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ATTITUDE OF POST GRADUATE STUDENTS TOWARDS ENVIRONMENTAL AWARENESS IN RADIO ACTIVE POLLUTION : A STUDY IN KALYANI UNIVERSITY, NADIA DISTRICT, W.B.

Dr. Mridula Das,
Assistant Professor in Chemistry, B.Ed Department,
Kalna College, Kalna, Burdwan, 713409

Abstract :

Today the vast and wonderful diversity of plant and kingdom that largely sustains the planet's ecological equilibrium is seriously endangered due to radioactive pollution. The menace of radioactive pollution spreading into the environment has raised extensively as a result of the discovery of artificial radioactivity, particularly due to the development of atom bomb and of techniques of harnessing nuclear energy.

Environmental education is the study of the relationships and interactions between natural and human system. It is interdisciplinary, combining aspects of natural sciences such as ecology and geography with aspects of social sciences such as economics, law, and public health. It has a positive impact on student achievement in core subjects. It helps improve the health of children. Field experiences and related programs as part of the regular school curriculum contribute to healthy lifestyles through outdoor recreation and sound nutrition.

The present study was aims to investigate the attitude of postgraduate students towards environmental awareness in radioactive pollution with the help of statistical treatment. Sample of the study considered of 160 PG students from different departments of Kalyani University, Nadia District. A paired t-test was used to compare means score of male and female students. A one-way ANOVA was used to compare means among grades. The result of Analysis shows that, there exist difference in radioactive pollution awareness of postgraduate students belonging Arts and Science background. M.Sc students are more aware than M.A student about radioactive pollution.

Key Words : Environmental awareness, radioactive pollution, Environmental Education, statistical treatment, t-test.

Introduction :

Radioactive pollution can be defined as the emission of high energy particles or radioactive substance into air, water or land due to human activities in the form of radioactive waste. Radioactive waste is usually the product of a nuclear process such as nuclear fission, which is extensively used in nuclear reactors, nuclear weapons and other nuclear fuel cycles. Radioactive pollution that is spread through the earth's atmosphere is called Fallout. The best example of fallout is the nuclear bomb attack on Hiroshima and Nagasaki, Japan in 1945 by United States of America during World War 2. As a result of nuclear bomb attack, nearly 2, 25,000 people had died as a result of long-term exposure to radiation from the bomb blast within 5 years of attack due to radiation effect and cancer.

In land and water, the major source of radioactive pollution remains with the nuclear fuel cycle. The nuclear fuel cycle is used in nuclear power plants, extraction and refinement of materials from nuclear substance to be used in nuclear reactors and nuclear weapons, where the contaminants are left behind after the useful material (Nuclear Isotope) is extracted. Radioactive contamination can enter the body through ingestion, inhalation, absorption or injection. For this reason, it is important to use personal proactive equipment when working with radioactive materials. Radioactive contamination may also be ingested as the result of eating contaminated plants and animals or drinking contaminated water or milk from exposed animals.

Education without communication is simply impossible. Communication in turn only work with an appropriate medium. In case of environmental education at educational establishment classes at school, college or universities level serve as this medium. In 1986 environmental education became an integral component of National Policy on Education for the first time after independence. The policy stated "there is a need to create consciousness of the environment which must permeate all ages and all sections should inform teaching in schools and colleges and should be integrated in the entire education process".

Environmental education seeks to develop awareness, skill, attitude, values and commitments for solving environmental problems. It involves child's investigation and systematic exploration of its own natural and social environment and prepares itself to solve problems for improving life.

Table 1: Sources of Radioactive pollution:

	Class	Sub-Class
1	Natural sources :	• Solar rays • Environmental Radiation • Radionuclide in Earth's Crust • Internal Radiation
2	Artificial Sources :	• Medical X-ray • Radio isotope • Nuclear tests • Radioactive Fall out • Nuclear Reactors • Nuclear power plants • Radioactive Ore Processing • Nuclear Installations • Radioactive Ore Processing • Industrial, Medical and Research use of radioactive materials • Radiation pollution from electric Fields

