

Research Article

Knowledge Attitude and Practice (KAP) and Health Impacts of MRI Among the Patients Attending MRI in Dhaka City

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Abstract

Introduction: Magnetic resonance imaging (MRI) is an important diagnostic method in modern clinical medicine. Patients' knowledge about MRI is of utmost importance for optimizing the workflow, safety, and patient comfort and saving valuable time for the MRI department. **Objective:** The aim of this study was to investigate the knowledge, attitude and practice (KAP) and health impacts of Magnetic Resonance Imaging (MRI) among the patients attending in Dhaka city. **Methodology:** This was a cross-sectional prospective study carried out at the department of Radiology and Imaging in Islami Bank Central Hospital & Popular Diagnostic Center, Dhaka, Bangladesh during January, 2022 to June, 2022. A purposive random sampling technique was used and a total of 200 cases referred for MRI, from OPD, aged above 15 years were enrolled in this study. The collected data were analyzed using Statistical Package for Social Sciences (SPSS) software, version 23.0. The ethical clearance of this study was obtained from the Ethics Committee of School of Public Health & Life Science, University of South Asia, and Dhaka, Bangladesh. **Results:** A total of (n=200) cases referred for MRI, from OPD, aged above 15 years were enrolled in this study. The majority 85(42.5%) patients belonged to the age group (46-60) and followed by 72(36%), (36-45) years, 22(11%), (26-35) years, 13(6.5%), (15-25) years and 8(4%), >60 years. The maximum 132 (66%) patients were male and the minimum 68(34%) were female. The maximum, 61(30.5%) were graduate and followed by 50(25%) HSC, 30(15%) SSC, 21(10.5%) Primary and 6(3%) had no formal education. Among the study patients, 110(55%) had previous knowledge about MRI. 35(17.5%) patients had previous knowledge about the health effect of MRI. 74 (37%) patients had seen close contact of relative/family member to face MRI examination. 196(89%) patients opined conversation is very important before MRI examination. 177(88.5%) patients felt nervous to conduct MRI test and 92(46%) patients practiced MRI before. The maximum 110(55%) felt discomfort. 86(43%) patients opined MRI took long time. 100(50%) of the patients observed metal effect during MRI, 78(39%) patients had MRI phobia and the maximum 18(9%) patients had allergic reaction. **Conclusion:** This study investigated (55%) study patients had previous knowledge about MRI. (17.5%) patients had previous knowledge about the health effect of MRI. (37%) patients felt to have close contact of relative/family member is needed during MRI test, (89%) patients had positive attitude to conversation before MRI examination, 177(88.5%) patients felt nervous to conduct MRI test and (46%) patients practiced MRI. The major impact of MRI on health was discomfort and MRI phobia.

Keywords

Knowledge, Attitude, Practice, MRI, Impact, Health

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1. Introduction

Magnetic Resonance Imaging (MRI) has been in clinical use for diagnosis diseases. At the time of introduction of this important diagnostic tool, there were many concerns about its safety and the effects of the different types of magnetic fields utilized in MRI on the body tissues [1]. Magnetic Resonance Imaging (MRI) uses a powerful magnetic field in the body to produce detailed pictures of the inside in the body [2]. An MRI scan uses a large magnet, radio waves, and a computer to create a detailed, cross-sectional image of internal organs and structures. It is used to help diagnose variety of conditions within the chest, abdomen spine, brain and pelvis etc. [3]. Magnetic Resonance Imaging (MRI) is safe for human body and there are no harms. But patients are feel many problems & impact several effect in health. Patients feel uncomfortable due to enclosed spaces [4]. If a person have any metal inside their body, such as bullets, shrapnel, or other metallic foreign bodies unable for MRI examination [5]. Patients have sometimes used an injection of intravenous (IV) contrast liquid to improve the visibility of a particular tissue that is relevant to the scan. Sometime contrast has reaction like as itching, rash, nausea, vomiting etc. Patients have feel discomfort and others problems due to examination time & sound. MRI examination used long time & loud sound [6]. Some of the patients feel phobia, discomfort and various type of problem due to lack of knowledge for MRI examination [7]. When previous conversation patient with MRI technologist for inform to MRI examination, many problems reduced [8]. The patients who have done MRI examination previously may feel better than new patients who come for MRI examination [9]. The potential of magnetic resonance imaging (MRI) has long been realized for early detection, diagnosis and personalized treatment of diseases. However, there are very few studies and limited data source regarding the knowledge, attitude and practice and health effects of magnetic resonance imaging (MRI) among the people of city level of Bangladesh in the national data base. Therefore, the researcher has designed this study. The aim of this paper was to determine the knowledge, attitude, and practice (KAP) and health effects of magnetic resonance imaging (MRI) among the patients attending in a Tertiary Care Hospital, Dhaka, Bangladesh

