

Effectiveness of Designed Nursing Guidelines on Reducing Anxiety Level among Patients Undergoing Magnetic Resonance Imaging

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Abstract: **Aims** of this study were to assess patient knowledge about Magnetic resonance imaging procedure, assess level of anxiety for patients undergoing Magnetic resonance imaging procedure and evaluate the effectiveness of nursing guidelines on reducing patients anxiety level for patient undergoing Magnetic resonance imaging. **Material and Methods** Quasi-experimental study design was utilized in this study. Hypotheses were formulated: The knowledge score for patients whom take guidelines was higher than who didn't take and The anxiety level for patients whom take guidelines was better than who didn't take. **The Sample** was of (60) adult patients from both sex who were admitted in Magnetic Resonance Imaging unit. Two tools were used: Interview patients assessment questionnaire and anxiety scale. **Results** showed a significant difference was found between study and control group as regard patient's knowledge about MRI procedure in all items. A significant difference was found between study and control group regarding level of anxiety. **It was concluded that**, level of knowledge for patients whom take instructions and guideline was higher than whom didn't take any instructions and guideline. Level of anxiety was lower in patients whom take instructions and guideline about MRI procedure. So nursing guidelines is very necessary, which has an effect on lowering anxiety level for patient undergoing Magnetic resonance imaging. **Recommendation** Pre procedure teaching and instructions should be an integral part of the nurses' duty in all hospitals. Each patient is given pamphlet include instructions about magnetic resonance imaging procedure, preparation before and during procedure and illustrate after procedure. Teach patients methods of coping therapeutically with anxiety.

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Introduction

Magnetic resonance Imaging (MRI) has been described as the most important medical innovation in the last 25 years. There has been an enormous increase in the use of this modality in the clinical setting. Over 80 million MRI procedures are now performed each year worldwide (Robinson, *et al.*, 2009) and (Hermann *et al.*, 2010).

Magnetic resonance imaging (MRI) is a noninvasive imaging technique that uses magnetic fields, radio waves, and computers to demonstrate abnormalities (ie, tumors or narrowing of tissue pathways through bone) of soft tissues such as muscle, tendon, cartilage, nerve, and fat (Frank *et al.*, 2008).

MRI is the preferred procedure for diagnosing a large number of potential problems or abnormal conditions in many different parts of the body. In general, MRI creates pictures that can show differences between healthy and unhealthy tissues. Physicians use MRI to examine the brain, spine, joints (e.g., knee, shoulder, hip, wrist, and ankle), abdomen, pelvic region, breast, blood vessels, heart and other body parts (Frank *et al.*, 2008).

Because an electromagnet is used, patients with any metal implants, clips, or pacemakers are not candidates for MRI. To enhance visualization of anatomic structures, contrast media may be injected intravenously. During the procedure, the patient needs to lie still for 1 to 2 hours and will hear a rhythmic knocking sound. Patients who experience claustrophobia may be unable to tolerate the confinement of closed MRI equipment without sedation. Jewelry, hair clips, hearing aids, credit cards with magnetic strips, and other metal-containing objects must be removed before the MRI is done (Frank *et al.*, 2008).

Magnetic resonance imaging, or MRI uses a powerful magnetic field, radio waves, rapidly changing magnetic fields, and a computer to create images that show whether or not there is an injury, disease process, or abnormal condition present. For the MRI procedure, the patient is placed inside of the MR scanner—typically a large, tunnel or doughnut-shaped device that is open at both ends. The powerful magnetic field aligns atomic particles called protons that are present in most of the body's tissues. The

applied radio waves then cause these protons to produce signals that are picked up by a receiver within the MR scanner. The signals are specially characterized using the rapidly changing magnetic field, and, with the help of computer processing, very clear images of tissues are created as "slices" that can be viewed in any orientation (**American College of Radiology, 2013**)

Magnetic resonance imaging (MRI) is known as a physiologically non invasive technique. Individuals being scanned, however, sometimes experience substantial anxiety as a result of the scanning procedures or environment. During clinical scans, 25–37% of patients experience anxiety. Causes of anxiety during scanning include the enclosed nature of the scanner leading to a claustrophobic reaction, anxiety regarding results, or having to keep still for long periods of time when in pain or discomfort (**Chapmana et al., 2010**).

