Nursing role in magnetic resonance imaging in Saudi Arabia

By: Dr: Fuad Abdulah Al-rababh

College of Human Medicine

Jordan University of Science and Technology – Jordan

Email: alrababh.f82@yahoo.com

Abstract:

Magnetic resonance imaging is one of the most important techniques used widely for diagnosis of many diseases as it gives a clear image for different tissues and organs in the body, it is used especially in diagnosis of neuropsychological diseases such as strokes.

One of the most happened adverse reactions of MRI examination is some negative emotions happened to patients such as anxiety and depression as the MRI device consists of closed dark cylinder and the patient have to lay inside it for a short period of time but the patient feels like it is a very long time and the opportunity for occurrence of anxiety and depression is more happened in patients suffer from stroke which affect the treatment and prognosis of the stroke.

A high quality nursing staff has an important role in management of this negative emotions (anxiety and depression) especially in patients with strokes and the improvement of the nursing quality is of important value for early correct diagnosis, evaluation and prognosis of stroke.

There are a great difference between the responsibilities of the conventional nursing in MRI and the responsibilities of the high quality nursing in MRI as it is divided into three stages before the MRI examination, during the MRI and after the MRI examination and patient discharge.

A huge study was done in a hospital to study the effect of high quality nursing on improvement of anxiety and depression in patients suffer from stroke and the results show a significant improvement compared to the usual nursing.

Ministry of health in Saudi Arabia is giving a great interest for training and education of the nursing staff in all its hospitals to be a high quality nursing staff as it believes in its importance and effect on the correct diagnosis and the patient psychological health and complains.

Keywords:

Resonance imaging, magnetic resonance imaging, MRI, Nursing

Introduction:

Magnetic resonance imaging (MRI) and also called nuclear magnetic resonance imaging (NMRI) is a non-invasive method that causes no pain for imaging by exploiting the property of nuclei in the body to act like magnets and do not use ionizing radiations (1).

Any nucleus can be used with any number of protons and neutrons but hydrogen ion is always used as it is abundant in the body and is arranged randomly in the body so when strong magnet is applied the nuclei is arranged in the magnetic field so it is an imaging test that uses powerful magnet and radio waves to take clear pictures for the body(1)

The MRI is the scanning of choice nowadays in many problems in different body organs and systems especially in neurological investigations and brain strokes as it is characterized by extremely high soft tissue resolution, spatial and temporal resolution, multiple sequences and post processing techniques(1)

A high quality nursing staff is of great importance helping patients to get over their fear from the MRI device and manage their anxiety and depression developed from the claustrophobia happening inside the MRI device and hence help the physicians also to correct diagnosis and control the prognosis of the disease (3).

The high quality nursing has a clear plan of responsibilities to follow divided into stages to help patient to complete his MRI examination (1):

A-before the MRI examination (patient preparation)

B-during the MRI examination

c-after the MRI examination (patient discharge)

A-nursing responsibilities in MRI before the procedure:

1-patient must be fasting before the MRI by 4 to 6 hours so nurse must confirm this information before scanning

2-the nurse must ask the patient if he suffers from claustrophobia or close spaces afraid and inform the doctor about this information so doctor give the patient sedatives or anxiolytics to make him sleep and less tension or suggest an open MRI device as one in twenty patients require sedation because of claustrophobia , if the patient takes sedation and he is outpatient nurse must give him the discharge instructions and deliver the patient to his family or if he inpatient initiate ssfety precautions as indicated(1,2)

3-before scanning nurse must take full history from the patient and make a head-to-toe assessment and ask if he suffer from any chronic diseases that require implanted devices which contain metals as the devices elecrodes and wires may be overheated and cause burn in tissues and the electromagnetic field may cause a malfunction to the implanted device or move it from its place these devices are (1,2) :

-Heart devices such as artificial prosthetic heart valves , implanted cardioverter defibrillator or pacemaker or vascular stents

-Brain eneurysm clips

-Inner ear implants

-Intrauterine device such as loop

-Recent artificial joints, metal sheets used in bone fractures or orthopedic hardware

4-nurse must ask the patient to remove everything they wear such as:

Jewelry, watches, credit cards ,hearing aids , pens , pocketknives , eyeglasses , pins , hairpins , metal zippers , removable dental accessories , drug patches that contain metal backings , tattoos cantaining metal accessories and anything made of metal as it effect on the magnetic waves used in scanning(1,2)

5-It is important to ask patient about pregnancy or predicted pregnancy as pregnancy is contraindicated to MRI (1, 2)

