RESEARCH ARTICLE

A QUALITATIVE STUDY ABOUT FALSE PERCEPTION STUDENT'S TOWARDS THE MAGNETIC RESONANCE IMAGING EQUIPMENT IN RADIOLOGY DEPARTMENT

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Manuscript Info

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Abstract

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Introduction-Magnetic resonance imaging has been called 'the most important development in medical diagnosis since the discovery of the x-ray' 100 years ago. It became the most important tools of modern radiology

Purpose-The aim of the study is to find out the student's false perception towards the magnetic resonance imaging equipment in radiology department.

Methodology- A prospective study was conducted by making objective type questionnaire and filled it by the students of paramedical college.

Result-At the end of study, following results were observed the study's result revealed several key themes regarding false perceptions of MRI equipment among students.23.04% students expressed fear of radiation exposure. 19.82% students held misconceptions about the potential danger of MRI scan. These misconceptions may arise from a lack of understanding and underlying principles of MR technology.18.43% students think that MRI generates images of the body by emitting sound waves and measuring their echoes. The most common false believe that MRI is only used for bone scan (28.57%). 20.74% students think that MRI can cause cancer.29.49% students have no idea about noise during the MRI scan.38.80% students are not aware about the prohibited items to the MRI room.

Conclusion- Comparing courses wise MRI safety knowledge in subjects by using chi-square test It is found statistically significant with p – Value **0.00623**, It mean's course wise MRI safety knowledge were change.Comparing to the others course medical lab technology (MLT) students have better knowledge about MRI equipment.The study did not find any significant differences in false perception of MRI equipment based on age or gender among the students. It implies that age and gender may not be significant factors in shaping these perceptions within this particular group.

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Introduction:-

Magnetic resonance imaging has been called 'the most important development in medical diagnosis since the discovery of the x-ray' 100 years ago. It became the most important tools of modern radiology. [1] The radio frequency pulse use in MRI in the range of 1-80MHz.The another term of MRI is spectroscopy. [2] MRI is based on the principle of NMR.MRI is a non-invasive imaging technique that provides details anatomical structure. MRI scanner involved with strong magnetic field, gradient coli, radio waves to create image of the body parts. Sophisticated technology use in MRI that detects the change in the direction of the rotational axis of protons in the water content of living tissues. [3] Basic MRI requires three steps:
1. Place the patient in a uniform magnetic field
2. Displace the equilibrium magnetization vector with an RF pulse
3. Observe the signal as the magnetization vector returns to equilibrium. [4]

History
In 1946, Felix Bloch at Standford and Edward Purcell at Harvard separately described NMR in a solid. They shared the Nobel Prize in 1952 in physics for this work. After 20 years later finally the discovery of computer in medical imaging was done. From that time NMR is known as MRI. Bloch continued his study with NMR of water. And Bloch noticed that nucleus behaves like a small magnet.This nuclear magnetism known as Bloch equation. NMR is not an imaging technique but rather a method to provide spectroscopic data concerning a sample placed in device. [2] Malignant tissue and normal tissues have different NMR spectrum first time showed in 1970 by Damadiyan. At this time Pal C Lauterbur developed a superconductor. As a result this superconductor makes the strong magnetic field in MRI. In 2003 Paul C.Lauterbur and Peter Mansfield won Nobel Prize for their discoveries of using MRIs as a diagnostic tool. [5]

Causes of false perception of students towards MRI equipment-
1. Limited knowledge
2. Misconceptions
3. Lack of exposure
4. A general fear of unknown

Corrective method to false perception of students to MRI equipment-
1. Providing accurate information
2. Opportunities for hand on experiences
3. Providing informational resources and materials
4. By offering specialized course on MRI technology.

Aim-
To accesses the false perceptions of students' towards the magnetic resonance imaging equipment in radiology department.

Methodology:-
A prospective study was conducted by making objective type questionnaire and filled it by the students of paramedical college. In this study total 217 students was filled the gogglefrom. Where 40% female and 60% male was participated and their age group was divided into 4 category that is 18-22Y,23-26Y,27-31Y,32-35Y and also divided into their course and programmed wise(UG,PG). The sampling method was purposive.