Many patients attending medical imaging departments will have a positive experience. However, others can experience a wide range of emotions relating to their scan, including anxiety, fear, and claustrophobia. The way patients experience health care is largely dependent on the attitudes and actions of the health care professionals they encounter. Strategies such as providing information, the use of audiovisual systems, team training, and anxiety reduction protocols have all been shown to be effective in reducing anxiety, fear, claustrophobia, and the need for sedation for people undergoing imaging (**Youssefzadeh et al., 1997**), (**Zachary et al., 2010**) and (**Munn, & Jordan, 2011**).

Significance of the study:

Clinical experience with the new technology of magnetic resonance imaging (MRI) has indicated that the procedure may produce anxiety in a number of patients, to the extent that occasionally a patient may be unwilling to undergo the procedure. So, this research is conducted to evaluate the effectiveness of nursing guidelines on reducing patients anxiety level undergoing Magnetic resonance imaging.

Aims of this study:

The aims of this study are to:

1. Assess patient knowledge about Magnetic resonance imaging procedure.
2. Assess level of anxiety for patients undergoing Magnetic resonance imaging.
3. Evaluate the effectiveness of nursing guidelines on reducing patients anxiety level for patient undergoing Magnetic resonance imaging.

Hypotheses:

1. The knowledge score of patient who receiving instruction about Magnetic resonance

imaging procedure will be higher than patient who isn't receiving instruction.

2. The anxiety score for patient who is receiving guidelines about Magnetic resonance imaging will be better than patient's who not receiving guidelines.

Research design:

Quasi-experimental study design was utilized in this study.

Technical design:

Setting of the study:

The study was conducted in waiting area of Magnetic Resonance Imaging unit at Assuit University Hospital.

Sample:

A sample consisted of 60 adult patients from both sex who were randomly recruited from Magnetic Resonance Imaging unit. Those 60 patients were equally divided into random sample study and control groups (30 for each). According to the following criteria: age ranged from 18 to 65 years and had no previous experiences of MRI examination.

Tools for data collection:

Data collected through using three tools:

I. Interview questionnaire sheet:

This tool was designed by the researchers which includes two parts:

Part I: Socio-demographic characteristics e.g (age, sex, marital status, level of education and occupation.)

Part II: Patient's knowledge as regard to (definition of MRI, indications of MRI, information about MRI procedure, time of MRI procedure, preparation for the procedure, contraindications for MRI and strategies to cope with anxiety during MRI procedure).

II: "Anxiety scale" (Humphris, 2000):

To determine the level of anxiety.

Total score is a sum of all five items range from 5 to 25.

Not anxious	= 1	Slightly anxious	= 2
Fairly anxious	= 3	Very anxious	= 4
Extremely anxious	= 5		

19 or above which indicates a highly anxious patient.

III: Designed Nursing Guidelines:

Designed by the researchers after reviewing related literature to provide patients with information about the MR imaging machine, indication of MRI, information about MRI procedure, preparation for the procedure, time of MRI and contraindications for

MRI. Instructions for strategies to cope with anxiety, the instructions included a description and discussion of relaxation techniques, e.g. blinding, imaginative visualization and breathing techniques that might be useful to the patient in managing anxiety during the examination. The booklet written in Arabic for easy understand.

Methods for data collection:

- A review of current and past, local and international related literature in the various aspects of the problems using books, articles, periodicals, and magazines was done. The proposed study setting was assessed for the numbers of patients in MRI unit at Assiut University Hospital.

- The researcher collected the data from patients by applying tool (I&II). The study was carried out at morning shifts.

- Duration of instructions session ranged from 30– 45 minutes for each patient.

- Designed booklet that was given for each patient who participate in the study.

Operational design:

Content validity:

It was established by panel of five expertise of medicine and Nursing field Who reviewed the instruments for clarity, relevance, comprehensiveness, understanding, applicability and easiness and correction was carried out accordingly.