2. Objectives

2.1. General Objective

To determine the knowledge, attitude and practice (KAP) and health impacts of Magnetic Resonance Imaging (MRI) among the patients attending in Dhaka city.

2.2. Specific Objectives

- 1) To determine the demographic characteristics of the study patients
- 2) To know the knowledge, attitude and practice of Magnetic Resonance Imaging (MRI) among the study patients
- 3) To determine the impacts of Magnetic Resonance Imaging (MRI) on the health of the study patients.

3. Methodology

This was a cross-sectional prospective study carried out at the department of Radiology and Imaging in Islami Bank Central Hospital & Popular Diagnostic Center, Dhaka, Bangladesh during January, 2022 to June, 2022. A purposive random sampling technique was used. The purpose, benefits, risks, entry and exit policy of this study was disclosed the study subjects. Then, written informed consent was obtained from the study subjects and a total of 200 cases referred for MRI, from OPD, aged above 15 years were enrolled in this study. All the study subjects went to MRI procedure. A standard protocol was used in MRI and the data were collected using a pre-structured Case Record Form (CRF). The collected data were cleaned, edited and entered into computer for analysis. The collected data were analyzed using Statistical Package for Social Sciences (SPSS) software, version 23.0. Inferential statistical analysis were performed and the results were presented as frequency and percentage in tables and charts. The ethical clearance of this study was obtained from the Ethics Committee of School of Public Health & Life Science, University of South Asia, and Dhaka, Bangladesh. A formal permission was also obtained from the Director and Registrar of Islami Bank Central Hospital & Popular Diagnostic Center, Dhaka, Bangladesh. The inclusion and exclusion criteria of this study were as follows:

3.1. Inclusion Criteria

- 1) OPD referred cases for MRI
- 2) Aged > 15 years
- 3) Willing to participate in the study

3.2. Exclusion Criteria

- 1) No referred cases
- 2) Aged < 15 years
- 3) Unwilling to participate in the study

4. Results

Table 1. Shows the age distribution of the study patients (n=200).

Age(Years)	Frequency	Percentage
15-25	13	6.5
26-35	22	11
36-45	72	36
46-60	85	42.5
>68	8	4

Table 1 shows the age distribution of the study patients. Among the patients, the majority 85(42.5%) belonged to the age group (46-60) and followed by 72(36%), (36-45) years, 22(11%), (26-35) years, 13(6.5%), (15-25) years and 8(4%), >60 years. p