Table 2:Classification and Effects of Radioactive Pollution

1	Effects of ionizing radiation on man	• Living cell dissociated by the alpha particle positive charge • DNA molecule can also be can be broken • Bring chronic alteration in DNA molecules • Temporary or permanent injury in the body
2	Effects of micro wave radiations	
3	Effects of non-ionizing radiations	• DNA breakage • Impairs fish productivity • Reduce effectiveness of plant photosynthesis
4	Effects of radio-frequency radiation	• Thermal effect • In air pose severe hazards to human's health • Kills a large of sea animal
5	Effects of fall out radiations	
6	Biological effects of radiation	• DNA breakage • Impairs fish productivity • Reduce effectiveness of plant photosynthesis • Thyroid cancer • hypothyroidism

7	Effects of X-ray	• Carcinogenicity in women • Low blood pressure • Anemia
8	Radiation effects on plants	• Growth Reduction • Cells are damaged
9	Effects of plutonium as carcinogen	• Serious bone cancer • Inducing chronic lung cancer
10	Effects of nuclear radiation on polymer	• Linking degradation • Gas formation • Double bond formation
11	Effects of krypton on global weather	• The release of Kr-85 into air will produce a measurable global change • The ionization produced by the isotope may prevent the buildup of huge electrical fields by thunder storms.
12	Danger from power plants and reactors	• The commissioning of boiling water power reactors have created enormous radio-pollutants in the environment • The untrained employees in power plants also yields 10 times larger volume of waste radio effluents from decontamination centre and suffer from serious health hazards
13	Nuclear Reactors	• The thermal effluents from nuclear

Table 3: Activities with One-in-a-Million Chance of Causing Death due to ionizing radiation

1	Receiving 10 mrem of radiation	Cancer
2	Smoking 1.4 cigarettes	Lung cancer
3	Eating 40 tablespoons of peanut butter	Liver Cancer
4	Eating 100 charcoal broiled steaks	Cancer
5	Spending 2 days in New York City	Air pollution
6	Driving 40 miles in a car	Accident
7	Flying 2,500 miles in a jet	Accident
8	Caneeing for 6 minutes	Accident

Protection and Control from Radioactive pollution:

- Nuclear devices should never be exploded in air
- Extreme care should be exercised in the disposal of industrial waste contaminated with

radio nuclides.

- Fission **reactions should be minimized as the rate of decay of radio nuclides and subsequent emission of radiation are unaltered by man**
- **Upgrading the instruments for radiation monitoring in the existing laboratories**
- **Researching new forest cultivation technologies for example extraction and processing of the non-contaminated inner part of the trees**
- **Compiling a concept for safe further processing and storage of radioactive wood waste**
- **Raising awareness of the importance of the problem with the regional and national political decision makers and in the media**
- **Explaining to the population to avoid the seriously contaminated forests**

Area of study :

The study area is Kalyani of Nadia district of West Bengal, India has been chosen for the present study. **Kalyani** is a city and a municipality in the Indian state of West Bengal. It is located around 50 kilometers (31 mi) from Kolkata — the capital of West Bengal, forming the northern most boundary of Kolkata metropolitan area. Kalyani is the administrative headquarters of Kalyani subdivision, a part of Nadia district. Situated on the banks of Hooghly River, the city is spread over an area of 29.14 square kilometers (11.25 sq mi). According to the 2011 census, Kalyani had a population of 100,620.Nadia is situated between 22º53″ and 24º11″ North latitude and 88º09″ and 88º48″ East longitude and about 390027 Sq Kms. in Area, this District is linear in shape with orientation of North-South.

Kalyani has two universities — University of Kalyani and Bidhan Chandra Krishi Viswavidyalaya; three engineering colleges - Kalyani Government Engineering College, Ideal College of Engineering and JIS College of Engineering; one medical college - College of Medicine & JNM Hospital and other institutes of higher education and research, including National Institute of Biomedical Genomics, Eastern Regional Station of National Dairy Research Institute. Kalyani Mahavidyalaya - a general degree college under University of Kalyani and S.K. Acharya Institute of Law are among the other institutes of higher education.

Objectives :

1. To know the level of attitude towards environmental awareness of radioactive pollution of postgraduate students.

2. To find out the comparison of environmental awareness of radioactive pollution among Postgraduate students of Arts and science group
3. To study the understanding and concept of radioactive pollution of postgraduate students

Assumptions :

1. PG students completed their part-I postgraduate degree.
2. MA students are graduate in different arts subject.
3. M.Sc students are graduate in different science subject.
4. All the PG students are age of 22-23years.