Pilot study:

A pilot study was conducted on 10% (6) patients to test the clarity and applicability of the tool. It was conducted to check the clarity of the statements, and simplicity of questions and to check the most common topics related to the study. The pilot study were excluded from the total number of study sample. Necessary corrections and modifications were done based on findings of pilot study to develop the final form of the tools.

Procedure:

Data were collected within duration of 3 months (from first of January, 2014 till end of March, 2014). At initial interview the researcher introduced herself to initiate line of communication in order to facilitate the implementation of the tools. The researcher divided randomly the patients into both control group and study group and interview with each patient individually and explained the nature and purpose of the study.

Each patient individually completed the questionnaire before they began the intervention as well as before beginning the procedure of MRI

examination. Patients who could not read or write were helped by the researchers to fill out the sheet.

Control group were assessed for the anxiety scale and the routine hospital instructions were given to them only, while the anxiety scale, the routine hospital instructions and the instructions designed by the researcher were all given to the study group. The anxiety level assessed immediately after the procedure of MRI examination was recorded for both groups.

Administrative design:

Official permissions to conduct the study was obtained by the researcher from the director of MRI department. Before conducting the study, personal communication was done with technicians and nurses to explain the purpose of the study and assure their best possible cooperation. This study approved by research ethical committee of faculty of nursing at Assiut University.

Ethical considerations:

- Research proposal was approved from Ethical Committee in the faculty of nursing.

- There is no risk for study subject during application of research.

- Written consent was obtained from patients or guidance that are willing to participate in study, after explaining the nature and purpose the study.

- Confidentiality and anonymity was assured.

- Study subject have the right to refuse to participate and or withdraw from the study without any rational any time.

- Study subject privacy will be considered during collection of data.

Statistical design:

The data analysis was carried out using computer program SPSS (Version, 17.0) The collected data were tabulated and analyzed by using frequency, percentage, distribution, mean, range and standard deviation. The level of statistically significant was considered at $p < 0.05$. T test was used to determine the differences between study and control group.

Results

Table (1) shows that; the highest percentage of both the study and control group were between the ages 20 - 40 years. Also there was equality in both sex. As regarding level of education in both study and control groups the highest percentage were Illiterate.

Table (2) shows that; there were statistical significant difference between study and control group as regarded knowledge about MRI procedure and there

was statistical significant difference between pre-test and post-test regarded knowledge in study group.

Table (3) shows that; the result showed that There were higher score of anxiety in patients in control group more than patient in study group there were statistically significant difference between pre and post test for study group.

Table (4) shows that; there were statistical significant difference between knowledge in pre and post test for study group and educational level

Table (5) shows that; there were statistical significant difference between level of anxiety in pre test for study group and sex. There were higher score of anxiety in female patients in control group more than in study group.

Table (6) shows that; the majority of both groups were reading Quran as a strategy to cope with anxiety before and during MR imaging.

Table (1): Sociodemographic Characteristics of Both Study and Control groups.

	Study group (n= 30)		Control group (n= 30)		p-value
	No.	%	No.	%	
Age:					
< 20 years	2	6.7	3	10.0	0.889
20 - 40 years	15	50.0	14	46.7	
> 40 years	13	43.3	13	43.3	
Sex:					
Male	16	53.3	16	53.3	0.796
Female	14	46.7	14	46.7	
Level of education:					
Illiterate	10	33.3	14	46.7	0.103
Primary	3	10.0	5	16.7	
Preparatory	3	10.0	4	13.3	
Secondary	6	20.0	5	16.7	
University	8	26.7	2	6.7	

Table (2): Distribution of Patients' knowledge for both control & study groups (pre &post) application of nursing guidelines.

