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Research about (Fear from Radiation)

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Abstract: *This study is a research concerns fear of radiation were distributed web link combines several questionnaires and information 501 questionnaire collected and analyzed through the Google program we found during this study society fear of medical radiation as general, and there are also other concerns depending on the type of gender , for example, fear of women from the ratio effect to the pregnancy and also apprehensive students from entering the field of radiology has been collecting information on the most important variables (age, sex, academic qualifications) At the end of the research found that most of the community have fear of radiation and they need to educate .*

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I. Introduction:

1.1 WHAT IS RADIATION:

Radiation is defined as energy that travels through space or matter in the form of a particle or wave. It can be produced in one of two ways: by radioactive decay of an unstable atom (radionuclide), or by the interaction of a particle with matter. Some attributes of radioactive decay are that it is spontaneous and random, and the type of radiation emitted depends on the specific radionuclide. Radiation emission as the result of an interaction, on the other hand, depends on both the incoming particle and the material it hits, and is theoretically predictable if enough information is known. (In reality, it is impossible to obtain enough information to make predictions about radiation emission from a single incoming particle, but it is possible to make statistical predictions about large numbers of particles.) Radioactive decay and interactions will be discussed in more detail in the following sections. Radiation is described by its type and energy. The types of radiation fall into two main categories: particulate and electromagnetic. Particulate radiation consists of particles that have mass and energy, and may or may not have an electric charge. Examples of particulate radiation include alpha particles, protons, beta particles, and neutrons. Electromagnetic radiation, on the other hand, consists of photons that have energy, but no mass or charge. A photon, as described by quantum theory, is a "particle" or "quantum" that contains a discrete quantity of electromagnetic energy which travels at the speed of light, or 3 x 108 meters per second. A photon is sometimes described as a “packet of light”. Visible light, ultraviolet light, x-rays, and gamma rays are all photons. The most common unit of energy used to describe radiation is the electronvolt (eV). An electronvolt is the amount of kinetic energy an electron gains when accelerated through a potential difference of one volt. The conversion to SI units is 1 eV = 1.6x10-19 joules. An eV is a very small unit of energy, so in many applications, it is more common to use kiloelectronvolts (1 keV = 1000 eV) or mega-electronvolts (1 MeV = 1,000,000 eV). Radiation can be either ionizing or non-ionizing, depending on its energy and ability to penetrate matter. Non-ionizing radiation, such as visible light, is not harmful. Only ionizing radiation is discussed in this course. Ionization is discussed in more detail on page 11. II. THE RADIOACTIVE ATOM All matter is composed of atoms. The atom contains a nucleus, consisting of protons and neutrons, with electrons revolving in orbits about the nucleus. Electrons carry a negative charge, protons carry a positive charge, and neutrons have no electrical charge. An atom normally has one electron in orbit for each proton in the nucleus, leaving the atom RSSC FUNDAMENTAL RADIATION CONCEPTS 072011 2-3 electrically neutral. An element is a type of atom distinguished by its number of protons (e.g. an atom of the element hydrogen always has one proton; an atom of the element helium always has two protons, etc). The atomic structure of an element is denoted as X A Z where: X is the chemical symbol of the element. Z is the atomic number, defined as the number of protons in the nucleus. This determines the chemical identity of the element. A is the mass number, defined as the sum of the number of protons and neutrons in the nucleus. Thus, A minus Z gives the number of neutrons. An element may have different numbers of neutrons and still be chemically the same. Each individual arrangement of protons and neutrons is referred to as a nuclide. Nuclides which have the same number of protons are called isotopes. Shown below are examples of isotopes of hydrogen: H Hydrogen 1 1 H Deuterium 2 1 H Tritium 3 1 Many nuclides (but not all) are unstable or "radioactive". In the above example of nuclides, only tritium is radioactive. Radioactivity is defined as the spontaneous disintegration of unstable nuclei, with the resulting emission of radiation that results in the formation of new nuclei. Stability of the nucleus is related to its ratio of neutrons to protons. For low atomic number elements, approximately equal numbers of neutrons and protons in the nucleus are necessary for stability. For elements of higher atomic number, the ratio rises to approximately 1.6 to 1. As a nuclide departs from this stable ratio, changes in the nucleus occur which tend to bring the product to a more stable arrangement. This approach to stability is accomplished by one or more of five (5) "radioactive decay modes"(1).

