



THE EFFECT OF ORIENTATION ON INCREASING KNOWLEDGE AND REDUCING ANXIETY DURING MRI EXAMINATION IN A RADIOLOGY INSTALLATION

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KEYWORDS	ABSTRACT
Orientation, Knowledge, Anxiety, Cortisol, MRI Examination	Radiology services encompass the use of ionizing and non-ionizing radiation sources for diagnostic imaging and therapy. Magnetic Resonance Imaging (MRI) is a crucial clinical radiology service, primarily conducted in hospital-based healthcare facilities. The aim of this research is to assess the influence of patient orientation on MRI-related knowledge and anxiety. This study employs a quasi-experimental design with pretest and posttest measurements, taking into account variables such as age, gender, education, diagnosis, and experience. The results of the research indicate that patient orientation effectively reduces anxiety levels and has a positive impact on the patient's experience during MRI examinations. The conclusions that can be drawn from this research are: The influence of orientation on knowledge in groups that were not given orientation and orientation found that there was no significant difference in the average knowledge before and after orientation ($p>0.05$), this was because respondents had previously read first about MRI examinations on the internet and after reading the knowledge questionnaire their knowledge increased because after they filled out the questionnaire they asked the researchers what was stated in the knowledge questionnaire. The research suggests that the use of open MRI machines with wider bore diameters, along with patient-oriented practices such as allowing patients to see during the examination, can reduce anxiety.

DOI: 10.58860/ijsh.v2i10.110

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INTRODUCTION

Clinical radiology services are health services that use ionizing and non-ionizing radiation sources for image-based diagnosis and/or therapy (SULTAN, 2018) . Magnetic Resonance Imaging (MRI) is a mid-level clinical radiology service that is only carried out in hospital-based health care facilities (Health, 2020). MRI examination is classified as a sophisticated examination modality and is one of the most important diagnostic tools in the medical field, however it takes quite a long time compared to a CT-Scan examination, some patients feel afraid and anxious during the examination. (Yakar & Pirinçci, 2020)

Anxiety cannot be known before the examination, often occurs when several sequences have been carried out, the patient then screams or presses the emergency button asking for the examination to be stopped for reasons of fear, because they feel confined or closed, which can have an impact on work flow such as limiting patient acceptance of MRI, and wasting scan time for the next patient. (Shimokawa et al., 2022) Patient anxiety is a common problem in the Radiology department, when patients come for MRI. The cause of anxiety during the examination occurs due to the closed nature of the MRI scanner which causes claustrophobic reactions, anxiety regarding the results, or having to

remain silent for a long time when feeling sick or uncomfortable, but the level of anxiety still occurs to a certain limit (low or high), namely more than 50 % patient. (Munn et al., 2015)

The most frequent sources of anxiety were inability to move (65%), length of procedure (61%), size of scanner "tunnel" (48%), and feeling confined (44%). At the beginning of the discovery of the MRI gantry hole, it used a closed/traditional hole with a diameter of 23.6 inches or 60 cm. However, as time goes by, other options have become available, such as MRI with a wide aperture measuring 70 cm. Unlike X-rays or Computed Tomography (CT) scans, MRI is a longer procedure. An MRI can take between 15 to 90 minutes to get proper images. Usually, the best option for very claustrophobic patients is to use an open MRI machine. patients with a diameter of 70 cm rated their examination experience as better ($p < 0.025$), compared with patients with a diameter of 60 cm and with an open scanner there was a higher level of anxiety ($p < 0.001$) before the examination. (Ahlander et al., 2020) Today almost all brands create mirrors mounted on the head coil, which can be removed and installed, so that the patient can see the operator and vice versa, they serve to reduce the patient's claustrophobia and anxiety, ensuring less downtime and improve patient examination results. However, in reality, anxiety is still found in MRI patients, which is characterized by increased levels of cortisol in the body (Madl et al., 2022).

Based on patient characteristics, anxiety in MRI patients in middle age is more significantly experiencing claustrophobia, 33% in the group of late adolescents 17-25 years (Amaliya et al., 2019) , adults experiencing moderate to moderate anxiety. weight as much as 69.6% (Asriningrum et al., 2020). Gender: anxiety levels are higher in women than men (Asriningrum et al., 2020) , (Madl et al., 2022) , (Ahlander et al., 2020) .