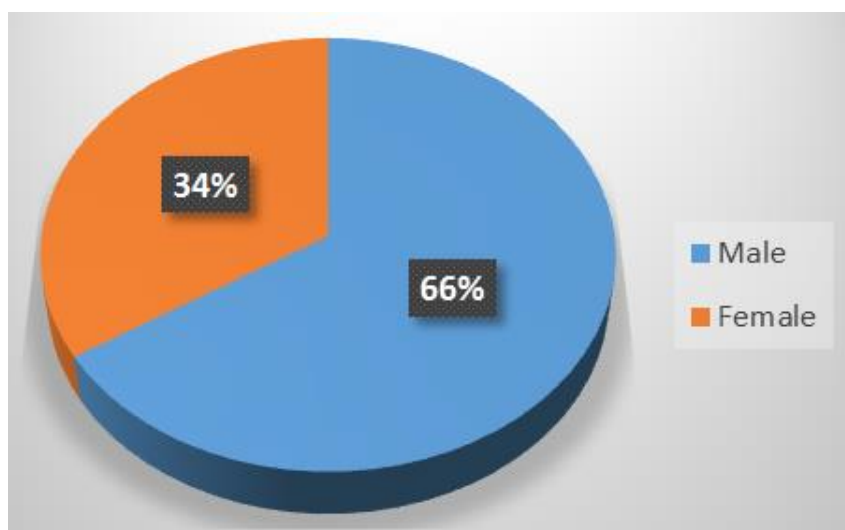


Figure 1. Shows the sex distribution of the study patients (n=200).

Figure 1 shows the sex distribution of the study patients. Among the study patients, the maximum 132 (66%) were male and the minimum 68(34%) were female.

Table 2. Shows the distribution of education level of the study patients (n=200).

Education Level	Frequency	Percentage
No formal education	6	3
Primary	21	10.5
SSC	30	15
HSC	50	25
Graduate	61	30.5
Masters	32	16

Table 2 shows the distribution of education level of the study patients. Among the study patients, the maximum, 61(30.5%) were graduate and followed by 50(25%) HSC, 30(15%) SSC, 21(10.5%) Primary and 6(3%) no formal education.

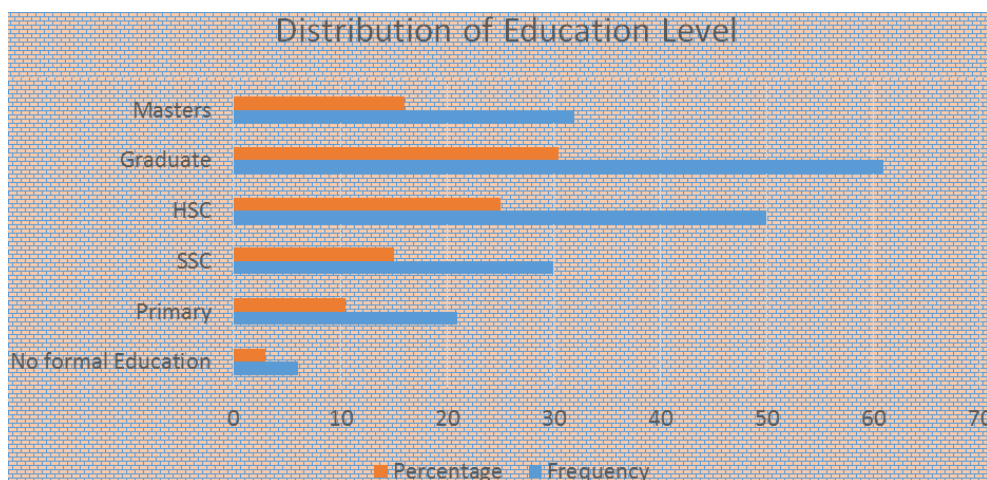


Figure 2. Shows the education level distribution of the study patients (n=200).

Table 3. Shows knowledge, attitude and practice of MRI of the study patients (n=200).