Hypothesis :

1. There is no significant difference in attitude towards awareness of radioactive pollution among postgraduate students of Arts and Science group.
2. There will be no significant mean difference in environmental attitude towards radioactive pollution among MA Girls and MA Boys student.
3. There will be no significant mean difference in environmental attitude towards radioactive pollution among M.Sc Girls and MSc Boys student.

Methodology :

The following steps and procedure adopted in conducting the study.

Research Design :

The volunteer sample in the study (N=160) consisted of 80 male and 80 female postgraduates students. The mean age of participants was 23 years. Each participants completed a test and retest questionnaire.

Instrument :

A questionnaire adapted by self was used to collect data. The 20 item questionnaire focuses on the awareness in radioactive pollution concerns. Each participant completed this questionnaire. The questionnaire addresses three dimensions: Environment, awareness and radioactive pollution. Each item contains 1 marks. The validity of the questionnaire was established by a review of three experts in educational technology. Selected items were revised based upon their comments and recommendations.

Procedure :

Data were collected from students score.

Data Analysis :

The questionnaire was used to assess postgraduate students 'attitude towards environmental awareness in radioactive pollution. A paired t-test was used to compare means score of male and female students. A one-way ANOVA was used to compare means among grades. The test was used to identify the source of significant differences at 0.05 level of confidence.

Selection of sample :

160 postgraduate students from Physics, Chemistry, History and Education Departments of Kalyani University of Nadia district are selected. Sample distribution is given below.

Group	Science (M.Sc)	Arts (MA)	Total
PG-Boys student	40	40	80
PG-Girls student	40	40	80
Total	80	80	160

Tool :

In this study we used the descriptive method. Data were collected with a quantitative data collection technique. Radioactive pollution awareness questionnaire was constructed by the investigator and was used in this study. The tool consists of 20 items in the form of objective type questions. The correctly answered questions will get one mark each. Therefore 20 marks are the maximum score and zero is the minimum score. Students answered the test paper questions. The student needed an average 40 minutes to finish it. The data was used only for the purpose of this study. The questionnaire covered with radioactive pollution related issues.

Reliability of the Tool :

For reliability of the tool, we used Test-retest method. Retest was taken after 20 days and the correlation is 0.88 (r=0.88).

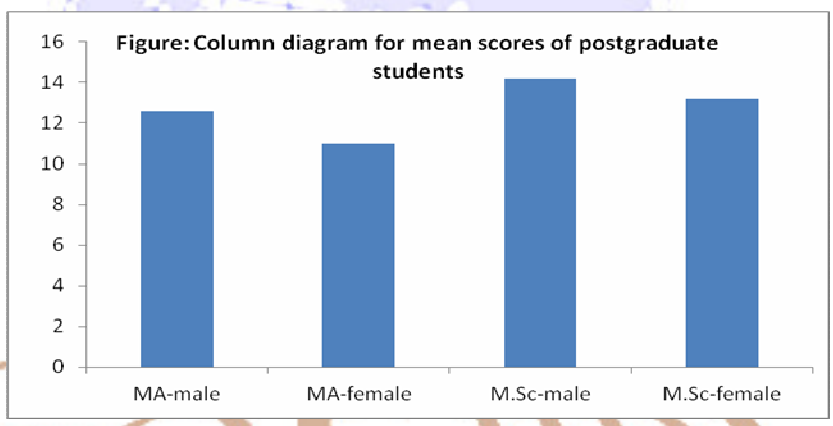
Validity of the Tool :

At the initial stage we choose 25 items for the questionnaire. After content validation 20 items are drafted.

Result :

Category	Group	Sum	Mean	SD	SE	t	p	Remark	Level
M.A	male	504	12.6	1.05	0.241	5.533	4.07E-7	Not significant	0.05
M.A	female	439	10.98	1.53	0.167				
M.Sc	male	568	14.2	2.430	0.384	2.240	0.02791	Not significant	0.05
M.Sc	female	528	13.2	1.435	0.227				

The above table shows that the mean scores of environmental awareness in radioactive pollution of M.A and M.Sc male and female students are 12.6, 10.98, 14.2 and 13.2 respectively. The observed t-values are 5.533 and 2.240 which are greater than the theoretical t-value 1.97 at 0.05 level of significance. Hence, the null hypothesis is rejected and alternative hypothesis is accepted. Therefore, there is significant difference in attitude towards radioactive pollution awareness among M.A and M.Sc students.