Inclusion Criteria
1. Students of paramedical college.
2. 1st year, 2nd year and 3rd year students.
3. PG student of paramedical college.
4. Students who have undergo in MRI scan before.
5. Students who are not seen MRI machine before

Exclusion Criteria
1. Intern students will be excluded.
2. Radiation and imaging technology students will be excluded.
3. Radio therapy students will be excluded.
4. Students of others college (except paramedical college) will be excluded.

Some questions were asked from each students (in Table1)

| 1	MRI stands for
2	What is the minimum scanning time of MRI?
3	Which type of radiation used in MRI?
4	How does MRI technology generated image of our body?
5	What safety concern is associated with MRI equipment due its strong magnetic field?
6	Does MRI scan produce loud knocking or buzzing noise during the imaging process?
7	What is the common false believe about MRI scan?
8	What can be done to address false perceptions about MRI equipment among students?
9	Self-grading- of MRI safety knowledge level.

Table-1:-Sample questions.

Sample Size-
During the study data was collected from 217 students of paramedical college in NIMS University, Jaipur, Rajasthan.

Result:-
In this study the age group was ranging between 18 to 35 years with mean age of students. There were 131males (60.37%) and 86 females (39.63%). Again the age group were subdivided like 18-22,23-26,27-31,32-35.
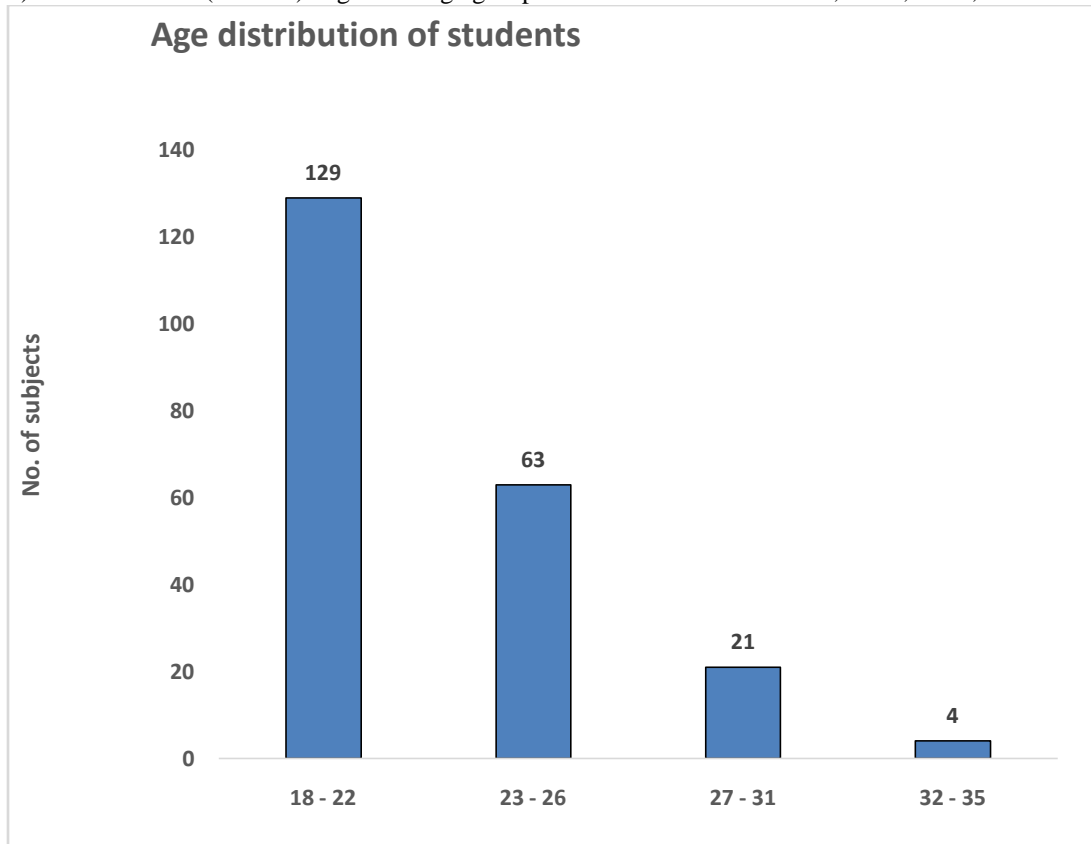

