A STUDY TO ASSESS THE KNOWLEDGE OF RADIO IMAGING TECHNOLOGY AMONG STUDENTS TOWARDS HANDLING THE RADIOGRAPHIC MODALITIES

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Abstract

Background: The main focus of the curriculum of radio imaging technology course is to spreadknowledge, skills, attitude required for the practice. By communication skills students can practice more with volunteer patients. The students in radiography include the subjects such as Anatomy and physiology, radiographic equipment's, radiation protection, radiography imaging techniques etc. Knowledge estimation may be beneficial for finding possible gap in an organization and publicize actual weakness and drawbacks. Present report on knowledge estimation takes preference over analyze specific qualified professional that are completely resolve by technology.

Objective: The aim of this study is to assess handling and care of radiographic modalities and knowledge of students on different modalities.

Methods: 94 samples data were collected prospectively and mean, average and percentage stats are used.

Result: Out of 94 Samples, the male population was 49 (52.1%) and female 46 (48.9%). They were divided into four categories on the basis of their class standards in which two were (BSc 2 nd and 3rd year) and other two were (MSc. 1st year and MSc. Final year students). Finding shows that BSc. 3rd year has highest knowledge on radiographic modalities i.e. 18.54% and BSc. 2nd year with least knowledge on radiographic modalities i.e. 16.80%.

Conclusion: The study concludes that knowledge related to radiographic modalities, handling and care of radiographic modalities must be known to everyone in terms of safety and precaution while working in the radiology department. Safety standards were maintained and guidelines were made along with how to use different modalities and how to handle them with care. Class should be taken at regular interval to check the knowledge of radiographers and staff working in the radiology department so that in case of emergency that can handle and safe both the patient and machine form damage.

INTRODUCTION

Radiographers or medical technologists are trained in health professionals who works in medical imaging by achieving a high quality radiographs. For correct diagnosis, suitable treatment, accurate positioning & technique is needed for the patients. [1]

Radiographers can be differentiated on the basis of their work experience or knowledge. To rule out & assess the knowledge between the beginners and qualified or experienced radiographers by the following their observation strategies. Firstly by beginners: such as remembering with brainstorming in the planning of evaluation phase and remembering combined with logical intellection and curiosity, open-minded, good observation, reading and seeking information, and by experienced radiographers use their knowledge in flexible manner by prediction according to situation from a different view point and by explaining on the details by selective reading with intuition and confidence. [2,3]

A knowledge radiographer provides satisfactory services to his/her client. Radiographers may acquire there knowledge by learning which might be through conference, books, lectures, article , related magazines and professors and by through self- learning or discussion among experienced radiographer and colleagues. [4]

Radio Imaging Technology students:

The main focus of the curriculum of radio imaging technology course is to spread knowledge, skills, attitude required for the practice. By communication skills students can practice more with volunteer patients. The students in radiography includes the subjects such as Anatomy and physiology, radiographic equipment's, radiation protection, radiography imaging techniques etc.

Radiographic Modalities:

X-ray

X-ray have universally used in the diagnostic medical imaging after the discovery in 1895. X- rays are produced by the x-ray machine. When photons interacts with the tissue they have distinct attenuation characteristics to see the contrast for comparison between tissues. It promotes electromagnetic radiation that passes through an object to produce image or radiographs and used in therapy to treat cancer and other related diseases. In early 18th century Crookes tubes were used for the production of x-rays, a discharged tube was invented in 1875 and was used by W.C. ROENTGEN, who discovered X-rays using this simple equipment in 1895. X-ray machine is a compound device that uses energy form 10 Kev to 150 Kev which is widely used in a medical imaging diagnosis in different areas of the world. With the capability of x-ray to pass through the hard objects it has been used in different places like medical profession (Radio-diagnosis) to check the fracture of bones, infection, lungs problems, osteoporosis, enlarged heart, swallowed item etc. [5]

Computed Tomography (CT)

From 1970 to now CT has transformed imaging to a new level in decision making. CT has many more importance than other imaging modalities. The word "Tomography" is known to everyone. In 1935 Grossman refined the technique and specify it as tomography (Greek **tomo's** means **section**). In 1937 Watson refined a new tomography technique in which section are cross section and called as transverse axial tomography. Hounsfield work made a technique that transform the medical and diagnostic radiology to the new era. He called the technique computed transverse axial scanning which was first published in 1973 in British journals Computed tomography goes through a series of steps to form an image on the computer console, CT scanners involves following steps that are: data acquisition, image reconstruction, image display, manipulation, storage, recording and communication. From years 1917 to 2008 many new invention and new generation came into existence. . In terms of scanning CT has changed the level with less san time and great improvement in clinical application like CT angiography, CT colonoscopy, CT urography etc. [6]

Magnetic Resonance Imaging (MRI)

In 1946 NMR (Nuclear magnetic resonance) was first described by two scientists (Bloch & Purcell) for which they were awarded a noble prize in physics in 1952. The technique in MRI changed when super conducting magnets with wide bore came into existence (approx. 30 years back) which develop of MRI in clinical application. The first clinical magnetic resonance image was produced in Nottingham and Aberdeen. MRI is one of the most power equipment in radio-diagnosis. It works on the hydrogen proton present in body with super conducting magnetic that precise these protons and helps in formation of image. Important pathologies used in MRI diagnosis in human body like CSF flow study, Spectroscopy, Non- contrast Angiography. [7]

Knowledge:

Knowledge estimation may be beneficial for finding possible gap in an organization and publicize actual weakness and drawbacks. Present report on knowledge estimation takes preference over analyse specific qualified professional that are completely resolve by technology. [8]

Justification:

Radio technologists are one of the main parts of the radiology department. Each radiographer must have proper knowledge related to radiation, patient safety, proper handling of radiographic modalities, anatomy, physics and communication skills.