1.2 Interactions Of Radiation With Matter

Radiation interacting with matter can be either scattered or absorbed. The mechanisms of the absorption of radiation are of interest because: a) absorption in the body tissues may result in biological injury; b) absorption is the principle upon which detection of radiation is based; c) the degree of absorption is the primary factor in determining proper shielding requirements. The transfer of energy from emitted radiations to matter occurs in two major ways: ionization and excitation. RSSC FUNDAMENTAL RADIATION CONCEPTS 072011 2-11 Ionization: The process resulting in the removal of an electron from an atom, leaving the atom with a net positive charge. Excitation: Addition of energy to an atomic system, transferring it from the ground state to an excited state. No ion pair is formed, but energy is then given off by the atom as fluorescent radiation or low energy x-rays when the atom returns to its ground state. Radiation can be classified into two groups: 1) Particulate radiation such as alpha and beta particles 2) Electromagnetic radiation such as x-rays or gamma rays. Particulate radiation can be either charged (alpha or beta particles) or uncharged (neutrons); however, only charged particle interactions will be discussed here. A. Interactions of Charged Particles All atoms are normally electrically neutral. When a charged particle strikes an orbital electron it ejects it from the atom, resulting in the formation of an ion pair. Since the removal of the electron from the atom decreases the total number of negative charges by one, it leaves the atom with a net positive charge. The ion pair consists of: 1) The positively charged atom 2) The negatively charged electron Such particles capable of creating ion pairs in this manner are called ionizing radiation. The term used to compare and relate the ionizing powers of different types of charged particles is specific ionization. Specific ionization is defined as the number of ion pairs per unit path length formed by ionizing radiation in a medium: Specific ionization = path length (cm) # of ion pairs formed The specific ionization is dependent on the velocity and mass of the charged particle (and therefore its energy), the charge of the particle, and the density of the absorbing material (the number of atoms available for ionization). The most common types of charged particles encountered in most applications are alpha particles and beta particles. Their particular interactions are described in more detail below. 2-12 RSSC FUNDAMENTAL RADIATION CONCEPTS 072011 1. Alpha Particles An alpha particle is a helium nucleus stripped of its orbital electrons. It is emitted from a radioactive atom with a velocity of about 1/20 that of the speed of light and with energies ranging from 4 to 9 MeV. Alphas cause ionizations in matter when they are deflected by the positive charge of a nucleus and pull the orbital electrons (attracted by the alpha's positive charge) along with them. Alpha particles also cause excitation along their path by pulling inner orbital electrons to outer orbits. Energy is then given off by the atom as fluorescent radiation (low energy x-rays) when the electrons drop back down to the inner orbital vacancies. Because of its relatively large mass (2 neutrons and 2 protons), high electrical charge (2+) and low velocity, the specific ionization of an alpha particle is very high. That is, it creates many ion pairs in a very short path length. Because of this, it loses all of its energy in a very short distance. The range in air is only several centimeters even for the most energetic alpha particles. Since the alpha particle has a very limited range in matter, it presents no external radiation hazard to man. Many alpha particles cannot penetrate the protective layer of skin. However, once inside the body, surrounded by living tissue, damage will be to the local area in which the alpha emitter is deposited. Thus, alpha emitters are an internal hazard and intake to the body must be prevented. 2. Beta Particles Beta particles are emitted from the nucleus of a radioactive atom with a wide range of energies up to some maximum value. When a beta is emitted that is below the maximum value, the neutrino carries away the rest of the energy. Beta particles, like alpha particles, lose their energy by ionization and excitation, but because of their small mass (1/7300 of an alpha) and lower charge (1/2 of that of an alpha) the interactions take place at less frequent intervals. Therefore, the beta particles do not produce as many ion pairs per centimeter of path as alpha particles, and thus, have a greater range in matter. The beta particle's range in matter depends on its energy and the composition of the material. a) Bremsstrahlung X-ray Production: Beta particles can interact with the nucleus of an atom and give rise to x-rays by a method called Bremsstrahlung. Bremsstrahlung (German for "Braking Radiation") occurs when a high-speed beta RSSC FUNDAMENTAL RADIATION CONCEPTS 072011 2-13 particle approaches the nucleus of an atom. The electrical interaction between the negative beta particle and the positively charged nucleus causes the beta particle to be deflected from its original path or stopped altogether. This stoppage or deflection results in a change in velocity, or deceleration, of the beta particle with the emission of x-rays of various energies. The likelihood of Bremsstrahlung production increases with increasing atomic number of the absorber. For this reason, beta shields are made from low atomic number materials, like aluminum or plastics, to reduce Bremsstrahlung production. X-ray tubes are made with high atomic number materials, to encourage Bremsstrahlung production. Beta particles require an energy of greater than 70 keV to penetrate the protective layer of the skin, and thus, are somewhat of an external hazard. The beta can also constitute an internal hazard.

A beta particle has a greater range in tissue compared to an alpha particle due to its low specific ionization, therefore, it gives up less energy per unit volume of tissue and is not as effective in causing damage as an alpha particle. B. Interaction of X-Rays and Gamma Rays From a practical radiation protection point of view, x-rays and gamma rays are identical, differing only in their place of origin. Gamma rays are emitted with discrete energies from excited nuclei. X-rays are emitted from outside the nucleus; i.e., an outer shell electron replaces a missing lower shell electron and a characteristic x-ray is produced, or the interaction of beta particles causes Bremsstrahlung radiation to be produced. The energy of a characteristic x-ray is approximately equal to the difference in the electron energy levels, but Bremsstrahlung radiation produces a continuous spectrum of energies up to some maximum value. Since x- and γ rays are chargeless, they do not interact by electrostatic forces as in the case of charged particles, which cause ionization of matter directly along their path of travel. However, x- and gamma rays do have sufficient energy to release secondary charged particles (electrons) from matter through one of three basic interactions: the Photoelectric Effect, the Compton Effect, and Pair Production. The high-speed electrons resulting from these interactions then cause ionization of the medium. 1. The Photoelectric Effect The Photoelectric Effect is the interaction of x- or γ-ray photons as well as other photons (such as light), whereby all of the energy of the photon is transferred to an inner shell electron (usually the K shell), ejecting it from the atom and leaving the atom with an inner shell vacancy. This shell vacancy creates an excitation energy which corresponds to the binding energy (BE) of the ejected photoelectron.[(2)]

