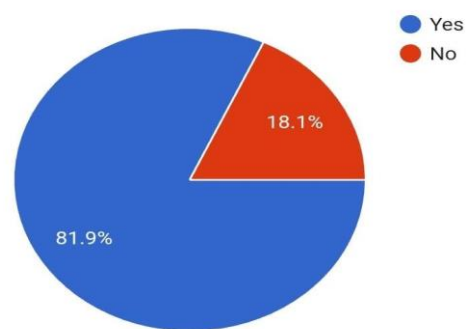


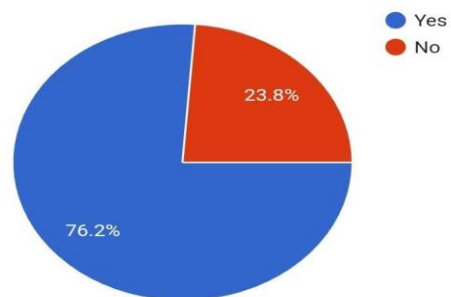
Figure 1: Awareness about the examples of hormesis



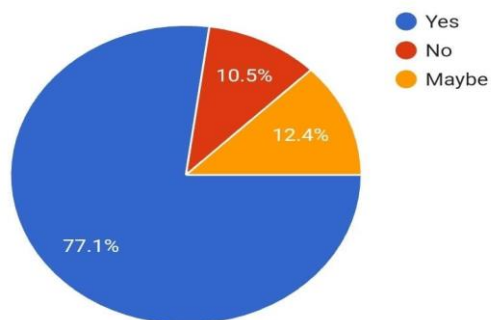
**Figure 2: Awareness about the radiation hormesis**



**Figure 3: Awareness about the types of radiation**



**Figure 4: Awareness about the causes of radiation hormesis**



**Figure 5: Awareness about hormesis caused due to radiation**

## RESULT

77.1% of the respondents were aware about radiation hormesis. 90.5% of the respondents were aware about examples of hormesis. 81.9% of respondents were aware about the types of radiation. 76.2% of the respondents were aware about the causes of radiation hormesis. 77.1% were aware that hormesis was caused due to radiation.

## DISCUSSIONS

In the early days of X-rays and radioactivity it was generally believed that ionizing radiation has numerous beneficial effects. It was claimed that blindness might be cured by X-rays. Ladies corsets contained radium. Drinking mineral water containing radium was very popular. People went to spas to drink radioactive water or stayed for hours in caves to be irradiated by ionizing radiation . 77.1% of the respondents were aware about radiation hormesis.[6]

Between 1925 and 1930 over 400,000 bottles of distilled water containing radium 226 and radium 228 were sold. It was advertised that some mixtures could treat over 150 disease, especially lassitude and sexually impotence. It is estimated that the collective skeletal radiation dose of victims of such radioactive medicine may had exceeded 350 Sv by the time the user died.90.5% of the respondents were aware about examples of hormesis.[7]

Gradually people found that the improper use of ionizing radiation could lead to many complications and harmful effects. X-rays are mutagen and there is a linear relationship between mutation rate and dose. The mutations, which are induced by radiation (or other mutagens) are mostly detrimental [8].76.2% of the respondents were aware about the causes of radiation hormesis.

When it was generally accepted that excessive radiation may be harmful, the first regulations for dose limits were introduced. . Despite carcinogenicity of X-rays was observed as early as 1902, the first radiation protection limits suggested in 1925 and for three decades these limits were based on the concept of a tolerance dose [9]. 81.9% of respondents were aware about the types of radiation.

The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), then proposed the linear no-threshold (LNT) theory in 1958 (UNSCEAR 1958). According to LNT theory that The effects of low doses of ionizing radiation can be estimated by linear extrapolation from effects observed by linear extrapolation from effects observed by high doses. There is not any safe dose because even very low doses of ionizing radiation produce some biological effect[10].77.1% were aware that hormesis was caused due to radiation.

## CONCLUSION

There is a moderate awareness amongst Allied Health Science students about Radiation Hormesis Enhanced awareness initiatives and educational programmes together with increased importance for curriculum improvements that further promote knowledge and awareness about Radiation Hormesis among Allied Health Science Students.

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