Present study is designed to find out the knowledge amongst the radio technologists and students for their skill

development, Safety from the radiation, handling of patients during theprocedure and Daily check of quality control and quality assurance of the machines, proper method of handling the modalities like X-rays, CT, MRI.

Objectives of the Study

1. To access the basic radiographic knowledge of radio imaging technology studentsin the radiology department.
2. To assess the knowledge in proper handling and care of radiographic equipment'sby the radio imaging technology students in the department of radiology.

Literature Review

Nasrollah jabbari et al carried out study in the **department of medical sciences Urmia,Iran in December 2011**.The aim of the study was to assess radiographic reject/repeat rateand additionally to rule the extent of dose to the patient from radiographic reject/repeat in radiology of Urmia University of medical sciences, Iran. During a period of 4 months the foremost frequent examination were picked in 3 radiology centers. A pattern was constructed as a repeat/reject study form for radiographers to complete every time a film was dropped by radiologists or repeated. The collected data were arranged at the end of each week & enrolled into the computer for search at the end of the study. The conclusionof the study revealed that highest and lowest repetition rates were from the pelvis, 14.01%and upper limb 4.17%. The main logic of repetition of radiographs were due to exposure (54%) and positioning (18%). The standard repetition rate in all three hospitals was 7.20%. It was found that individual fault has an essential role in repetition of radiographs.It proves that those patients receive repeat radiographs gets $3.23mGy\text{-}cm^2$ on an average. Pelvis receives the highest level of repetition rate. Seeing the radiosensitive organ analogous to pelvis especially in pediatrics patients a few special considerations must be tested for pelvis diagnosis. [9]

Jonathan Kruskal et al done a retrospective study in the **department of radiology, Beth Israel, Deaconess Medical Centre, Boston** in **August 2011**. The imaging department shows anticipation to authorize and maintain effective quality, security and conduct improvement program. Essential factors include devotion to the key principle of quality management & correct utilization of quality tools. The first is the collection of important information, followed by the selection and study of quality and performance data, study and list of causes that likely to add in a process failure, fault or negative events. Quality improvements needs a good, devoted and frequently planned attempts by a number of proficient and good team members with aim to do right things in a regular interval in each case. Process can be maintained by appreciating and celebrating the achievements with all points keeping in mind or learned in department organization.[10]

The study is done by **L. Borgen., et al,** in the **department of radiology, Drammen hospital, Drammen, Norway**, **(2014).** The objective of the study is to search the pattern of radiologists and radiographers on case practice vary from that of clinicians and to see the knowledge related to the radiations in this unit. Method of the study contains questioner form which was given to the 82 participants (radiologists and radiographers) inthe Norway. Comparison was done with already published study which is done by clinicians. Questions initiate with case farfetched to alter the treatment as well as the responder radiation, and knowledge related to case guidelines. Result of the study reveals that radiographers calculate the highest percentage of case most likelihood to trouble the treatment (20%) when compared to radiologists (10%) and clinicians (5%). Where there is shortage of time, counterbalance for limited or small clinical examination, and the main reason in these types of cases is patient's expectations which are seen by radiologists compared to clinicians. Radiologists and radiographers have controlled and better knowledge compared to radiation and they more familiar to case study compared to clinicians. Conclusion shows that the mental representations of radiologists and radiographers in different from that of clinicians, shows that the use of imaging likelihoodaffects the treatment, and the reason of such cases. Radiographers and radiologists have better knowledge in radiation from that of mentioned clinicians. But this unit has the capability of improving their knowledge in radiation protection. [11]

The study was done by **M K A Karim** in the **department of physics, University Technology Malaysia, 81310 Skudai, Johar Malaysia** in **2016.** To access the level of knowledge or intelligence and awareness/ information between 120 radiographer's personnel employing in 7 public hospitals in Johar, Malaysia regarding computed tomography technology & radiation doses on a set of questionnaires. Participants were divided into 2 groups on the basis of groups: 1) medical professional 2) Allied health professionals. The questionnaires were forwarded into 1) personal data 2) relative radiation dose 3) advancement in current CT technology. 1/3 of the participants from bothgroups were able to assess relative radiation dose for common CT diagnosis. No meaningful difference is seen in 2 groups with the medical profession giving a mean score of 26.7 and allied health profession with mean score of about 25.2. The review mark notice that variation regarding the sense of intelligence and understanding the risks of radiation and CT optimization technique. [12]

The study is done by **K R Reddy, et al,** in the **Department of oral medical and radiology, Vishnu dental college, Bhimavaram, India (2017).** The objective of the study based on the awareness and knowledge of the radiographers, dental students, dental practitioners in the radiation hazards and protection. The design of the study was taken place in 120 subjects between the radiographers, practitioners, students in dental in the west Godavari district, India. Method of the study is based on 25 question survey and datawere collected using the statistical information. Two tests were used in the statistical i.e., Kruskal Wallis test and turkey post hoc test. Result of the study reveals that very small amount of

percentage uses rectangular collimators, amongst all, 22.5 % dentist, 25 % of radiographers and students doesn't have any kind of knowledge related to film speed which they were using. 25% of radiographers and dentist hold the radiographic films by themselves while doing the radiographs. In all 120 participants 60% of dentist, 80% of dental students and 72% of radiographers were not worn lead apron during the exposure and no used the thyroid collar. Conclusion of the study states that dental practitioners doesn't have adequate knowledge compared to radiographers and dental students, there must training session at regular interval and change in the dental education from time to time to improve the awareness amongst the participants and knowledge related to radiation protection. [13]