1.3. Exposure

Exposure is a measurement of the amount of electric charge produced by photons in a mass of air. The electric charge comes from the production of ion pairs, which are collected by the detector and measured as a current. It can be measured as a rate (exposure per unit time), for sources which emit radiation continuously, or as a total integrated exposure, for sources such as x-ray tubes that emit radiation in a single pulse.

The traditional unit used for exposure is the roentgen (R). 1 R is the amount of radiation required to liberate one electrostatic unit of charge (of either sign) in 1 cm^3 ofair at standard temperature and pressure (STP) [(5).]

1.4. Absorbed Dose

Absorbed dose is a measure of the energy deposited in a material by all types of radiation. The traditional unit is the rad (radiation absorbed dose), which is equal to 100 ergs/gram. The SI unit for absorbed dose is the gray (Gy), equal to 1 joule/kg. 1 Gy = 100 rads.

Absorbed dose is difficult to measure directly, and so is frequently calculated from other quantities such as exposure. In order to calculate it, it is necessary to know the correct conversion factor for the material of interest. For example, to convert exposure to dose in air, , where D = absorbed dose and X = exposure. However, to convert exposure to dose in tissue, . (R) (rad/R) 88 .0(rad) X D air   (R) (rad/R) 93 .0(rad) X D tissue

Note- In radiation protection, the roentgen and rad are often used interchangeably since, in tissue, they are approximately equal. Strictly speaking, though, the roentgen is a unit of exposure and applies only to x- or gamma radiations. [(5)]

1.5. Equivalent Dose / Dose Equivalent

Equivalent dose (HT) is a quantity calculated from the absorbed dose that takes into account that some types of radiation are more harmful to biological tissue than others. It is equal to the absorbed dose in a tissue from each type of radiation (DR,T) multiplied by a radiation weighting factor (wR) for that type of radiation, summed over all types of radiation present

The traditional unit used for dose equivalent is the rem, which stands for “roentgen equivalent man”. The SI unit is the sievert (Sv), and 1 Sv = 100 rem. The radiation weighting factor is unitless; however, a different unit is used for the equivalent dose to make it easily distinguishable from the absorbed dose.

Note that, prior to 1990, “equivalent dose” was referred to as “dose equivalent”, and the quality factor (Q) was used instead of the radiation weighting factor. (U.S. regulatory agencies still use this convention.) HT is calculated in the same way for both quantities, although some values for Q differ from the current values for wR. See the table below for a list of these constants[.(5)]

1.6. Effective Dose / Effective Dose Equivalent

The ED or EDE is a quantity that takes into account that the various organs and tissues of the human body respond to radiation differently. It is used primarily in radiation protection, and is intended to compare the risk of stochastic effects associated with a non-uniform exposure to radiation with that of a uniform whole-body exposure. A stochastic effect is a health effect that occurs randomly and for which the probability of the effect occurring, rather than its severity, is assumed to be a linear function of dose (example: getting cancer). The ED is intended to estimate risk for radiation protection purposes only, and is not intended for calculating individual-specific doses.

The ED is calculated by multiplying the equivalent dose (HT) to each organ/tissue by the tissue weighting factor for that organ/tissue (wT), summed over all the organs/tissues in the body

The tissue weighting factor is an estimate of the proportion of the risk of stochastic effects resulting from irradiation of an organ or tissue to the total risk of stochastic effects when the whole body is irradiated uniformly. Thus, a higher number corresponds to a higher risk. [5]

1.7. Committed Effective Dose / Committed Effective Dose Equivalent

The CED or CEDE is a quantity that calculates the total dose an individual would receive over a lifetime from an intake of radioactive material. It is equal to the ED or EDE (corresponding to the CED or CEDE, respectively) integrated over a period of 50 years following the intake for adults, or to age 70 for children. Note that the dose rate usually decreases over time, depending on the half-life of the substance and the speed at which it is eliminated from the body. [5]

1.8.Total Effective Dose / Total Effective Dose Equivalent

The TED or TEDE is simply equal to the sum of the radiation dose from external radiation plus the dose from internal radiation. [5]

IX. Conversion Of Traditional Units To S.I. Units [5]

QUANTITY	TRADITIONAL UNIT	S.I. UNIT
ACTIVITY	CURIE (Ci)	BECQUEREL (Bq)
EXPOSURE	ROENTGEN (R)	COULOMB/KILOGRAM (C/kg)
ABSORBED DOSE	RAD	GRAY (Gy)
EQUIVALENT DOSE	REM	SIEVERT (Sv)