Graph 1:- 18-22 years: 129 individuals, accounting for 59.45% of the total.23-26 years: 63 individuals, representing 29.03% of the total.27-31 years: 21 individuals, making up 9.68% of the total.32-35 years: 4 individuals, constituting 1.84% of the total. The table provides a breakdown of the population based on age, indicating a higher

proportion of individuals in the younger age groups (18-22 and 23-26) and a smaller proportion in the older age groups 27-31 and 32- 35.

Gender distribution of subjects
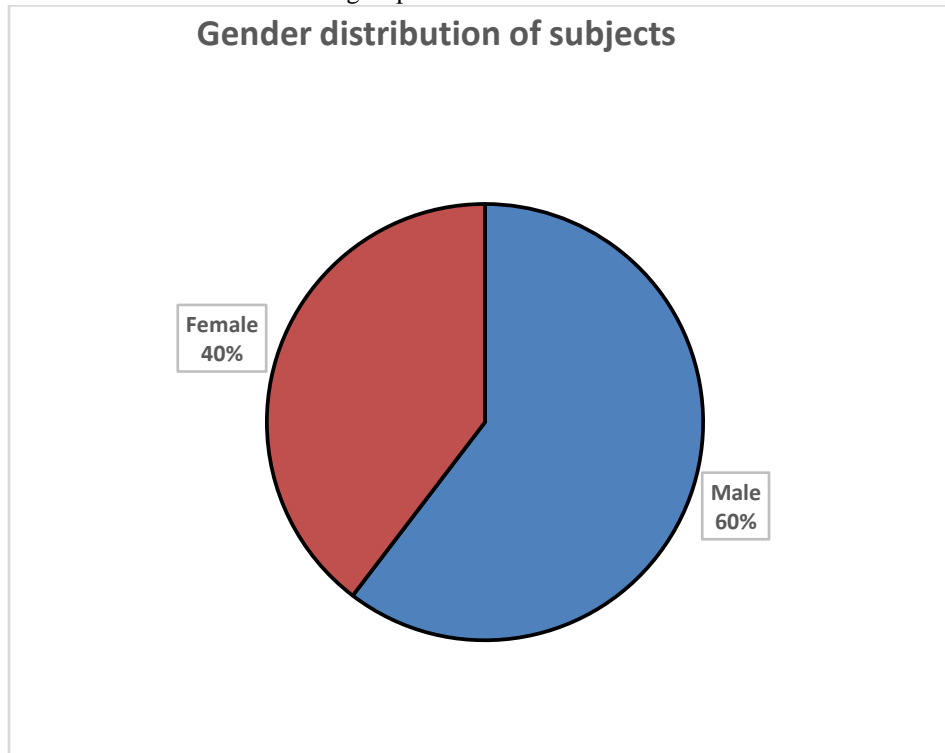
Graph 2:-Male: 131 individuals, accounting for 60.37% of the total. Female: 86 individuals, representing 39.63% of the total. The table provides a breakdown of the population based on gender, indicating that there is a higher proportion of males (60.37%) compared to females (39.63%).