Knowledge, attitude and practice of MRI	Response	Frequency	Percentage	P-value
Previous knowledge about MRI	Yes	110	55	0.045
	No	90	45	
Previous knowledge about the health effects of MRI	Yes	35	17.5	<0.001
	No	165	82.5	
Have you seen any close contact of family member/ relative to face MRI examination?	Yes	74	37	<0.001
	No	126	63	
Conversation is very important before MRI examination	Yes	196	98	<0.001
	No	4	2	
Feeling nervous to conduct MRI	Yes	177	88.5	<0.001
	No	33	16.5	
Experiencing of MRI before	Yes	92	46	0.110
	No	108	54	

Table 3 shows knowledge, attitude and practice of MRI of the study patients. Among the study patients, 110(55%) had previous knowledge about MRI. 35(17.5%) patients had previous knowledge about the health effect of MRI. 74 (37%) patients have seen close contact of relative/family member is needed during MRI test. 196 (89%) patients opined conversation is very important before MRI examination. 177(88.5%) patients felt nervous to conduct MRI test. 92(46%) patients experienced MRI before to conduct this present one.

Table 4. Shows the attending of the study patients in MRI with various body parts (n=200).

Attending in MRI Test for	Frequency	Percentage
Spine	112	56
Brain	42	21
Joints	26	13

Attending in MRI Test for	Frequency	Percentage
Abdomen	8	4
Neck	4	2
Prostet	4	2
Brest.	4	2
Total	200	100

Table 4 shows the attending of the study patients in MRI with various body parts. Among the study patients, the majority 112(56%) had MRI of spine and followed by 42(21%) brain, 26(13%) joints, 8(4%) abdomen, 4(2%) neck, 4(2%) prostet, 4(2%) breast.

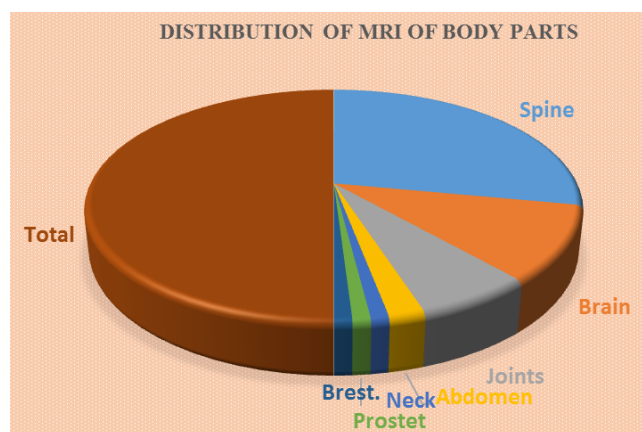


Figure 3. Shows the distribution of MRI of body parts of the study patients (n=200).

Table 5. Shows the impacts of MRI test on health of the study patients (n=200).

Impact of MRI on health	Frequency	Percentage
Sound impact on health:		
discomfort	110	55
Headache	16	8
Irritation	10	5
Dizziness	8	4
Time impact on health:		
Long time	86	43
Very long time	8	4
Medium	42	21
Short time	4	2
Metal effect on health	100	50

Impact of MRI on health	Frequency	Percentage
Problem faced during MRI		
phobia	78	39
claustrophobia	12	6
nausea	10	5
breathlessness	2	1
Reaction injected by MRI contrast		
Allergic reaction	18	9
HTN reaction	8	4
Skin rash	2	1

Table 5 shows the impacts of MRI test on health of the study patients. Regarding the sound impact of health, the maximum 110(55%) felt discomfort and followed by 16(8%) headache, 10(5%) irritation and 8(4%) dizziness. Regarding time impact of MRI on health, 86(43%) patients took long time and followed by 42(21%) medium time, 8(4%) very long time, 4(2%) short time. Regarding metal effect on health, the half, 100(50%) of the patients observed metal effect. Regarding problems faced by the patients during MRI, 78(39%) patients had MRI phobia, and followed by 12(6%) claustrophobia, 10(5%) nausea, 2(1%) breathlessness. Regarding injected by MRI contrast. The maximum patients 18(9%) had allergic reaction and followed by 8(4%) HTN, 2(1%) skin rash.