1.8.1 CONVERSION FACTORS FROM TRADITIONAL UNITS TO S.I. UNITS:
1 curie = 3.7 x 1010 disintegrations/sec
1 microcurie = 2.22 x 106 disintegrations/min
1 disintegration/second = 1 becquerel (Bq)
1 curie = 3.7 x 1010 becquerel (Bq)
1 millicurie = 37 megabecquerel
1 nanocurie = 37 Bq
1 roentgen = 2.58 x 10-4 coulomb/kilogram
100 rads = 1 gray (Gy)
100 rems = 1 sievert (Sv) [5]

1.9. Sources Of Information On Radionuclides

There are several sources of information providing useful summaries of the properties of radionuclides. One is the Chart of the Nuclides, available from Knolls Atomic Power Laboratory, Lockheed Martin, 1310 Kemper Meadow Drive, Cincinnati, OH, 45240 Every stable or radioactive nuclide is assigned a square on the diagram. Isotopes occupy horizontal rows and isotopes occupy vertical columns. Isobars fall among descending 45° lines. Basic properties of each nuclide are listed in the boxes, including atomic number, neutron number, atomic weight, thermal neutron capture cross section, half-life, and other data. The Chart of the Nuclides also diagrams the transformations that occur for various decay modes and is particularly useful for tracing through a radioactive series.

A most useful source of data for radionuclides of interest is a shareware software program entitled RADDECAY, available from the UF Radiation Control and Radiological Services Department. RADDECAY is a program for displaying radioactive decay information for 497 radionuclides. Data provided include the half-life, radioactive daughter nuclides, probabilities per decay, and decay product energies for alphas, betas, positrons, electrons, x-rays, and gammas.[5]

1.10. Medical uses

Medical Imaging began with radiography after the discovery of x-rays in 1895 by Wilhelm Röntgen, a German professor of physics. X-rays were put to diagnostic use very early, before the dangers of ionizing radiation were discovered. Upon travelling through the tissues, the radiation from X-rays is absorbed differentially depending on the density of the tissue being penetrated. The radiation piercing the tissues produces on a photographic film or a fluorescent screen the different densities within the body, thus creating an image. The limiting factor in this method of diagnosis is the similarity between the densities of adjacent soft tissues within the body, making it a very interesting imaging technique for bone or foreign objects in the body but not for soft tissue pathologies. [1]

1.11. **Nuclear Medicine**

Nuclear Medicine became possible in the 1950s. In nuclear medicine procedures, radionuclides are combined with pharmaceutical compounds, to form radiopharmaceuticals. Once these radiopharmaceuticals have been administered to the patient, they converge in specific organs or in cellular clusters that are more 'active' than others. This allows nuclear medicine to image the extent of a disease process in the body, based on the cellular function and physiology, rather than relying on physical changes in tissue anatomy. In nuclear medicine the recorded radiation is emitted from within the body rather than generated by an external source as is the case with X-rays. This emitted radiation is then registered by gamma cameras. In some diseases nuclear medicine studies can identify medical problems at an earlier stage than other diagnostic Nuclear medicine scans use a special camera (gamma) to take pictures of tissues and organs in the body after a radioactive tracer (radionuclide or radioisotope) is put in a vein in the arm and is absorbed by the tissues and organs. The radioactive tracer shows the activity and function of the tissues or organs.

Each type of tissue that may be scanned (including bones, organs, glands, and blood vessels) uses a different radioactive compound as a tracer. The tracer remains in the body temporarily before it is passed in the urine or stool (feces). [4]

.type of nuclear medicine

Therapy is small parsinteg than than Diagnostic

- Tests
- Bone Scan.
- Cardiac Blood Pool Scan.
- Gallbladder Scan.
- Gallium Scan.
- Kidney Scan.
- Liver and Spleen Scan.
- Lung Scan.
- Positron Emission Tomography (PET).
- Salivary Gland Scan.
- Testicular Scan. [4]

1.12. Ultrasound

In the 1960's the principals of sonar (developed extensively during the second world war) were applied to diagnostic imaging. The technique is similar to the echolocation used by bats, whales or dolphins. The ultrasound scanner transmits high-frequency sound waves into a body by use of a probe or transducer. The pulses or waves penetrate into the body and bounce off the organs. The return wave vibrates the transducer; the transducer turns the vibrations into electrical pulses that are sent to the ultrasonic scanner where they are transformed into an image. Ultrasound has become a very popular imaging technique, as it has no adverse bio-effects [1]

1.13.Computed Tomography

In the 1970's G.N. Hounsfield and A.M. Cormack were awarded the Nobel Prize in medicine for the invention of Computed Tomography. This technique uses computer-processed X-rays to produce tomographic slices of specific areas of the body. It provides a better insight into the pathogenesis of the body, thereby increasing the chances of recovery.