Education level distribution of subjects
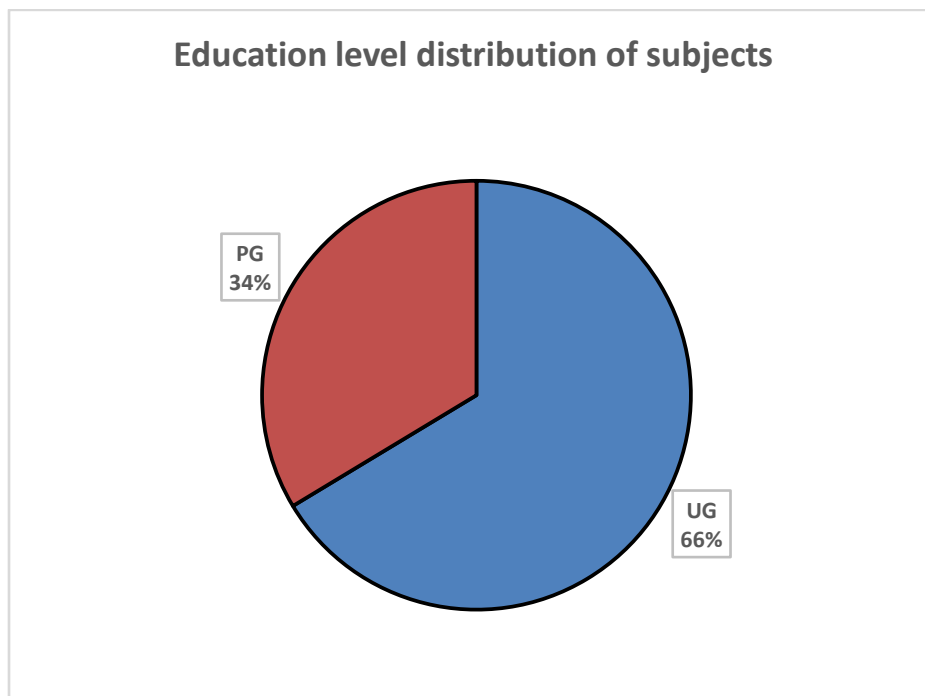
Graph-3:-The table represents the distribution of individuals based on their educational status. The data includes a total of 217 people. The educational categories and their corresponding percentages are as follows; UG

(Undergraduate): 144 individuals, accounting for 66.36% of the total.PG (Postgraduate): 73 individuals, representing 33.64% of the total.
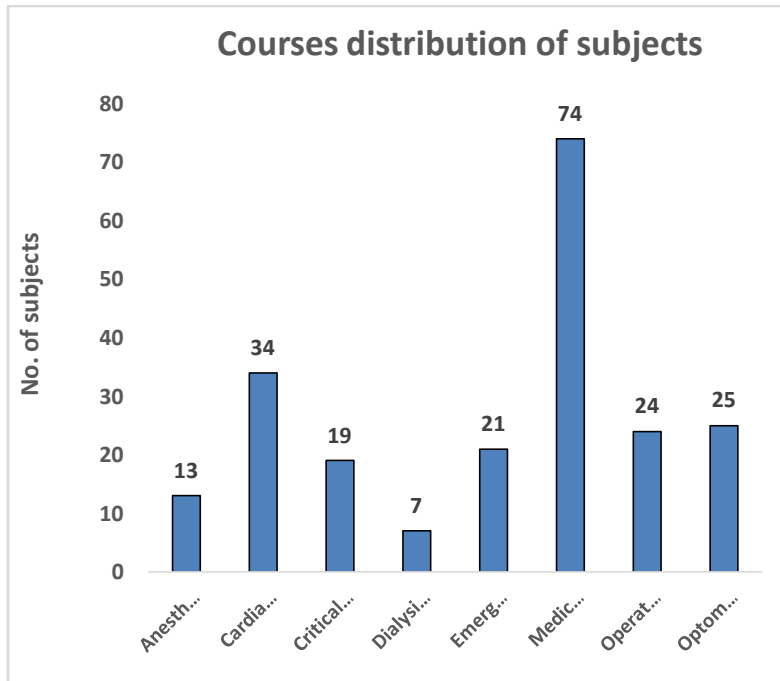