5. Discussion

Magnetic resonance imaging (MRI) is an important diagnostic method in modern clinical medicine. Patients' knowledge about MRI is of utmost importance for optimizing the workflow, safety, and patient comfort and saving valuable time for the MRI department. This study investigates patient knowledge levels regarding MRI safety before an MRI examination as well as the impacts of MRI on the patients' health. This present study was conducted among 200 patients at the department of Radiology & Imaging (MRI) in Islami Bank Central Hospital & Popular Diagnostic Center. A total of 200 referred cases for MRI from OPD randomly enrolled in this study. The aim of this study was to determine the knowledge, attitude and practice (KAP) and health impact of MRI among the patients attending in a tertiary care hospital in Dhaka city. The present study showed that the highest percentage 85(42.5%) of the study sample were in age group (46-60) years, while the lowest percentage 8(0%) of them belong to >68 years as shown in (Table 1). The present study showed that the highest percentage 66% of the study sample were male & 34% are Female. Regarding education level of the study patients, this study observed, the maximum, and

61(30.5%) were graduate and followed by 50(25%) HSC, 30(15%) SSC, 21(10.5%) Primary and 6(3%) no formal education (Table 2). These findings of our study are persistent with another study conducted in Saudi Arabia in 2022 by AM Dhafer et al, [10]. This present study observed Among the study patients, 110(55%) had previous knowledge about MRI. 35(17.5%) patients had previous knowledge about the health effect of MRI. 74 (37%) patients have seen close contact of relative/family member to face MRI examination. 196 (89%) patients opined conversation is very important before MRI examination. 177(88.5%) patients felt nervous to conduct MRI test. 92(46%) patients experienced MRI before to conduct this present one. A similar study was conducted by Alelyani M et al in 2021. In their study, they observed, the mean knowledge score regarding MRI safety was 0.29 ± 0.25 , which reflects poor knowledge, whereas the attitude score was 0.67 ± 0.20 , reflecting a moderately positive attitude. Awareness and attitude among patients improved as education levels increased. Finally, only 53.5% of the respondents were aware of the noise produced by the MRI scanner. The findings of this study are partially similar to this present study. Similar findings were also observed in some other studies. [11, 12]. This current study observed, the majority 112(56%) had MRI of spine and followed by 42(21%) brain, 26(13%) joints, 8(4%) abdomen, 4(2%) neck, 4(2%) prostet, 4(2%) breast and Regarding the sound impact of health, the maximum 110(55%) felt discomfort and followed by 16(8%) headache, 10(5%) irritation and 8(4%) dizziness. Regarding time impact of MRI on health, 86(43%) patients took long time and followed by 42(21%) medium time, 8(4%) very long time, 4(2%) short time. Regarding metal effect on health, the half, 100(50%) of the patients observed metal effect. Regarding problems faced by the patients during MRI, 78(39%) patients had MRI phobia, and followed by 12(6%) claustrophobia, 10(5%) nausea, 2(1%) breathlessness. Regarding injected by MRI contrast. The maximum patients 18(9%) had allergic reaction and followed by 8(4%) HTN, 2(1%) skin rash. Similar findings were also observed in some other studies [13-14]. Finally, this present study he study findings suggest that a complex combination of factors affects patient knowledge regarding MRI safety before an MRI examination. Hence, the hospital and radiological department must provide the patient with accurate information about MRI. The investigated findings of this present study will be a great use to the medical personnel as well as the patients and policy makers of Bangladesh.

6. Conclusion

This study investigated (55%) study patients had previous knowledge about MRI. (17.5%) patients had previous knowledge about the health effect of MRI.(37%) patients have seen close contact of relative/family member to face MRI examination,(89%) patients had positive attitude to conversation before MRI examination, 177(88.5%) patients felt nervous to conduct MRI test and (46%) patients practiced

MRI. The major impacts of MRI on health were discomfort and MRI phobia.

7. Limitations of the Study

This was a dual center study with a purposive random sample size within a short study period. Therefore, the results of this study may not represent the whole country.