6-nurse must inform the radiologist if the patient has kidney disease and require hemodialysis as it is contraindicated to give those patients contrast that contain Gadolinium as it cause nephrogenic fibroses dermopathy(1,2)

7-make sure that all equipment's used in MRI room is compatible with MRI technique other than it will be damaged

8-nurse must explain what will happen during the MRI scan to the patient and tell him that the MRI scanner will make loud banging and that he should be silent and do not move for several minutes and how to relax inside the device (1, 2)

B- Nursing responsibility during MRI scanning:

-the nurse must ask the patient to relax and sleep perfectly while taking the images and some minor movements are allowed and ask the patient if want an ear plugs if he couldn't bear strong noising, also ask if he want a pillow or blanket (2)

-inform the patient that if he can breathe normally or will hold breathing according to the required examination

- the most important responsibility of the nurse during MRI is monitoring the patients that in need for monitoring especially who taken sedation or anesthesia to perform the MRI as they have great potential for physiological status change such as respiratory rate, oxygen saturation, temperature, heart rate and blood pressure(1).

Who are patients in need for monitoring during MRI?

1-patients receiving sedation or anesthesia

2-mentally unstable patients

3-physically unstable patients

4-neonates and pediatric patients

5-physiologically compromised patients

6-patients unable to communicate with the MRT technologist

7-patients undergoing MR-guided interventional procedures

8- Patients that may have allergy to the MRI contrast dye

9-high risky patients or critically ill

All those patients needs critical observation for the vital physiological parameters and ensure their safety inside the MRI device (1)

C-nursing responsibility after the MRI procedure:

If the patient is sedated or anaesthetized nurse should transfer him to the recovery room to continue monitoring his vital parameters especially for pediatric patients and neonates as some sedatives take a relatively long time for clearance from body e.g. chloral hydrate , phenobarbital and others.

Patient shouldn't depart the MRI before we ensure he is completely conscious and alert and has stable vital signs and should be delivered to his family or accompany to drive him to home (1).

As we see the radiology nurse or nurse works in MRI should have high level of knowledge, expert and independent as they treat with wide variety of patients, they routinely start check the peripheral i.v.s.,give medications , monitor vital signs ,suction for patients , insert Foleys and help patients in their personal needs.

The nurse is the link between patients and the radiologist or technologist they inform about any unusual patient needs and vice versa

The nurse also responsible for patient sedation as it is given via intravenous administration during special procedure and also responsible for monitoring vital parameters for patients with special needs, patients from intensive care units or patients in emergency situation or pediatric patients.

The MRI examination takes a long time pateints have to stay in dark and closed place inside the MRI device which drives negative emotions to the patients such as tension, anxiety and depression and the risk will increase in case of neurological diseases and brain strokes that leads to low spirits and partial loss of self-ability or cognitive dysfunction therefore the nursing quality in MRI examination is very important to optimize the efficiency of the examination and increasing the patient compliance.

Research questions:

We need to know the effect of high quality nursing on the negative emotion developed in patients performing MRI , the effect on the anxiety and depression especially in stroke patients who have a big opportunity for this adverse reactions so we need to measure the effect and measure the patient complains towards the nursing services he received during his MRI journey,

Also we want to put a hand on how to improve the quality of the nursing staff what we have to do to improve it, what is the missing parts in our health care organization to reach the best results in nursing the MRI patients.

Previous study:

Aim if the study:

A huge study is performed to analyze the effect of high quality nursing in improvement of anxiety and depression of patients with acute stroke in MRI examination in Liaocheng people's hospital from January 2016 to January 2017 (3).

Methodology and objectives:

Two groups of patients are involved in the study one is the control group and the other is the observation group , the control group was treated with routine nursing according to the doctor instructions routine preparation for the examination such as safe movement from the bed , placement beside monitor ,presence of emergency drugs and one to two nurses are present and responsible for the patient , on the other hand the observation group was treated with high quality nursing in which they make full assessment of the severity of the disease ,problem solving for all difficulties facing the patient during the MRI examination immediately ,handling the anxiety and depression of the patient and establishment of data base consists of files of personal information about the patients before they discharge .

The high quality nursing staff consists of one head nurse (experience 5 working years at least and able to deal with emergency and severe diseases) , two senior nurses (experience at least 2 working years and make invasive operations perfrctly) and four to six junior nurses , the head nurse is responsible for managing the process , supervising the high quality nursing staff and handle the problems during the practical work , the senior nurses are responsible for training and assessment of junior nurses (3) .