Knowledge	Study group (N= 30)		Control (N= 30)		P
	No.	%	No.	%	
Unsatisfactory	6	20.0	30	100.0	0.000*
Satisfactory	24	80.0	0	0.0	

Statistically significant at $p < 0.05$

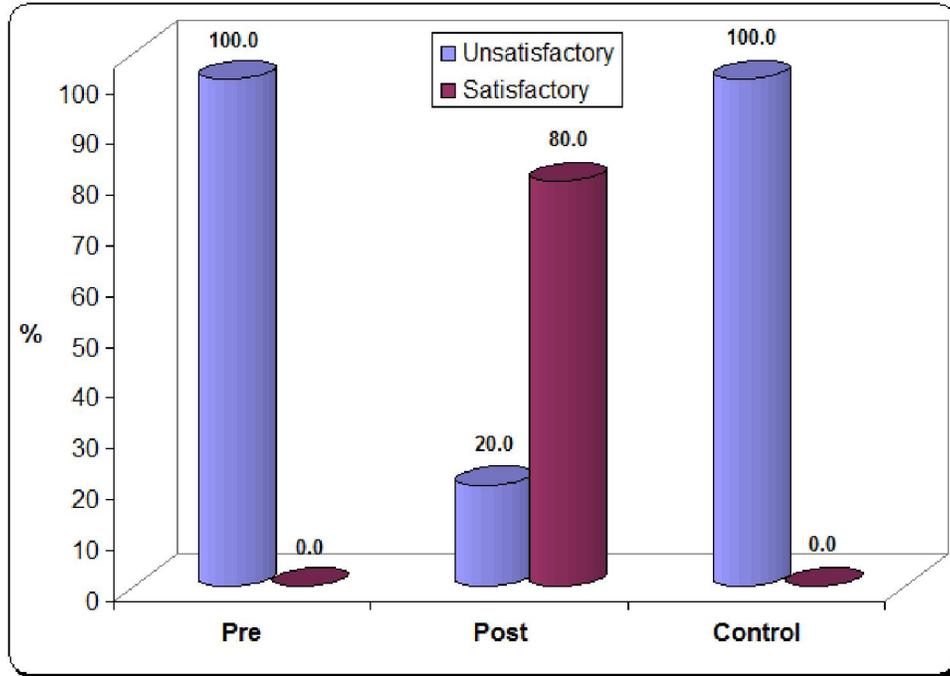


Table (3): Comparison of anxiety levels among the study and control groups after MRI examination

Anxiety	Pre (n= 30)		Post (n= 30)		Control (n= 30)		P1	P2
	No.	%	No.	%	No.	%		
Low anxious	17	56.7	30	100.0	14	46.7	0.000*	0.000*
High anxious	13	43.3	0	0.0	16	53.3		
Mean ± SD	17.23 ± 5.57		7.63 ± 3.02		18.57 ± 4.82		0.000*	0.000*

Statistically significant at $p < 0.05$

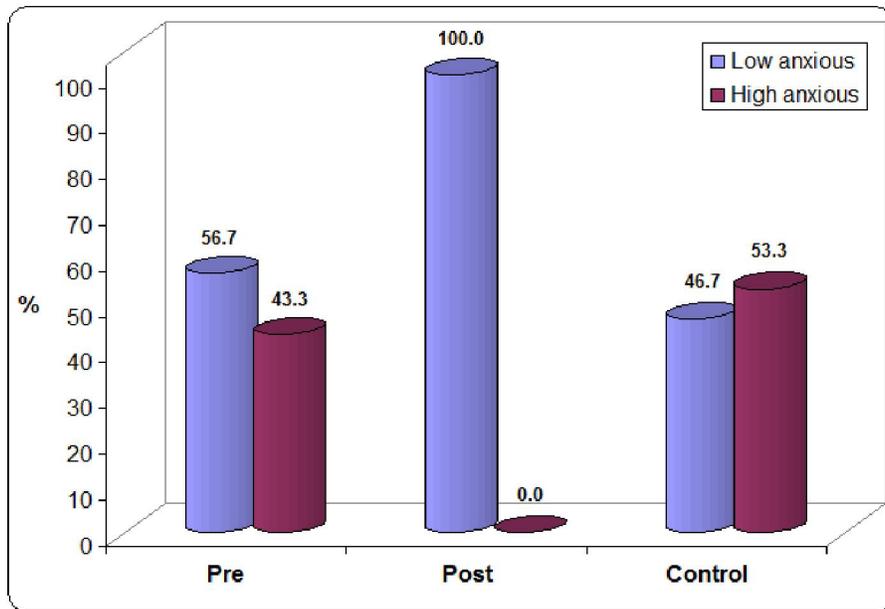


Table (4):Relation between Knowledge and Sociodemographic Characteristics in pre and post test.