8. Recommendations

A multi-center study may be conducted with a large statistical sample size all over the country to justify, the results of this study. At the same time, the health personnel should disclose the impacts of MRI on health to the parties who had not practiced MRI before.

Ethical Approval

The ethical clearance of this study was obtained from the Ethics Committee of School of Public Health & Life Science, University of South Asia, and Dhaka, Bangladesh.

Conflicts of Interest

The authors declare no conflicts of interest.

References

- [1] Duru FLR, Scheidegger MB, Lüscher TF, Boesiger P, Candinas R. Pacing in magnetic resonance imaging environment: clinical and technical considerations on compatibility. *Eur Heart J*. 2001; 22(2): 113–124. <https://doi.org/10.1053/euhj.2000.2149>
- [2] Kanal EBA, Bell C, Borgstede JP, et al. ACR Guidance Document for Safe MR Practices: 2007. *Am j Roentgenol*. 2007; 188(6): 1447–1474. <https://doi.org/10.2214/AJR.06.1616>
- [3] Briggs J. Knowledge Retention from Pre-operative Patient Information. *Best Practice*. 2000; 4(6): 1–6. [Google Scholar]
- [4] De Wilde JP, Grainger D, Price DL, Renaud C. Magnetic resonance imaging safety issues including an analysis of recorded incidents within the UK. *Prog Nucl Magn Reson Spectrosc*. 2007; 51(1): 37–48. <https://doi.org/10.1016/j.pnmrs.2007.01.003>
- [5] Sammet S. SUEE02: Introduction to a Comprehensive MR Safety Course for Medical Students. *Medical Physics*. 2013 Jun; 40(6Part4): 117.
- [6] Ajam AA, Tahir S, Makary MS, et al. Communication and team interactions to improve patient experiences, quality of care, and throughput in MRI. *Top Magn Reson Imaging*. 2020; 29(3): 131–134. <https://doi.org/10.1097/RMR.0000000000000242>

- [7] Laidlaw SH. Patients with multiple sclerosis: their experiences and perceptions of the MRI investigation. *J Diagnostic Radiography Imaging*. 2003; 5(1): 19–25. <https://doi.org/10.1017/S146047280300004X>
- [8] Reynolds F, Kelly KA. *Mol Imaging*. 2011; 26 online. [Google Scholar]
- [9] Alahmari DM, Alsahli FM, Alghamdi SA, Alomair OI, Alghamdi A, Alsaadi MJ. Assessment of Patient Knowledge Level Towards MRI Safety Before the Scanning in Saudi Arabia. *Int J Gen Med*. 2022 Jul 28; 15: 6289-6299. PMID: 35924179; PMCID: PMC9342873. <https://doi.org/10.2147/IJGM.S368652>
- [10] Alelyani M, Gameraddin M, Alasmari A, Alshahrani F, Alqahtani N, Musa A. Patients' perceptions and attitude towards MRI safety in Asir Region, Saudi Arabia. *Patient Preference Adherence*. 2021 May 21; 15: 1075-1081. PMID: 34054293; PMCID: PMC8149308. <https://doi.org/10.2147/PPA.S309186>
- [11] Zhang, Zhitong Zou, Ronald B. Staron., Paula W. Brill 'Incidence of Immediate Gadolinium Contrast Media Reactions. *American Journal of Roentgenology*, 2011. Volume 196, Issue 2. <https://doi.org/10.2214/AJR.10.4885>
- [12] Sammet S, Sammet CL. Implementation of a comprehensive MR safety course for medical students. *Journal of Magnetic Resonance Imaging*. 2015 Dec; 42(6): 1478-86.
- [13] Smart JM, Burling D. Radiology, and the Internet: a Systematic Review of Patient Information Resources. *Clin Radiol*. 2001; 56(11): 867–870. <https://doi.org/10.1053/crad.2001.0738>
- [14]