The above column diagram shows that there exists different radioactive pollution awareness in mean score among postgraduate students of Arts and Science group. M.Sc students are more aware in radioactive pollution than M.A students. PG boys students are more aware than PG girls student in radioactive pollution awareness.

Findings :

1. There is significant difference in awareness in radioactive pollution among Science and arts University students in postgraduate level.
2. M.Sc students are significantly higher than M.A student about radioactive pollution.
3. M.Sc male students are more aware in radioactive pollution than M.Sc female college

students.

4. M.A male students are more aware in radioactive pollution than M.A female students
5. M.Sc female students are more aware than M.A male and female students.

Limitation of the study :

1. The study was limited to only one University .
2. The sample of the study was restricted to 240 postgraduate students only.
3. The research was limited only to Nadia District of West Bengal due to shortage of the time.
4. The reliability of the awareness of radioactive pollution scale was determined only by test-retest method due to shortage of time
5. Only the content validity of the scale was determined.
6. The difference in the mean score of radioactive pollution awareness was found out only by t-test.

Suggestions for future study :

1. The scale of awareness in radioactive pollution can be standardized on the basis of large samples.
2. A similar study can be conducted by including larger samples from various schools of West Bengal or other state of India.
3. This work will be applicable on different college and university students.
4. Other independent variable like age, cast and region etc. will be considered for future study.
5. The study can be conducted upon common people not only the pupils.

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Summary :

It is found that M.Sc students are significantly higher than M.A student about radioactive pollution. We must be aware of potential radiological risks and take appropriate protective measures

to minimize them. Through an enhanced awareness risks and a sense of personal responsibility for minimizing those risks, we can contribute to maintain exposures to radiation and radioactive material as low as reasonably achievable.

References:

1. Bratu I, Georgescu (2005) "Scientificial Researches, Agroalimintary process and Technologies" Vol XI(2) 271-274.
2. Patil G V, Jinjar A.S (2012) "GOEIRJ" Vol I(II) 61-71.
3. Fairlie I, Sumer D.A (2006) "Chornobyl 20: Remembrance for the future" conference April 23-26.
4. Hwang W T, Han M H, Jeong H J, Kim E H (2008) "Journal of Nuclear Science and Technology, September 5, 594-597.
5. Baykara O, Hasar H, Obek E, Dogru M (2005) "Journal of Radioanalytical and Nuclear Chemistry" Vol 265(1), 95-99.
6. Frank N, Hippel V (2011) "Bulletin of the Atomic Scientists" Vol 67(5), 27-36.
7. Rao KR (2001) "Current Science" vol. 81(12), 1534-1546.
8. Sevior M (2006), "J. of Environmental studies" Vol 63(6), 859-872.
9. Bhatia G, Bhatia M (2013) "IOSR-JHSS" Vol.11(5),43-46.
10. Shivkumar G S (2012) "Research paper" ISSN No 2231-5063, Vol.1(X), 1-4.
11. Sadhu V, Dillion J S (2005) " Perspectives in Education", Vol. 21(2), 117-122.
12. Sreekumari K E, Ajitha K (1998) "Progress of Education" 3, 41-44.
13. Makki M H, Khalick A E (2003) "Environmental Educational Research" Vol. 9, 21-33.
14. Brody M J (1991) "The Journal of Environmental Education" Vol. 22 (2), 24-33.
15. Rebolj N, Devetak I (2013) "Energy and Environment Reseaarch" Vol. 3 (1) 106-114.
16. Shobeiri S M, Omidvar B, Prahalladay N N (2007) "Int. J. Environ. Res" Vol 1(1), 28-34.
17. Shivakumar G S (2012) "Research Thoughts" Vol. 1(X) 1-4.
18. Mishra S K, (2012) "International Journal of Scientific and Research Publication" Vol (11), 1-4.