	Pre-test	P-value	Post-test	P-value
Age:				
≤ 40 years	5.12 ± 3.02	0.528	14.88 ± 3.87	0.070
> 40 years	4.38 ± 3.23		12.31 ± 3.47	
Sex:				
Male	5.53 ± 3.02	0.197	14.00 ± 4.38	0.747
Female	4.07 ± 3.06		13.53 ± 3.42	
Level of education:				
Less than secondary	2.79 ± 2.26	0.000*	11.64 ± 3.46	0.003*
Secondary or more	6.56 ± 2.61		15.63 ± 3.26	

Statistically significant at $p < 0.05$

Table (5): Relation between Anxiety and Sociodemographic Characteristics in pre and post tests

	Pre-test	P-value	Post-test	P-value
Age:				
≤ 40 years	17.71 ± 5.18	0.604	7.82 ± 2.96	0.701
> 40 years	16.62 ± 6.20		7.38 ± 3.20	
Sex:				
Male	14.60 ± 6.00	0.007*	6.80 ± 2.81	0.133
Female	19.87 ± 3.66		8.47 ± 3.09	
Level of education:				
Less than secondary	18.21 ± 5.27	0.376	8.50 ± 3.16	0.145
Secondary or more	16.38 ± 5.85		6.87 ± 2.78	

Statistically significant at $p < 0.05$

Table (6) Distribution of strategies to cope with anxiety for both control & study groups before and during MR Imaging.

Strategies	Study		Control	
	No.	%	No.	%
Accompanying someone with me at examination room	1	3.3	3	10
Reading Quran	22	73.3	20	66.7
Relaxation techniques	3	10	1	3.3
Close my eyes	4	13.4	3	13.4
No	0	0	2	6.6
Total	30	100	30	100

Discussion:

Magnetic resonance imaging (MRI) is becoming an increasingly common form of examination for both adults and children. Although it is non-invasive and considered painless, both adults and children experience anxiety during the examination. Adults undergoing MRI scans can experience anxiety, claustrophobia and fear during the scanning experience and, in some cases, require sedation. There is a significant amount of literature published on the phenomenon of claustrophobia and particularly

claustrophobic terminations that occur during MRI imaging (Munn, 2013).

In a different survey of radiographers, 71.6% of respondents stated that patient anxiety was a common issue in their imaging department when patients presented for MRI (Ashrafpoor *et al.*, 2011).

The study findings revealed that the highest percentage of both the study and control group were between the ages 20 - 40 years. Also there was equality in both sex. As regarding level of education in both study and control groups the highest percentage were illiterate.

The study findings revealed that the majority of sample were having unsatisfactory knowledge regarding machine, procedure preparation, contraindication, and time needed for the procedure. This may be due to highest percentage of both the study and control group were illiterate.

In the same line (**Mohammed et al., 2013**) reported that the majority of sample were having unsatisfactory knowledge related to machine, procedure preparation, contraindication, and time needed for the procedure.

The study findings revealed that there were statistical significant difference between study and control group as regarded knowledge about MRI procedure and there was statistical significant difference between pre-test and post-test regarded knowledge in study group.

In the same line (**Mohammed et al., 2013**) revealed that there were differences of pre test and post test knowledge and there was statistical significance difference of patient's knowledge after instructions.

Törnqvist (2010) mentioned that MRI is becoming increasingly applicable and common for adults as well as for children it is important to study patients' experiences and the adjusted preparation and realization of MRI examinations. If the adjusted preparation and realization of examinations facilitates for patients undergoing an MRI then there will be a gain both for patient comfort and for efficiency in the use of resources.