Effective communication between patients and providers has become imperative in radiological diagnosis. Therefore, radiographers as experts must remain sensitive to the physical and emotional needs of patients through good communication, patient care skills, and behavior in accordance with the code of ethics. A radiologist's ethical responsibilities include respecting patients and treating them with dignity, as well as maintaining patient privacy and confidentiality. (Ochonma et al., 2015)

Acute anxiety that can prevent completion of the examination is approximately 2%, this is caused by substantial problems, namely the scanning procedure and the environment, both those who report anxiety directly and the number of scans that are stopped prematurely (O'Laughlin et al., 2021).

As many as 30% of patients experienced moderate to severe anxiety, and required repeat scans and took longer for the MRI examination. It was also found that patients who were very anxious (as many as 2 people) tended to only lie down on the MRI examination table for a short time and moved more, which could trigger artifacts. Caused by movement (motion artifacts) and repeated scanning, which can lengthen the time of the examination procedure (McGraw, 2022) .

The MRI examination causes severe anxiety in 37% of patients, 5-10% cannot complete the MRI due to claustrophobia where patients cannot cooperate because they feel "buried alive and left alone in the examination room", resulting in a decrease in image quality due to induced artifacts movement, prolonging the examination time and even requiring sedation or general anesthesia in claustrophobic patients, which will increase the cost of the examination. (Yakar & Piriñci, 2020)

Research conducted overseas (Ghana) states that the availability of MRI facilities, level of education can influence patient knowledge and experience about MRI (significance $P < 0.05$). In men and women, there was a weak correlation between age, sosiodemografi and knowledge about MRI, a

strong correlation was found between knowledge and patient experience which influenced anxiety, claustrophobia, headaches and loneliness during the MRI procedure (Asante & Acheampong, 2020).

Meanwhile, based on research conducted in Indonesia, it was stated that there was no relationship between patient knowledge and anxiety level (p-value 0.059) with the sufficient correlation coefficient category (Desry, 2021). At general hospital Dr. Mohammad Hoesin Palembang MRI examination is a supporting examination which is very useful in establishing a diagnosis and is used as a comparison modality if there is still doubt in carrying out an action plan. In one day, the average number of MRI patients is 18 patients with various types of examinations, and the characteristics of the patients are different, some have low education and some have high levels of education and for those who are doing an MRI examination for the first time, these patients feel afraid and anxious so they can resulting in failure and disrupting the inspection process.

The researchers conducted a similar investigation focusing on the impact of pre-procedure education and orientation on patient anxiety levels (Aboalizm et al., 2016). Their results demonstrated a significant decrease in anxiety when patients were adequately informed about the MRI procedure beforehand, which aligns with our findings.

Next research emphasized the importance of patient-centered care and the role of clear communication in reducing anxiety during medical procedures (Hong & Oh, 2020). Their research highlights the significance of addressing patient concerns and providing informative sessions, which were aspects we considered in our orientation program. Based on research that has been carried out by previous researchers and the experiences that researchers have had at the place where the researcher works, the researcher is interested in conducting research on the influence of knowledge on patient anxiety during MRI examinations at the radiology installation at general hospital Dr. Mohammad Hoesin Palembang.

The aim of this study was to analyze the influence of orientation on the level of knowledge and anxiety during MRI examinations at the Radiology Installation at general hospital Dr. Mohammad Hoesin Palembang. This research is useful for improving knowledge in MRI examinations. The results of this study indicate that providing orientation to patients before the MRI examination can reduce their anxiety. This has positive implications on better patient experience during medical procedures.

METHOD

Research is quasi experimental research (quasi experiment). The research design uses a pretest and posttest with a control group design. Research variables include knowledge, anxiety and cortisol measured based on characteristics (age, gender, education, disease diagnosis and experience). Sampling was carried out using purposive sampling technique. The target population in this study was all patients who underwent an MRI examination at the Radiology Installation of general hospital Dr. Mohammad Hoesin Palembang. The samples in this study were patients who underwent an MRI examination at the Radiology Installation at general hospital Dr. Mohammad Hoesin Palembang. The research was carried out in May 2023 – July 2023

RESULTS AND DISCUSSION

The results of this research consist of 5 (five) main steps of the Research and Development (R&D) method, namely, the analysis stage (Analysis), the product design stage (Design Product), the validation or evaluation stage (Evaluation), the Implementation stage (Implementation) and the product results (Product Results).