Hounsfield's original CT scan took several hours to acquire one single slice of image data and more than 24 hours to reconstruct this data into an image. Today's CT systems can acquire a single image in less than a second and reconstruct the image instantly. [3]

1.14.MRI

In 1971 Raymond Damadian showed that nuclear magnetic relaxation times of tissues and tumors differed, motivating scientists to use MRI to study disease. Many scientists over the next 20 years contributed to the development of Magnetic Resonance Imaging. With MRI radio waves 10,000 to 30,000 times stronger than the magnetic field of the earth are sent through the body. This strong magnetic field causes the alignment of particles, called protons, which are found naturally within the body, mostly in hydrogen atoms. As these protons move back into their original positions, they send out radio waves of their own. The scanner picks up these signals and a computer turns them into a picture. These pictures are based on the location and strength of the incoming signals. Different protons send out different signals, depending on which tissue the proton can be found in. A traditional MR scanner has a moveable table upon which the patient is placed, and which slides into the hollow cylindrical magnet. The magnetic field usually lies between 0,5 and 7 Tesla and is generated by super conducted magnets, which are being cooled by helium. (3)

1.15.**Radiotherapy**

Radiotherapy or radiation oncology is concerned with prescribing radiation, and is different from radiology, the use of radiation in medical imaging for diagnostic purposes. Radiation therapy is commonly applied to a cancerous tumor because of its ability to control cell growth. Ionizing radiation works by damaging the DNA of exposed tissue, leading to cellular death. To spare normal tissues (such as skin or organs which radiation must pass through to treat the tumor), shaped radiation beams are aimed from several angles of exposure to intersect at the tumor, providing a much larger absorbed dose here than in the surrounding, healthy tissue. Current research focuses on even more precise targeting of the tumor, for instance by collimator adaptation, gating or dose painting. Radiation dosimetry is the measurement and calculation of the radiation dose in matter and tissue resulting from the exposure to indirect and direct ionizing radiation.

Radiotherapy the treatment of disease, usually cancer, by ionizing radiation in order to deliver an optimal dose of either particulate or electromagnetic radiation to a particular area of the body with minimal damage to normal tissues. The source of radiation may be outside the body of the patient (external beam irradiation) or it may be an isotope that has been implanted or instilled into abnormal tissue or a body cavity. Called also radiotherapy and irradiation.

Because of improvements in tumor localization, beam direction, planning and prescribing the field to be irradiated, and determining the precise dosage needed, radiation therapy is far more effective and less harmful now than when it was first introduced.

External Beam Irradiation. Modern radiation therapy primarily uses high-energy x-rays or gamma rays with peak photon energies above 1 megavolt; this is called megavoltage therapy. These high voltages are produced by linear accelerators or by cobalt-60 teletherapy units. Megavoltage radiation is more penetrating than lower energy radiation. It produces less damage to the skin at the entry port, is absorbed less in bone, and is scattered less, thus reducing the exposure to tissues outside the x-ray beam. Low-energy x-rays that do not penetrate are used for treatment of superficial skin lesions.

Internal Radiation Therapy (brachytherapy). This can involve the implantation of sealed radiation sources in or near cancerous tissue. Isotopes, such as radium-226, cesium-137, iridium-192, and iodine-125, are introduced either temporarily or permanently into body tissues (interstitial radiation therapy) or body cavities (intracavitary radiation therapy). Permanent sources have a short half-life so that the dose received by the patient is limited.

Another form of internal radiation therapy is the administration of radioactive materials into the bloodstream or a body cavity. Iodine-131 is given orally in certain cases of hyperthyroidism and cancer of the thyroid; it is absorbed by the digestive system and concentrated in the thyroid. Phosphorus-32, a pure beta emitter, is injected intravenously for the treatment of various myeloproliferative diseases, leukemias, and lymphomas.

Protection from Radiation. Hospital personnel concerned with the care of patients receiving radiation therapy must be aware of the hazards of radiation and the protective policies and procedures established to reduce these hazards. Most institutions and clinics provide a safety program under the leadership of a radiation physicist or radiation safety officer. Since radiation cannot be seen or felt, it is extremely important to observe all rules outlined in the program.

Sources of radiation that may be of particular concern to health care personnel include: radioactive substances such as radium and cobalt-60 that are used as implants and serve as internal sources of radiation; external sources of radiation such as x-ray machines and cobalt-60 therapy units; and liquid radioisotopes such as iodine-131 and suspensions of radioactive gold or phosphorus.

Generally speaking, the degree of exposure to radiation depends on three factors: (1) the distance between the source of radiation and the individual, (2) the amount of time an individual is exposed to radiation, and (3) the type of shielding provided. (See discussion at radiation.)

When a patient receives radiation therapy from an external source, therapists must be aware of, and observe carefully, the policies and procedures established for personnel in and around x-ray rooms and the rooms that house teletherapy units. After the treatment is finished, the patient will not serve as a hazard of radiation. This type of radiation therapy is often done on an outpatient basis.

Internal implants can present certain hazards for persons in contact with the patient for as long as the implant is in place. Visitors should sit at least six feet away from the patient and stay no longer than a total of one hour each day. Pregnant staff members and visitors should avoid all contact with the patient.