The study was conducted by **Neeru Kapur et al.,** in the **department of Radio- Diagnosis, SGT Medical College, Budhera, Gurugram (Haryana), India** in **2019.** The objective of the study is to access radiographs that are acceptable for the clinical purpose with minimal dose to the patient. To attain the ideal work, estimation of image quality must be in equilibrium condition to the patient dose. X-rays are the source of cause to the skin damage and other side effects which are life threatening. The studies include the 40 numbers of patients of different age group and of both the gender on those radiographs were repeated. The closure of the study shows that 40 radiographs in computed tomography in period of 6-month repetition of radiographs was for chest - 11, lumber spine - 8, cervical -6, pelvis - 3, abdomen - 2, upper limb - 4, lower limb - 4 and skull - 2. Conclusion of the study states that repetition of radiographs were due to wrong positioning, marker placed on wrong side, collimation defect, false exposure factor takes place due to lack of knowledge in the radiographers. [14]

A study was carried out by **A R Farajollahi et.al,** in the **Medical education research Centre, and department of medical physics, Tabriz University of medical science Tabriz, Iran (2014).** The objectives of this study were based on the knowledge of the radiographers and to examine the achievable analytical and situational contribution to this knowledge. Method of the study formulated a questionnaires survey which is distributedto a unit of 120 radiographers. This survey of questions has two sections. First sections contain all their personal information like age, sex, grades in school, work experience etc. and second section contain 17 multiple choice questions related to radiographic imaging and their safety issues. Result was 63.8% and personal information was not included for scoring in the analytical data. Conclusion of the study shows that academics are powerful indicators in knowledge of the radiographer's profession. New courses and regular knowledge to radiographers are highly recommended. [15]

The study was conducted by **Larsson et al** in **the institute of klinsik Watenskap, department of clinical sciences, intervention and technology, Huddinge** in **November 2014.** The objective of the study was to educate in the field of radiography evolution similar to digital image production process by compassionating how radiographers achieve tasks and spread knowledge in counting the information scenario in work process. The mode of this study follows a qualitative ethnographic approach. Using participants view and a re-structured conversation with radiographers at 6 Swedish hospitals. Out of 37 radiographers only 25 radiographers were examined using a conversation process. Radiographers further divided into 2 categories 1) beginners with 1 year or less experience and 2) qualified or experienced with 5 or more experience radiographers. The radiographers' works into 3 phase 1) planning 2) performance and 3) evaluation. Balker's theory was marked to analyze the knowledge. To rule out the result& assess the knowledge between the beginners and qualified or experienced radiographers by the following their observation strategies. Firstly, by beginners: such as remembering with brainstorming in the planning of evaluation phase and remembering combined with logical intellection and curiosity, open-minded, good observation, reading and seeking information, and by experienced radiographers use their knowledge in flexible manner by prediction according to situation from a different view point and by explaining on the details by selective reading with institution and confidence. The closureof study demonstrates the role of radiographers and their intelligence condition have shuffled in 4 principal areas 1) communication in work 2) image processing 3) image quality assurance 4) decision making. [16]

The review is done by **F. Paolicchi., et al** in the **Diagnostic and interventional radiology, via Rome 67, 56100 Pisa, Italy, 21 October (2015).** The objective of the study is the basic knowledge of radiation protection and dose estimations in the radiological procedures between the radiographers. Method of the study gives the questioners survey with fair analytical features and earthly distributed, which is distributed amongst the 780 participants. Result of the study states that only 12.1% of the participants present in the radiation protection course on regular interval. 90 % of radiographer's states that they have adequate knowledge in the radiation protection but most of them underrate the radiation dose in many of the radiological procedures. In amongst all 4 to 5 % of participants declare that pelvis magnetic resonance and abdominal ultrasounds are exposed patients to radiation. On the other hand, 7 % of participants states that ionizing radiation is not used in the mammography. About 50 % of the participants' states that radiation induced cancer doesn't depend on the age and gender and are not good in comparing between the deterministic and stochastic effects. Young radiographers with less than 3 year of experience have excellent knowledge than from the old and more experienced ones. Conclusion of the study says that there must be increase in awarenessto the radiation protections issues and radiological procedures. There must be training course for the undergraduate, postgraduate ad radiographers from time to time for the betterment of the patient safety. [17]

The analysis done by **R.A. Manaf., *et al*** in the department of **Community health, faculty of health and medical science, university putra, Malaysia (2018).** Diagnostic is one of the main parts of radiology department. It needs a good knowledgeable radiographer so to ensure the image quality and patients satisfactions. The objectives of this study

are to show the scientific articles based on radiographer's knowledge in imaging and factors related to radiographer's knowledge. The research was also done how to increase radiographer's knowledge based on imaging. The method of their study is to use different search engines i.e. Pub Med, science direct, Medline, and CINAHL. Radiographers and knowledge are the two main key words that were used in the search of the title. The study was published in December 2016, which is written in English, conducted on different aspects related to imaging and studies that accounts the radiographer's knowledge. The studies that excluded was somewhat related to the radiology science and the measurements to the equipment's techniques. In the results 28 articles were approved in which 15 met the inclusion and exclusion criteria. The conclusion of the study highlights on the training and educations criteria for the betterment of the radiographer's knowledge based on imaging and to improve the future in imaging without giving any error.[18]