The study findings showed that There were higher score of anxiety in patients in control group more than patients in study group as a result of receiving the designed instructions before MRI procedure. There were statistically significant difference between pre and post test for study group.

In the same line (**Mohammed et al., 2013**) revealed that there were highly statistically significant difference among levels of anxiety from pre test and post test.

In the same line (**Sayed et al., 2011**) revealed that A highly significant difference was found between the two groups when the total anxiety scores were compared after the procedure of MRI examination and after the designed instructions were given.

As (**Selim, 2001**) mentioned in his article "Effect of Pre-Instruction on Anxiety Levels of Patients Undergoing Magnetic Resonance Imaging examination," patients who received the designed instructions significantly lower levels of anxiety than the controls group. Revealed a highly significant difference was found between the two groups (study and control groups) in the study group decrease in the level of anxiety than in the control group.

Similar to this studies (**Tischler et al., 2008**) report that there was a statistically significant difference between anxiety for patients who received information and who did not. Before a scan, many patients feel a need for information. The patients who received information mainly found it useful or very useful.

Yossefzadeh (1997) showed that anxiety and information are linked, as the mean anxiety levels were statistically significantly higher in those who did not receive information compared with those who did.

Medeiros et al., (2012) mentioned that according to the values of anxiety obtained by both groups in this study, the experimental group showed lower levels of anxiety. providing information prior to the MRI scan has positive effects, which decreases the state of anxiety of the patients.

Chapman et al., (2010) mentioned that magnetic Resonance Imaging (MRI) is associated with high levels of anxiety in many patients which may interfere with image quality and increase examination time. Increased information about the MRI scanning procedure and expected experiences during the scan may help patients to lie still during the sequences, with a decrease in motion artifacts.

American College of Radiology (2013) mentioned that Some patients who undergo MRI examinations may feel confined, closed-in, or frightened. Perhaps one in twenty may require a sedative to remain calm. Today, many patients avoid this problem when examined in one of the newer MRI units that have a more "open" design. Some MRI centers permit a relative or friend to be present in the MR system room, which also has a calming effect. If patients are properly prepared and know what to expect, it is almost always possible to complete the examination.

In addition (**American Heart Association, 2010**) stated that, some patients may experience anxiety inside the MRI scanner (claustrophobia). Most of the time this feeling disappears after they get used to the machine.

The study findings showed that there were statistical significant difference between knowledge in pre and post test for study group and educational level.

The study findings showed that there were statistical significant difference between level of anxiety in pre test for study group and sex.

These results were in agreement with (**Mohammed et al., 2013**) who reported in her study that as Some female patients who are undergoing magnetic resonance imaging examination cannot terminate the procedure due to producing anxiety and claustrophobia, so health instructions for those is very necessary, which has an effect on lowering anxiety

and claustrophobia related to magnetic resonance imaging examination.

In the same line (*Chapman et al., 2012*) Magnetic resonance imaging (MRI) scans frequently trigger state anxiety in individuals being scanned and mentioned that women in both groups showed a higher level of anxiety than the men.

Study findings showed that, the majority of both groups were reading Quran as a strategy to cope with anxiety before and during MR imaging. This may be explained that they are Muslims and reading Quran can help calm emotions and reactions to stressors, and can be a vital support in times of crises to decrease anxiety.

In the same line (*Sayed et al., 2011*) revealed that, the majority of both groups were reading Quran as a strategy to cope with anxiety and claustrophobia before and during MR imaging. This may be explained that we are Muslims and all of us think that the cure is in Quran as our God (subhanah wa taala) said.

Street, et al., (2007) reported that One-session treatment of cognitive therapy for specific phobias has been found to be highly effective, and those patients with preexisting claustrophobia may benefit from one-session treatment, This intervention was based on the factors found to be most associated with anxiety in the scanner and the strategies commonly used to combat it, and the most strategies they used were a very simple breathing exercise they taught.

Finally, it seen logic to say that, application of nursing guideline is very important for patient undergoing MRI procedure based on the result of the present study, which indicated applicability of patient to improve knowledge and anxiety scale.

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