Graph-4:-The table represents the distribution of individuals across different courses. The data includes a total of 217 people. The courses and their corresponding percentages are as follows: Anesthesia Technology: 13 individuals, accounting for 5.99% of the total. Cardiac perfusion: 34 individuals, representing 15.67% of the total. Critical Care: 19 individuals, making up 8.76% of the total. Dialysis Technology: 7 individuals, constituting 3.23% of the total. Emergency Technology: 21 individuals, accounting for 9.68% of the total. Medical Lab Technology: 74 individuals, representing 34.10% of the total. Operation Theatre Technology: 24 individuals, making up 11.06% of the total. Optometry: 25 individuals, constituting 11.52% of the total.The table provides a breakdown of the population based on different courses, indicating the number of individuals and their respective percentages in each course.
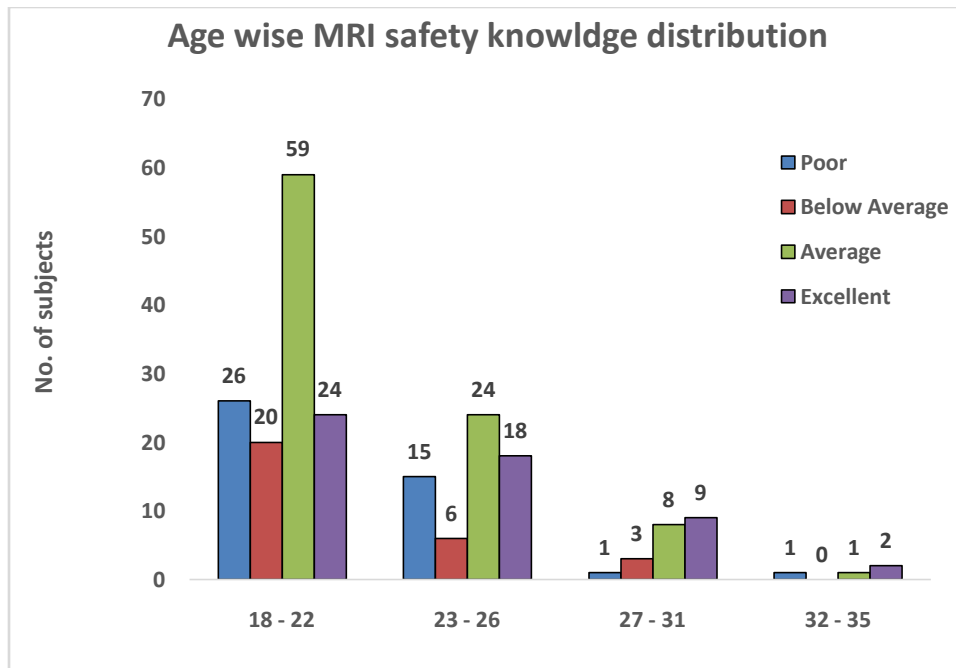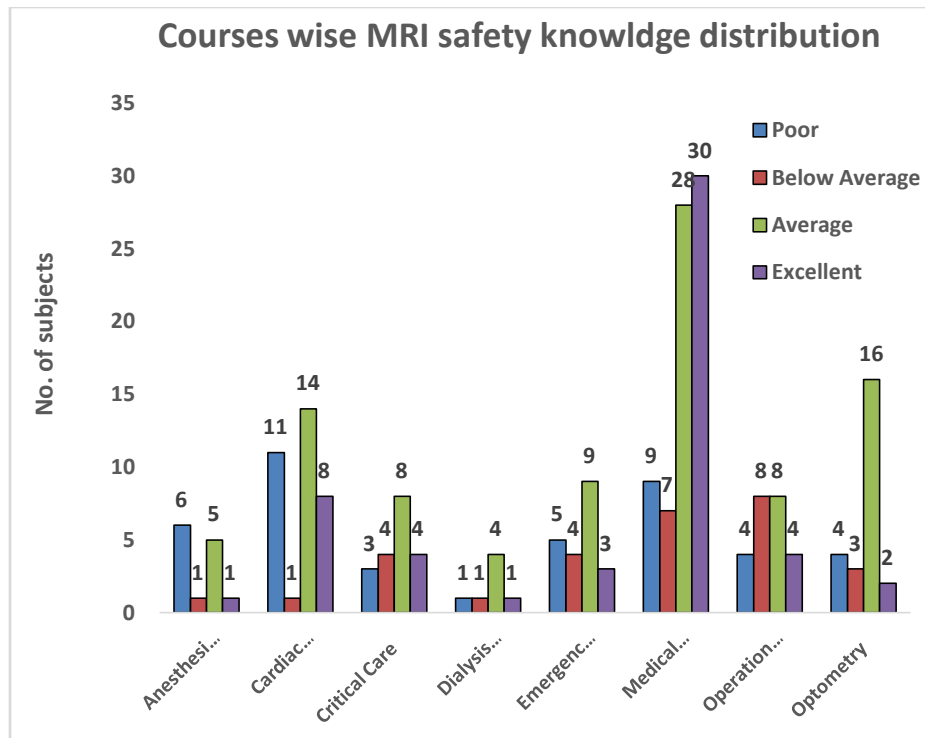