Mysara Rumman et al conducted study in **the department of medical imaging, Faculty of Allied Medical Health, Palestine Ahliya University College, Dheisha, and Bethlehem Palestine** in **August 2018**. The objective of this study is to estimate the students' awareness & the ability of radiographic positioning and to check the criteria and achieve ability of clinical training. Multiple choice questionnaires were filled by the students of Al-Alhiya and AL-quads University.1 marks was given for right and zero marks for wrong answer. Later all the correct solutions were modified into the percentage form. Maximum students didn't attain excellent score. 60% for Al-Quads University & 56% for Al-Ahliya University was the mean averages score. The grade of English on students and their present has an effect on scores. The estimation of students' intelligence of radiographers positioning indicates great performance with tremendous skill in English and presence of students. The conclusion states that weak and low execution at questionnaires by the students. [19]

The study was carried by **Abba M et al** in the **department of medical radiography, Bayero University, Kano, Nigeria** in **2018**. The objective of the study is to check the knowledge of CT parameters & to enforce their administration among CT radiographers in all radio diagnosis centers in Kano. The method of the study was based on the questioner survey. Feedback approval from CT- radiographers were calculated or checked out using a verified questionnaire to assess the radiographer's knowledge of CT parameters in Kano from March to November 2017. Questionaries' regarding image quality, CT parameters were asked. Result of the study shows that primitive awareness of CT parameters. Yet there is some related modifications in radiographer's intelligence or knowledge of complex CT parameter and their foreseen effects on image quality. A number of error were analyzed with regards to influence CT parameters, their administration & the end outcome on image quality design/characteristics, intelligence and number of professional years of practice he/she had been found to be associated with radiographer's morale in manipulating or administration of CT parameters. However, age and sex were found slightly similar or analogous to them. Conclusion states that radiographers had ample of knowledge related to CT parameter. [20]

Research Methodology

Methodology is logic of scientific investigation. It is a procedure of research technique. Methodology means description, explanation and justification of the method involved in the study. It contains the standard and principles employed to guide the choice structure process and use of method. The present investigation was conducted in SGT University, Faculty of Allied Health Science, department of Radio- diagnosis for the assessment of students in radiography and the radiographer's/ technologists knowledge in handling radiographic modalities. The details of various method and material used while conducting the study are described as under.

1) **Locale of the study:** The study was conducted in department of Radio-diagnosis, SGT Hospital & Research Institute, Gurugram, as it will be feasible for the research.

2) **Subject of the study**: Students was selected and segregated on the basis of their general radiographic knowledge and experience on the radiographic modalities for the research purpose.

3) **Study duration and collection of data**
➢ Duration of the study will be from 1 October 2019 to 30 July 2020.
➢ Collection of data will be from 1 November 2019 to 30 April 2020.

4) **Study type:** Quantitative study was performed to assess the students' knowledge in handling the radiographic modalities in the department of Radio-diagnosis of SGT hospital and Research Institute, Gurugram (Haryana).

5) **Sampling and size of the subject**: A total of 94 participants were selected for the research (BSc.2nd year 31 students, BSc.3rd year 31 students, MSc. 1st year 18 students, MSc. 2nd year 14 students), all the students are assessed on their clinical postings working on the all the modalities in radiology department, who are taken from the department of radiology in the SGT Hospital and Research Institute for the purpose of research. Students will be selected randomly for the assessment and to formulate them into a report.

6) **Method of the Data Collection**: 94 participants were used, all the participants were on their clinical postings and provided unidentified and well-structured form in online Google form platform in multiple choice formats due to the COVID-19 & were distributed to them for self-assessment of their knowledge on the basis of their qualification. The

questionnaire consists of 4 Section i.e., Section-A contains demographic characteristics (e.g. age, gender), academic qualification and work experience, Section-B were having a basic Multiple Choice Question, Section-C contains Awareness based question and Section-D was having Descriptive with suggestion based question for the estimation of Radio imaging technology student knowledge on modalities. Every right question contains 1 marks and no negative marking for wrong answer. Question related to personal information will be freed from scoring.

7) **Statistical analysis:** Statistical analysis is the science of the collection, organization and interpretation of data. It deals with all aspects of this, including the planning of data collection in terms of the design of survey and experiments. This study will use an appropriate statistical analysis.

8) Selection criteria
a) Inclusive criteria.
- BSc. (RIT) Students (2nd and 3rd year)
- MSc. (RIT) Students (1st and 2nd year)

b) Exclusive criteria.
- Non radiation workers like nurses, Receptionist etc.
- Doctors/ radiologists.
- Patients will not be included.
- Staff will not be included other than radiographers.

9) **Setting and Resources:** The setting and resources are taken from the department of radiology, SGT University, Gurugram (Haryana). In this study different radiographic equipment's will be used that contains X-ray, Computer tomography and Magnetic Resonance Imaging.
a) X-RAY MACHINES.
- MARS-50/FC/ALLOPSE with IITV ALLENGERS 800MA.
- SEMENS 600MA
- .AMS-525F/C MULTIPOSE ALLENGER500MA.
b) MARS-50/FC/ALLOPSE (WITH FLORO) ALLENGER600MA.
- ALLENGER-525/FC/ ALLOPSE 500MA.
- CT SCAN 16 SLICES SEMENS.
- MRI PHILIPS 1.5 TESLA.