In the observation group ,full evaluation for the vital signs is done ,the examination time was determined and the nurses ,nurses are combined with the examination requirements in all stages especially for unstable patients ,safety education was done to the patients and their family and discussion of the negative emotions is done with patient also the nursing pathway is clearly shown in a table to facilitate the nursing operation and improve the quality of examination so that the warm harmonicas clean environment was created and all patients needs were assessed.

The two groups are of the same number of patients, same age average, same MRI device, same diagnosis physicians (acute stroke), and same duration of education and also suffer from other side diseases as hypertension or diabetes by the same ratio (3).

The inclusion criteria:

1-all patients must be diagnosed as acute stroke

2-the patients must perform full MRI examination as requires in the research

3-the patients must have complete clinical data and signed the consent for the research

The exclusion criteria:

1-the patient is conjugated with other diseases and performed other examinations in the same time

2-patients suffer from severe disease so that not completed his MRI examination

3-patients not allowed to do MRI scan

4-patients with history of neuropsychiatric disease as severe anxiety and or depression

Observation:

The researcher used self-rating anxiety scale (SAS) and self-rating depression scale (SDS) for the evaluation of anxiety and depression happened to patients during the MRI ,the scale is degreed from 0 to 100 and the higher the score is the severer the symptoms of anxiety and depression.

The nursing satisfaction is also evaluated using a questionnaire made by the hospital including questions about the nursing operation, nursing attitude with patients and problem solving and a score is given from 0 to 100 , the higher the score is the satisfaction about nursing staff is more (3).

High quality nursing in Saudi Arabia:

Ministry of health in kingdom of Saudi Arabia gives a great interest for improvement of the nursing staff in all its hospitals and health care organisations as the ministry do lots of studies and researches about the effect of high quality nurses on the public health and their satisfaction ,the ministry improves the nursing staff through many training and education programs especially in the field of radiation nursing that includes MRI nursing and employment of head nurses from foreign countries which are leaders in field of improvement of nursing quality to manage younger nurses or those of low expert to improve their quality

The ministry do a lot of advertising programs to motivate young students (males and females) to study nursing in different regions of Saudi Arabia as there is a great need of them, we need a huge number of nursing staff so as we can improve the nursing quality in Saudi Arabia at least double the number of nursing staff available now in our ministry (4).

Results:

-In the observation group the completion rate of the examination was increased and the average duration was shortened

-before the examination there is no difference in SAS and SDS scores between the two groups , the scores in control group before discharge were higher than those before examination in contrary the scores are lower in observation groups before discharge .

-the nursing satisfaction scores is significantly higher in the ovservation group than the control group (3)

Conclusion:

A high quality nursing can significantly improve the anxiety and depression developed in patients with acute strokes due to MRI examination and that improvement lead to better completion rate for the examination ,shortening of the duration of examination and hence increase the satisfaction of patient towards nursing staff (3).

MRI examination is of significant importance in diagnosis and treatment of patients especially neuropsychological patients and those who suffer acute stroke , but MRI has some adverse reactions on the patients most important one of it is anxiety and depression in patients who have claustrophobia or who have higher opportunity for developing anxiety and depression as stroke patients .

High quality nursing staff has a great role in radiology field especially in MRI examination in management and control of negative emotions developed due to the examination in addition of their important role in nursing responsibilities before, during and after the MRI examination such as preparation of patient ,removal of any metal objects with patient, intravenous injection of the sedatives for patients with claustrophobia, taking full history from the patient to know other diseases ,injection of contrast dye needed for some MRI examinations, monitoring the vital signs of patients during the examination ,helping patients with special needs and neonates or pediatric patients and finally patient discharge to his family or room safely .

The effect of high nursing quality in MRI is studied versus the use of routine nursing and it is found to be of great significance to improve the adverse reactions of MRI and hence better diagnosis and control prognosis of the disease through increasing the completion rate of the examination and decreasing the duration of the examination and so increasing the satisfaction of patients towards nursing services.

References:

(1)Nursing lounge: Nursing responsibilities : MRI pre and post procedure , published on April , 2013

(2)Nursing 2019: preparing a patient for MRI , published on October , 2008

(3)Iranian journal of public health : effect of high quality nursing on improvement of anxiety and depression of patients with acute stroke in MRI examination , By : Lin Wu and Li Zhang

, published on December 2017

(4)Nursing and care : Quality of nursing care in Saudi Arabia : Needs and improvements ,By: Abbas Al Mutair , published on : 29 october 2015