Graph-5:-The chi-square test was performed to analyze the relationship between age groups and MRI safety knowledge in the subjects. However, the test did not reveal a statistically significant relationship (p > 0.05) between age groups and safety knowledge. The distribution of safety knowledge across different age groups did not vary significantly.
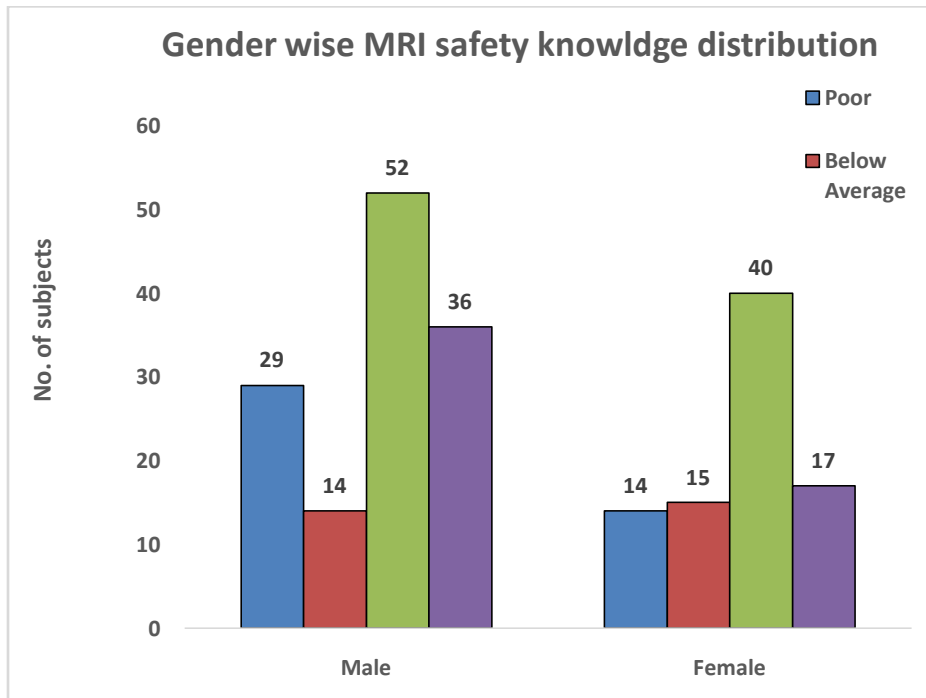
Graph-6:-The chi-square test was performed to analyze the relationship between gender and MRI safety knowledge in the subjects. However, the test did not reveal a statistically significant relationship (p > 0.05) between gender and safety knowledge. The distribution of safety knowledge between males and females did not differ significantly.
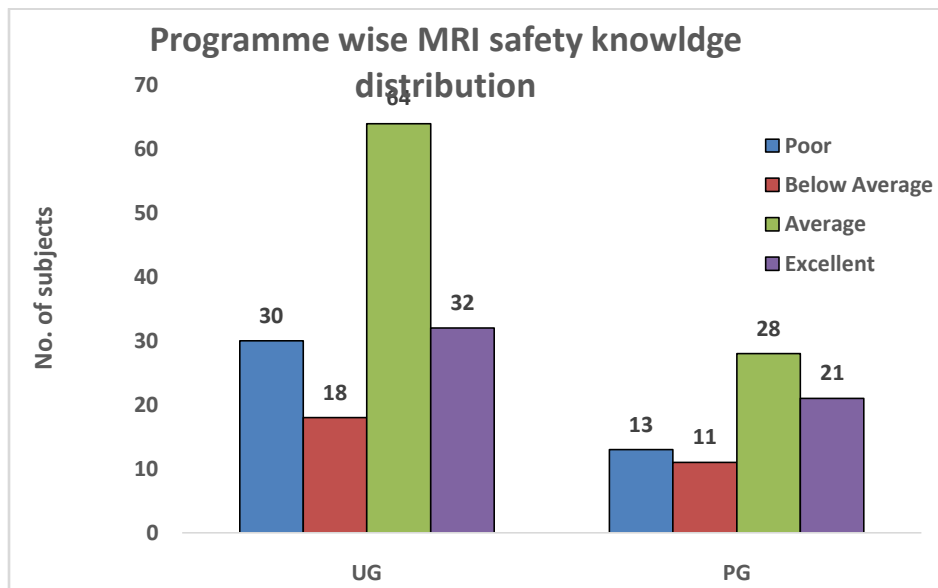
Graph-7:-The chi-square test was performed to analyze the relationship between the program of study and MRI safety knowledge in the subjects. However, the test did not reveal a statistically significant relationship (p > 0.05) between the program and safety knowledge. The distribution of safety knowledge between undergraduate (UG) and postgraduate (PG) students did not differ significantly.