Results
Total 99 samples were taken; the first five samples were test samples. 94 samples that were under went for the study purpose which contains 50 males and 44 females. These 94 samples were divided into four categories on the basis of class i.e. (BSc. 2nd year, BSc 3rd year, MSc 1st year, MSc 2nd year). Samples taken from BSc. 2nd year were 31 samples, Samples taken from BSc. 3rd year were 31 samples, Samples taken from MSc. 1st year were 18 samples, and Samples taken from MSc. 2nd year were 14 samples. 30 marks Google form which contains MCQ was given to them for the general radiographic knowledge, on to how to handle and care radiographic modalities. On an average form 30 marks MCQ (BSc 2nd year obtain 16.80 marks out of 30 marks, BSc.3rd year obtain 18.54 marks out of 30 marks, MSc 1st year obtain 18.38 marks out of 30 marks, MSc 2nd year obtain 18.35 marks out of 30 marks.
BSc 3rd year score the highest marks(18.54), then MSc 1st year(18.38),then MSC 2nd year (18.35) and BSc 2nd year(16.80).
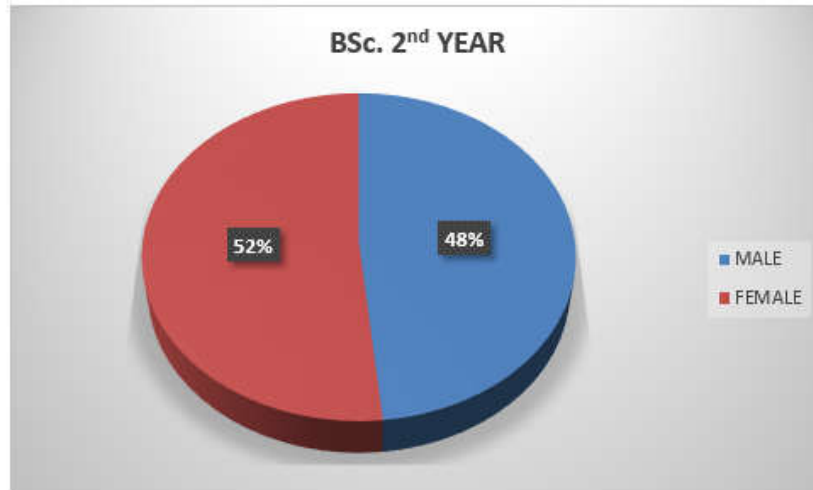
18.54> 18.38>18.35>16.80 (out of 30 marks)

On comparing BSc 1st year and 2nd year with MSc 1st and 2nd year, the score of Bachelor of radio imaging technology students were 17.67 marks and the score of Master of radio imaging technology students were 18.36 marks.
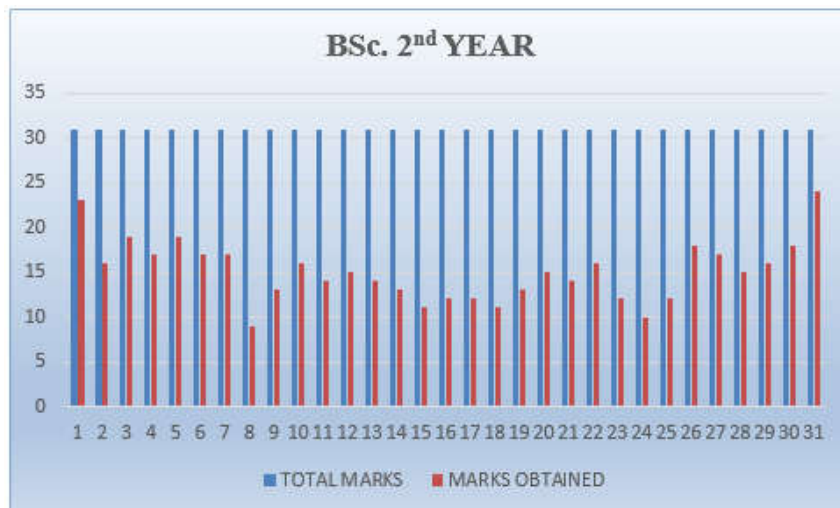
18.36>17.67 (out of 30 marks)
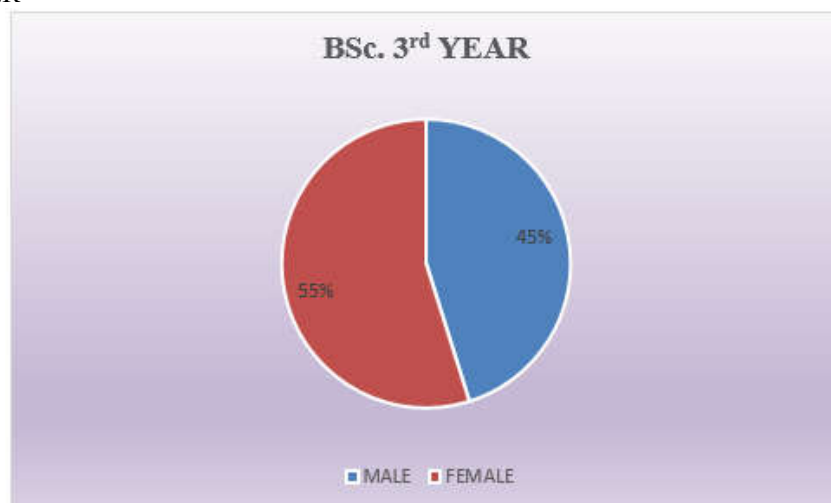
Analysis and Interpretation
FIGURE 1 - GENDER

The above figure 1 shows the demographic representation of total no. of males and females samplesfrom 31 samples of BSc. 2nd year, in 31 samples 15 were females (48%) and 16 were males(52%) who underwent the study.