Results of Workload Calculation and Arrangement of Radiographer Human Resources (HR)

The NOVITA formula is a development design for modifying workload calculations and preparing human resource (HR) requirements for radiographers from two methods, namely the Work Indicator Of Staffing Need (WISN) Method and the Ilyas Formula, the Work Indicator Of Staffing Need (WISN) method is a method to calculate labor requirements based on the actual workload carried out by the workforce (WISN Formula, 2016) while the Ilyas Formula is a method for calculating health human resource requirements (HRK) by classifying individual workloads (Hartawan & Ilyas, 2020) . NOVITA's formula in preparing radiographer requirements follows BAPETEN Head Regulation Number 21/Ka-BAPETEN/XII.02 concerning clinical radiology services with minimum personnel requirements (Riyanto, 2017).

Dr. Hospital H. Abdul Moeloek Lampung Province is a hospital owned by the regional government of Lampung Province which is a type A hospital and is also a teaching hospital (Lampung Governor Regulation Number 40 of 2016, 2016) , stated in the Decree of the Hospital Director Number 180/7.H/VII.02/10.27/X/2022. Based on the results of observations and document review, namely, Decree of the Main Director Number 180/VII.02/10.27/X/2022 on October 5 2022, the Radiotherapy Unit at RSUD Dr. H. Abdul Moeloek Lampung Province has 4 (four) radiotherapy modalities, namely:

Linear Accelerator (LINAC)

Linear Accelerator (LINAC) is a LINAC radiotherapy is a type of external radiation therapy that uses a linear accelerator to produce high-energy X-rays or electrons to cancer cells (RI, 2020). Linear Accelerator (LINAC) at RSUD Dr. H. Abdul Moeloek Lampung Province has been operating and is entering its second (second) year, based on the results of the 2022 performance and quality report on quality indicators for patients, which are completed at 70 to 80 patients per day.

CT Simulator

CT Simulator is a tool used in radiotherapy planning to produce detailed images of the area to be treated (Kasmudin, 2021) . The following are the results of the 2022 performance and quality report on quality indicators for patients completed in radiotherapy planning, namely the CT Simulator for 18 to 20 patients per day with the following details:

- a) CT Simulator Cranium area.
- b) CT Simulator Cervical area.
- c) CT simulator of the thorax area.
- d) CT Simulator abdominal – pelvic area.
- e) CT Simulator for the Extremity area

Brachytherapy

Brachytherapy is an internal radiation activity that places radiation material directly on the area to be treated (Kasmudin, 2021). There are 2 (two) radiographers in the brachytherapy room and the patient limit is 3 – 5 per day. Results of the 2022 performance and quality report on quality indicators in the radiotherapy unit starting brachytherapy for types of gynecological malignancies, namely cervical cancer and endometrial cancer.

C-ARM

C-ARM in radiotherapy functions to support medical services, in quality indicators in 2022 for patients who complete 4 to 10 patients per day.

The following is a description of the activities of 4 (four) radiotherapy modalities at RSUD Dr. H. Abdul Moeloek Lampung Province from the 2022 quality indicators report.

**Table 1 Description of Radiotherapy Modalities
Dr. Hospital H. Abdul Moeloek Lampung Province**

Type of Tool Modality	Number of HR in Radiotherapy	Number of Patients in Radiotherapy	BAPETEN minimum requirements
Linear Accelerator (LINAC)	4	80 Patients/day	25 Patients/day
CT Simulator	2	20 Patients/day	500 Patients/year
Brachytherapy	2	5 Patients/day	According to needs and type of treatment
C-ARM	2	Patients/day	300– 400 Patients/year

CONCLUSION

The conclusions that can be drawn from this research are: The influence of orientation on knowledge in groups that were not given orientation and orientation found that there was no significant difference in the average knowledge before and after orientation ($p > 0.05$), this was because respondents had previously read first about MRI examinations on the internet and after reading the knowledge questionnaire their knowledge increased because after they filled out the questionnaire they asked the researchers what was stated in the knowledge questionnaire.

The effect of orientation on anxiety in the group that was not given orientation was that there was no significant difference in the average anxiety before and after the examination ($p > 0.05$), this was because patients could not prepare themselves from a state of anxiety towards a condition that was more constructive in dealing with their problems, whereas the group orientation showed a significant difference in anxiety before and after being given orientation ($p < 0.05$) because orientation for patients undergoing an MRI examination for the first time had a significant influence on the patient's ability to adapt to the examination room environment, in the form of orientation to the room, image of the patient during an examination where almost the entire body is included in the bore gantry, and the procedures they must adhere to during the examination. There is a significant correlation between anxiety and cortisol levels in the MRI examination in the group given orientation ($p = 0.011$) with a value of $r = 0.637$, meaning the strength of the correlation. Meanwhile, with a positive correlation direction, this means that the higher a person's knowledge, the higher their understanding of the MRI examination and the lower their cortisol levels.

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