When administering direct patient care, staff members should plan interventions so that each task can be accomplished as quickly as possible. Since distance is a factor in protection, it is advisable to position oneself as far as is feasible from the source of radiation. For example, if the radioactive implant is in the pelvis, the caregiver might stand at the head or foot, rather than the side, of the bed. Protective lead aprons or portable shields may or may not be recommended by hospital protocol. Whatever the policies, every person caring for the patient should know and follow the recommended policies and procedures.

A film badge is worn on the outside of any protective devices worn by caregivers. The badge records the cumulative dose of radiation received by each person, and is used to monitor exposure over a period of time. It should be sent for monthly testing to be sure that no one is receiving more than the maximum allowable exposure. This amount should not exceed five rem per year. One should never lend one's badge to another staff member or borrow another staff member's badge.

Another factor to be considered is accidental removal or dislodgment of a radioactive implant. Most patients are confined to bed and refused bathroom privileges, but it is still possible for a radium needle or radon seeds, for example, to be accidentally removed from the body. Should an implant become dislodged the physician or radiation safety officer must be notified immediately. Under no circumstances should a radioactive substance be handled with the bare hands. A lead container and long-handled forceps should be kept at the patient's bedside in the event an implant should become dislodged. It can then be picked up immediately and placed in the container. Dressings, bed linen, bedpans, and emesis basins should be checked with a radiation detection instrument after each use or before disposal.

Liquid radioactive substances require additional precautions since these substances can enter the body of a worker through the skin, or by ingestion or inhalation. Not all types of radioactive materials require the same precautions. For example, iodine-131 is excreted in the urine for several days after it has been administered to the patient. In addition it appears in the patient's sweat, tears and saliva; thus all articles such as bed linens and toothbrush used by the patient must be considered a possible radiation hazard. Phosphorus-32 acts in the same way. Colloidal gold-98 usually is instilled into a body cavity and is not absorbed as are iodine and phosphorus. However, the radioactive gold emits gamma rays that penetrate beyond the patient's body and present a radiation hazard.

Patient Care. Specific goals for the care of a patient receiving radiation thearapy will depend on the location of the irradiated site, the patient's medical diagnosis, and the source of radiation, i.e., whether it is internal or external. Special precautions in regard to handling radioactive material have been presented above. In addition to the goal of protecting patients and caregivers from unnecessary exposure, goals of patient care include familiarizing patients and significant others with the purpose and therapeutic effects of radiation therapy and helping them recognize and deal with its expected side effects.

Most people have a limited knowledge of radiation and how it affects cells, both normal and malignant. This lack of knowledge can add to the anxiety and stress already being felt by patients and significant others. The kinds of information they will need include how radiation works, whether or not patients present a hazard to others while undergoing treatment, when they will begin to experience its effects, and how long it will be before they begin to recover from the effects.

Before treatment is initiated, the patient is told the expected therapeutic effects, what it is like to have a treatment, and what might be expected of the patient during the course of therapy. Most patients will receive external radiation therapy on an outpatient basis; hence, they will need to keep scheduled appointments or notify the clinic if they are unable to come when expected. They should be assured that the source of radiation is outside their bodies (if it is) and that they cannot serve as a source of radiation.

Teaching patients and significant others how to recognize expected side effects and participate in their management is especially important when patients are not hospitalized. Written information that is easily comprehended should be available to them, as well as sufficient time and personnel to answer any questions they may have after reading the instructions and attempting to follow them at home. They should be encouraged to write down questions that have arisen between visits and to bring these questions with them on their next visit.

In general, most side effects will not begin before a week to ten days after the first treatment. This allows time for patients to assimilate information given to them and to adjust to whatever changes they might experience. They can be told that side effects typically continue throughout the course of treatment and for several weeks after the last treatment. However, individual reactions can and do vary.

Although all body systems can be affected by radiation, the skin is the system most at risk for injury. The reaction results from an inflammatory process caused by breakdown of cells in the epidermis and is similar to a sunburn. In preparation for radiation therapy the physician will mark the target area with indelible ink.

Daily assessment of the skin for degree of reaction can be done by the patient or some other knowledgeable person. First-degree reactions resemble a sunburn and can destroy hair roots, causing the hair to fall out. Second-degree reactions, also called dry desquamation, produce bright red erythema. Sweat glands and hair follicles are damaged and the hair falls out. This change can be irreversible. Third-degree reactions, also called moist desquamation, are characterized by a dark purple color and possibly formation of blisters and ulcers. If the area is exposed to air, scabbing over the exposed area can occur. Fourth-degree reactions are very rare and are the result of radiation overdose. They are characterized by tissue necrosis. [(4)]

II. Problem of the study

There are a great percentage of people talk about radiation as a very serious procedure and there is some people canceled their appointment because they are fear from radiation and its complication .