FIGURE 2 MARKS OBTAINED

The above figure 2 shows the no of marks obtained out of 30 marks by 31 BSc 2nd year students.

FIGURE 3 GENDER

In the above figure 3, it shows the demographic representation of total no. of males and females samples from 31 samples of BSc. 3rdnd year, in 31 samples 17 were females (55%) and 14 were males(45%) who were underwent the study.
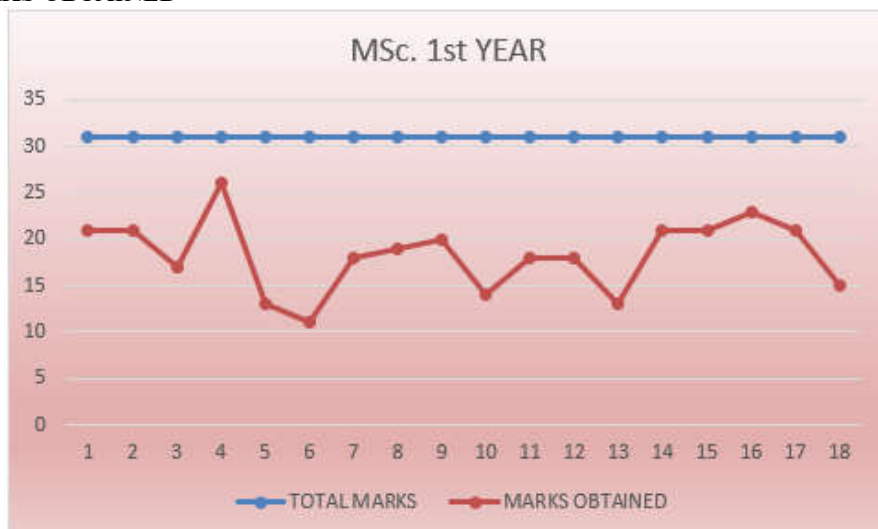
FIGURE 4 MARKS OBTAINED

The above figure shows the marks obtained by 31 samples of BSc 3rd year from 30 marks.

FIGURE 5 GENDER

The figure 5 shows the demographic representation of total no. of males and females' samplesfrom 18 samples of MSc. 1st year, in 18 samples 9 were females (50%) and 9 were males (50%) who were underwent the study.
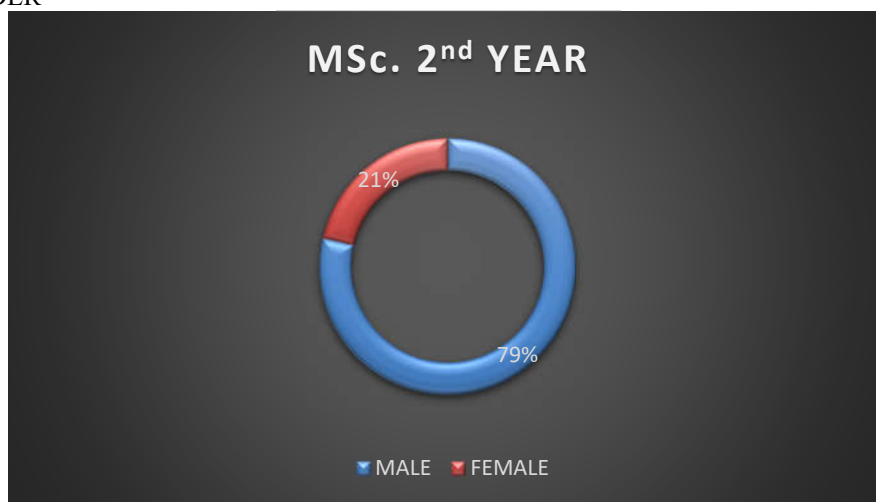
FIGURE 6 MARKS OBTAINED

The figure 6 shows the marks obtained by 18 samples of MSc. 1st year that underwent the study.
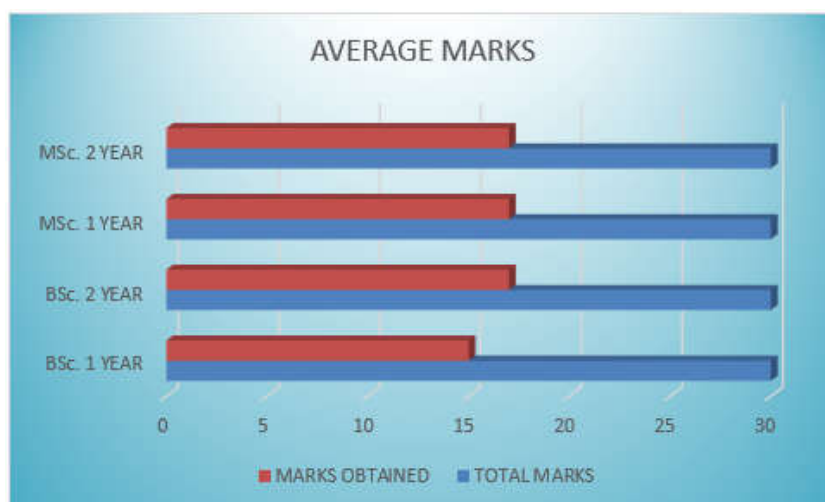
FIGURE 7 GENDER