Graph-8:- the chi-square test was performed to analyze the relationship between different courses and MRI safety knowledge in the subjects. The test revealed a statistically significant relationship (p < 0.05) between MRI safety knowledge and the course Anesthesia Technology. The distribution of safety knowledge varied significantly among the courses, specifically in the case of Anesthesia Technology. However, further analysis is required to determine specific patterns and differences between other courses.

Discussion:-

The study's result revealed several key themes regarding false perceptions of MRI equipment among students.23.04% students expressed fear of radiation exposure. 19.82% students held misconceptions about the potential danger of MRI scan. These misconceptions may arise from a lack of understanding and underlying principles of MR technology.18.43% students think that MRI generates images of the body by emitting sound waves and measuring their echoes. The most common false believe that MRI is only used for bone scan (28.57%). 20.74% students think that MRI can cause cancer.29.49% students have no idea about noise during the MRI scan. 38.80% students are not aware about the prohibited items to the MRI room.within the Anesthesia Technology course, 46.15% of the students have a false perception about MRI.

In this study there p value is not significant for age or gender wise within the study population, but the result shows that Male population have better knowledge about MRI equipment where the age group of 18-22 has more knowledge then other age group about MRI equipment.

In the study of Alelyani Saudi Arabian health workers' perception and attitudes toward magnetic resonance imaging safety, founds that, the education level of health workers had no significant impact on perception of MRI safety. The knowledge score of MRI safety for nurses was significantly higher than the score of dentists, physicians, and laboratory specialists (p-value ¼ .005). The attitude score showed no significant difference regarding the gender, age, profession, or education level of the participants (p-value >0 .05). The results highlighted the importance of training and higher studies for health workers regarding the perception and attitudes toward MRI safety. The overall knowledge of MRI safety and procedures is generally acceptable. However, more intensive health education programs are needed to improve the level of knowledge.

In another study of Sreshtha and Khadka assessment of patients' knowledge perception and safety regarding MRI scan Majority of 85.5% patients answered that MRI uses harmful ionizing radiation like CT scan and radiography. Almost 43 patients who answered MRI functions in disease treatment also answered decreased in pain after MRI

scan were in age group between 25 years and 50 years. This study also revealed that majority of 26.8% patients faced problem as claustrophobia along with anxiety during the scan, out of which 13 patients have history of previous MRI scan. This study decrease in pain was higher in diagnosis and treatment answer. Majority of the patients faced anxiety along with claustrophobia during the MRI scan. Assessment of patient knowledge, perception and safety regarding MRI scan can be the key to increase patient compliance and save valuable scan time

Conlusion:-

Comparing courses wise MRI safety knowledge in subjects by using chi-square test It is found statistically significant with p – Value **0.00623**, It mean's course wise MRI safety knowledge were change. Comparing to the others course medical lab technology (MLT) students have better knowledge about MRI equipment.

The study did not find any significant differences in false perception of MRI equipment based on age or gender among the students. It implies that age and gender may not be significant factors in shaping these perceptions within this particular group.

I would like to study farther on age and gender in this regards in future as a future scope of research.

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Conflict of Interest-
The author has no conflict of interest.

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