Objectives

to reduced of the Fear From Radiation

Specific objectives

- To determine causes of fearing from radiation
- To determine which age is more afraid from radiation
- To determine male or female more afraid from radiation
- To determine health care or puplic more afraid from radiation

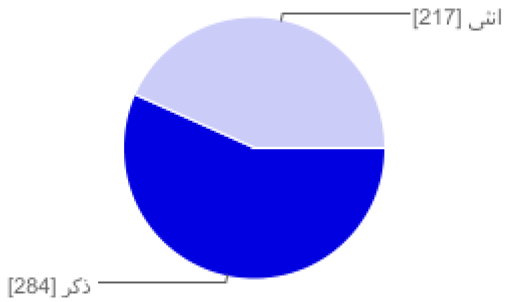
III. Material and Methods:

Distributed the questionnaire for male and female (18 years -75 years)
In KSA JEDDA region It was questionnaire society through the link follows
https://docs.google.com/forms/d/1vmUODs2Eb5qwqlt56pqP5LlnQ9kl-pEaFn3uwvqJGM8/viewform

Method of data analysis:

The data will be analyzed using Excel and under windows in forms of bars, correlation .

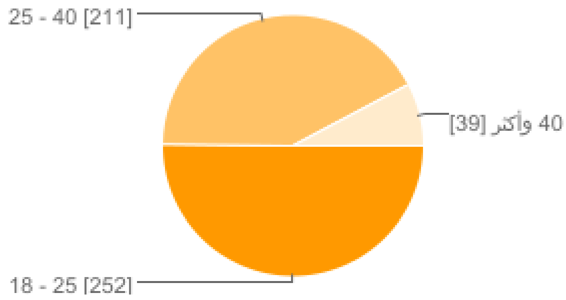
1) Gender?



male	**284**	56.6%
Female	**217**	43.2%

Figure 1 percentage of male to female

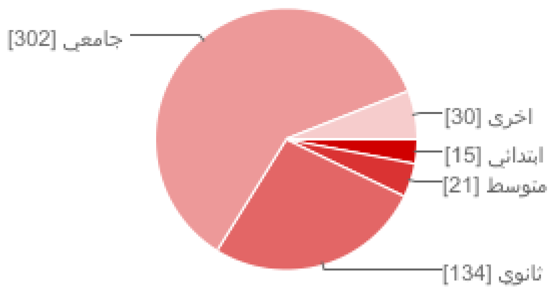
2) Age?



18 - 25	**252**	50.2%
25 - 40	**211**	42%
40 and above	**39**	7.8%

Figure 1 percentage of age

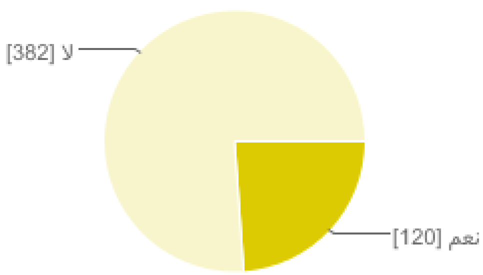
3) Educational level?



primary	**15**	3%
Intermediate	**21**	4.2%
secondary	**134**	26.7%
university	**302**	60.2%
other	**30**	6%

Figure 3 percentage of Educational level

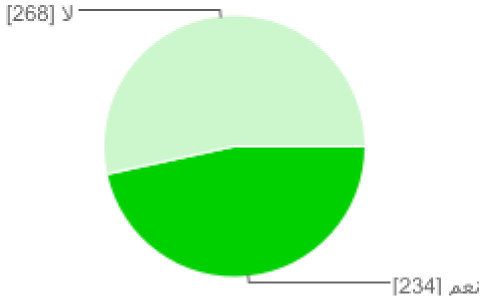
4) Do you fear from the radiology?



yes	**120**	23.9%
no	**382**	76.1%

Figure 4 percentage of you fear from the radiology

5) do you have any information about the protection from radiology?

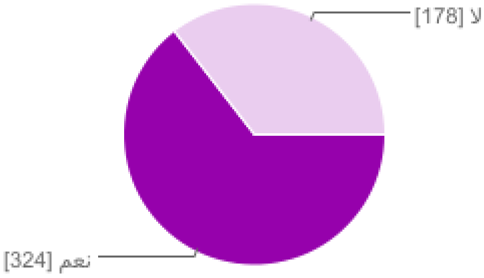


yes **234** 46.6%

no **268** 53.4%

Figure 5 percentage of information about the protection from radiology

6)do you have any information about the side effects of radiology?

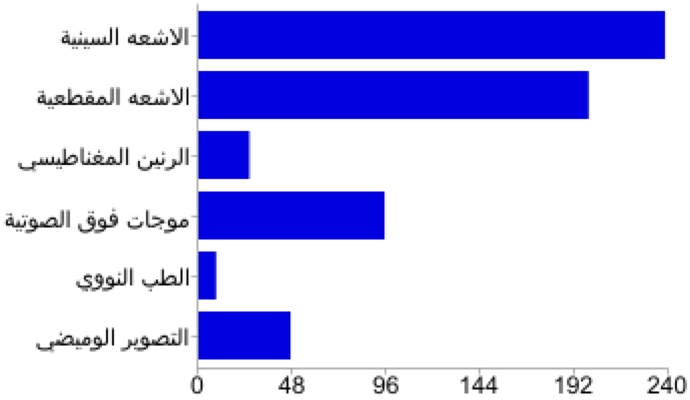


Yes **324** 64.5%

no **178** 35.5%

Figure 6 percentage of any information about the side effects of radiology

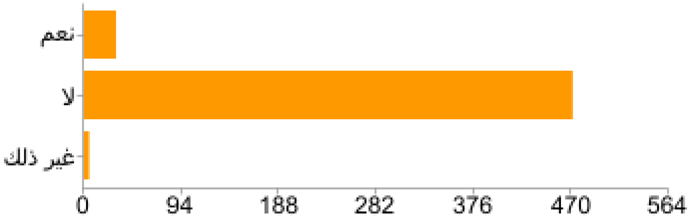
7) did you use one of the following advices ?