The Graph 7 shows the demographic representation of total no. of males and females' samples from 14 samples of MSc. 2nd year, in 14 samples 3 were females (21%) and 11 weremales (79%) who were underwent the study.
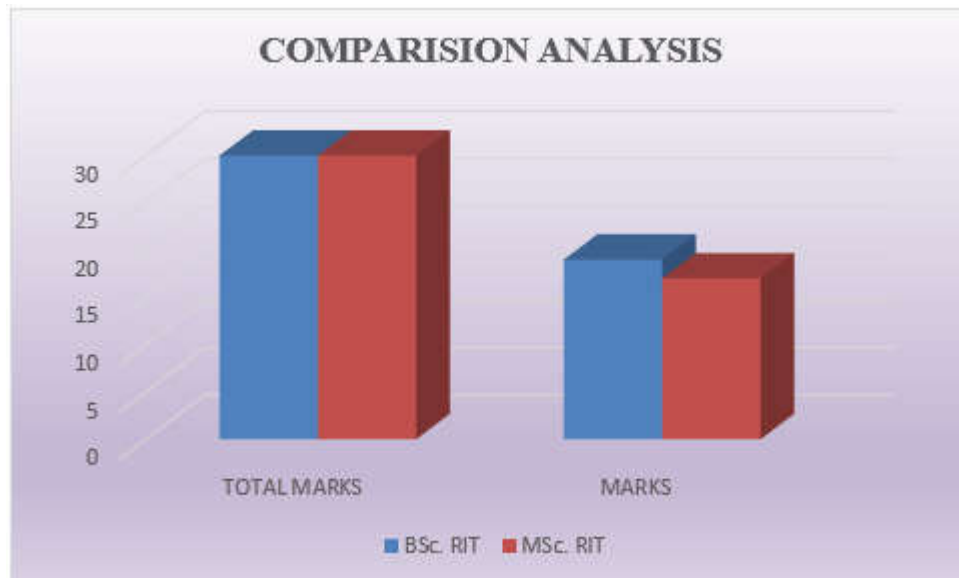
FIGURE 8 MARKS OBTAINED

The above Graph shows the marks obtained by 14 samples of MSc 2nd year that underwent the study.

FIGURE 9

The figure 9 shows marks obtained on an average base by 94 samples of different categories.

FIGURE 10

The above figure shows the comparison of marks of 94 samples between the BSc RIT and MScRIT students.

Discussion

In this study we compared the knowledge of four categories of different class i.e. under graduate students and under post graduate students on the general radiographic and on handling, care of radiographic modalities. This study is inspired by a research conducted onradiographs that are acceptable for the clinical purpose with minimal dose to the patient, which is conducted by **Neeru kapur** et al. in the SGT UNIVERSITY in the radiology department. The main objective of the study is to attain the ideal work, estimation of image quality must be in equilibrium condition to the patient dose and from this we got an idea of taking survey of radiographic knowledge and their proper handling and care of radiographic modalities by the students who are under the clinical posting and working with the radiographic modalities.

But this study was specific to radiographic films and patients' safety using the ALARA principle and I was able to figure how many study really know about the modalities on whichthey are working and how to handle and care the radiographic modalities.

After I have completed the study I found that the students that were under the clinical postinghaving better knowledge compared with others.

Conclusion

After completing my study it is concluded that BSc 3rd has the better knowledge compared with BSc 2nd year (18.54 out of 30 marks on average), MSc. 1st year (18.38 out of 30 markson average) and MSc. 2nd year (18.35 out of 30 marks on average). The main reason behindthat is working more with radiographic modalities. And on comparing the Bachelor of radio imaging technology students with Master of radio imaging technology students , Master students have better knowledge (17.67<18.36 from the scoring of 30 marks).

References

[1]. Mysara Rumman, Muntaser S. Ahmed, Hjouj Mohammad, Ammar A. Oglat, Nursakinah Suardi and Hazem Altalahmah, An Assessment of Senior and Juniormedical imaging students familiarity with Correct Radiographic Evaluation Criteria and clinical training efficiency, International journals of chemistry and pharmacy. ISSN: 2456-8473.

[2]. Larsson W. Lundberg N. Hillergå rd K. Radiography ,Use Your Good Judgement -Radiographers' Knowledge in Image Production Work., 2009;15 (3):e11-21. Fulltext (DOI) (http://doi.org/10.1016/j.radi.2008.09.003)

[3]. Br J Radiol. 1994 Oct;67(802):945-50, Reporting of fracture radiographs by radiographers: the impact of a training programme, DOI: 10.1259/0007-1285-67-802-945.

[4]. Abdullah Ahmed Almalki, Rosliza Abdul Manaf, Muhamad Hanafiah Juni, HayatiKadir Shahar, Noramaliza Mohd Noor, and Abdelsafi Abbas Mohammed Gabbad,A Systematic Review on Radiographers' Knowledge in Imaging doi:10.1166/jmihi.2018

[5]. Guang-Hong Chen*, Joseph Zambelli, Nicholas Bevins, Zhihua Qi, and Ke Li.2366, X-ray phase sensitive imaging methods: basic physical principles andpotential medical applications,doi:10.2174/157340510791268533.

[6]. Stephen P Power, Fiachra Moloney, Maria Twomey, Karl James, Owen J O'Connor, Michael M Maher, Computed tomography and patient risk: Facts,perceptions and uncertainties, DOI: 10.4329/wjr.v8.i12.902.

[7]. Vijay P.B Grover, Joshua M. Tognareli, Mary M.E Crossey, Jane Cox, Simon DTaylor-Robinson, Mark J. W. Mc Phail, magnetic resonance imaging: Principle and Technique: lesson for clinicians 2015.

[8]. A R Farajollahi, PhD,D F Fouladi, MD,M Gohjazadeh, PhD andA Movafaghi, Radiographers'professional knowledge regarding parameters and safety issues in plain radiography: a questionnaire survey, doi:

10.1259/bjr.20140090.

[9]. Nasrollah Jabbari1, Ahad Zeinali, Leili Rahmatnezhad, Patient dose from radiographic rejects/repeats in radiology centers of Urmia University of MedicalSciences, Iran, DOI:10.4236/health.2012.42015.

[10]. Jonathan B. Kruskal , Ronald Eisenberg, Jacob Sosna, Chun Sham Yam, Joshua D. Kruskal, Phillip M. Boiselle, Quality Improvement in Radiology: BasicPrinciples and Tools Required to Achieve Success, :Oct 4

[11]. Lars Borgen and Erling Stranden, Radiation knowledge and perception of referralpractice among radiologists and radiographers compared with referring clinicians,doi: 10.1007/s13244-014-0348-y.

[12]. M K A Karim, S Hashim, D A Bradley, N A Bahruddin, W C Ang and N Salehhon, Assessment of knowledge and awareness among radiology personnel regarding current computed tomography technology and radiation dose, doi:10.1088/1742-6596/694/1/012031.

[13]. K Roja Reddy, Meenakshi Krishnan, T Ramesh, B Sravani Krishna, G Swathi andK Sai Parveen, Evaluation of knowledge and awareness on practice of dental radiography safety measures in west Godavari district, India- a questionnary basedcross – sectional study, volume 1 of ACTA SCIENTIFIC DENTAL SCIENCES.

[14]. Neeru kapur, Natasha Nargotra, Tanu singh, Ritu Dhaka, Ram Shankar Rajak, Nitish Virmani, BB sharma, study of proper technique to avoid repeat radiographywith proper instruction and positioningP-ISSN:2663-4554.

[15]. A R Farajollahi, PhD,D F Fouladi, MD,M Gohjazadeh, PhD andA Movafaghi, Radiographers' professional knowledge regarding parameters and safety issues in plain radiography: a questionnaire survey, doi: 10.1259/bjr.20140090.

[16]. Larsson W. Lundberg N. Hillergå rd K. Radiography ,Use Your Good Judgement -Radiographers' Knowledge in Image Production Work., 2009;15 (3):e11-21. Fulltext (DOI) (http://doi.org/10.1016/j.radi.2008.09.003.

[17]. F. Paolicchi, F. Miniati, L. Bastiani, L. Faggioni, A. Ciaramella, I. Creonti, C. Sottocornola, C. Dionisi, and D. Caramella, Assessment of radiation protection awareness and knowledge about radiological examination doses among Italian radiographers, Published online 2015 Nov 23. doi: 10.1007/s13244-015-0445-6.

[18]. Abdullah Ahmed Almalki, Rosliza Abdul Manaf, Muhamad Hanafiah Juni, HayatiKadir Shahar, Noramaliza Mohd Noor, and Abdelsafi Abbas Mohammed Gabbad,A Systematic Review on Radiographers' Knowledge in Imaging doi:10.1166/jmihi.2018

[19]. Mysara Rumman, Muntaser S. Ahmed, Hjouj Mohammad, Ammar A. Oglat, Nursakinah Suardi and Hazem Altalahmah, An Assessment of Senior and Juniormedical imaging students familiarity with Correct Radiographic Evaluation Criteria and clinical training efficiency, International journals of chemistry and pharmacy. ISSN: 2456-8473.

[20]. Abba M et al., Assessment of Radiographers knowledge of manipulation of computed tomography of KANO state. Nigerian general of medical imaging andradiotherapy. (VOL 1 november 2018.

[21]. L. L. Lundvall, M. A. Dahlgren, and S. Wirell, Professionals' experiences of imaging in the radiography process— A phenomenological approach. Radiography20, 48 (2014).

[22]. A. Cannavale, M. Santoni, P. Mancarella, R. Passariello, and P. Arbarello, Malpractice in radiology: What should you worry about? Radiol. Res. Pract. 2013 (2013), Available from: http://www.ncbi.nlm.nih.gov/pubmed/ 23691316.

[23]. G. J. Becker, J. L. Bosma, M. J. Guiberteau, A. M. Gerdeman, D. P. Frush, J. P.Borgstede, and A. B. Radiology, ABR examinations: The why, what, and how. Int. J. Radiat. Oncol. Biol. Phys. 87, 237 (2013).

[24]. S. Ramanathan and J. Ryan, Radiation awareness among radiology residents, technologists, fellows and staff: Where do we stand? Insights Imaging 6, 133(2015).

[25]. Dilmanian FA, Zhong Z, Ren B, Wu XY, Chapman LD, Orion I, ThomlinsonWC. Computed tomography of x-ray index of refraction using the diffraction enhanced imaging method. Phys Med Biol. 2000;45:933–946.