X-ray	**238**	51.4%
CT	**199**	43%
MRI	**26**	5.6%
US	**95**	20.5%
Nuclear medicine	**9**	1.9%
Fluoroscopy	**47**	10.2%

Figure 7 percentage of use one of the following advices

8)did you cancel any radiological investigation ? the reason?



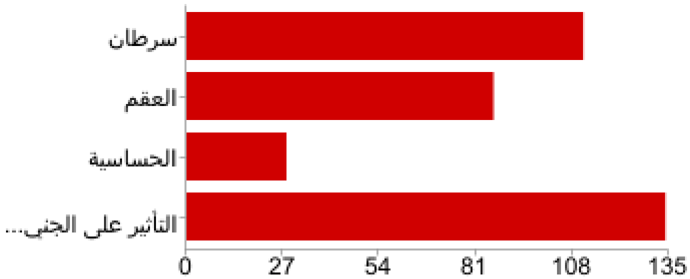
yes **31** 6.2%

no **471** 93.8%

Other **5** 1%

Figure 8 percentage of you cancel any radiological investigation

9)if you suffer from fearing from the radiology, what dieases do you expect to happen from the radiology?



cancer **111** 33.7%

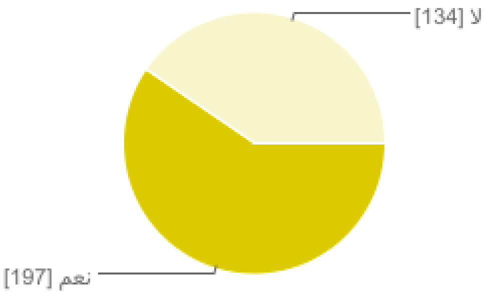
infertility **86** 26.1%

allergy **28** 8.5%

The effecting on the fetus **134** 40.7%

Figure 9 percentage of , what dieases do you expect to happen from the radiology

10)only for age 18-25, if you have chance to enter MIT college ,will you agree?

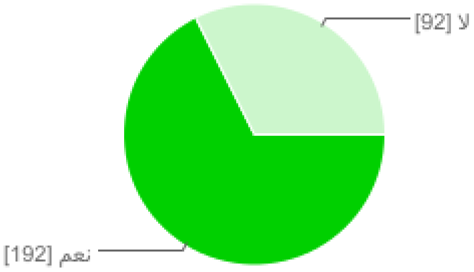


yes **197** 59.5%

no **134** 40.5%

Figure 10 percentage of age 18-25, if you have chance to enter MIT college ,will you agree

11)only for age 40 and above , if your son or daughter has chance to enter MIT college , will you agree?



yes **192** 67.6%

no **92** 32.4%

Figure 11 percentage of age 40 and above , if your son or daughter has chance to enter MIT college , will you agree

The Variable:
The variables are age and Gender education levels .

IV. Result :

Our sample was 501 parsons 56.6% male and 43.2% female .
50.2% their was 18-25 , 42% their age was 25-40 and 7.8% their age was 40 and above.
Educational level for them 3% primary , 4.2% intermediate , 26.7% secondary , 60.2% university , 6% other.
23.9% was fearing from the radiology , and 76.1% was no .
56.6% have information about the protection from radiology and 53.4% don't have.
64.5% have information about the side effects of radiology and 35.5% don't have.
51.4% used x-ray , 43% used ct , 20.5% used U/S , 10.2% used fluoroscopy , 5.6% used mri , 1.9 used N/M.
6.4% canceled radiology investigation while 93.8% no.
40.7% of people who suffer from learning from radiology expect the effecting on fetus is the main side effect of radiology .
While 33.7% expect the cancer , 26.1% expect infertility, 8.5% expect allergy.
59.5% of people who their age from 18 t0 25 , they will agree to enter MIT college if they have a chance whil 40.5% don't .
67.6% of people who their age from 40 and above they will agree for their sons and daughters to enter radiology Department College if they have a chance while 32.4%.

Desiccations:
We found there are a lot of people have fearing from radiation especially the women cause the side effect on their fetus and infertility .
Also we found there are a lot of percentage don't desert to study and enter radiology science college .

V. Conclusion and recommendations :

1. Identify the percentage of fearing from the radiology and its side effect .
2. We have to educate the community to know advantages and disadvantages of the radiology through the following :

- Educational lecture about radiology .
- Rehabilitate the medical staff about radiology.
- Increases the level of protection from the radiology.
- Improved the radiology subject in universities.
- Distribute instruction that clarify the using of radiology and protection from it in the hospitals.

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