EFFECTIVENESS AND USAGE OF WRITTEN AND VERBAL COUNSELLING INFORMATION ON ANXIETY IN MRI AT A TERTIARY CARE HOSPITAL IN CHENNAI

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Abstract Background:
Magnetic resonance imaging (MRI) causes severe anxiety in many patients. Anxiety during MRI leads to prolongation of the procedure and deterioration of image quality, resulting in loss of labor and increase in cost. Objective:
The Objective of this study was to investigate the effect of written and verbal information on state anxiety in patients undergoing MRI. Material and Methods: A cross-sectional prospective study was conducted with 300 participants. The study was carried out between March 2022 and April 2022 at the Radiology Department of the tertiary care hospital. The participants were divided into 3 groups as group 1 (control group), group 2 (written information) and group 3 (verbal counselling information). The trait anxiety and state anxiety of the participants were measured by State-Trait Anxiety Inventory (STAI) inventory, which can measure anxiety status.
Results: The trait anxiety scores of all three groups did not differ statistically (p = 0.20) from demographic variables. Group 3's state anxiety levels were statistically lower than those of groups 2 and the control group (p 0.001) (p 0.001). In comparison to the control group, group 2's state anxiety levels were statistically lower (p 0.001).
Conclusion: Verbal and written information can help to lessen MRI anxiety. Written information may not be as good at lowering MRI anxiety as verbal information.
Key Words: anxiety; MRI; Magnetic resonance imaging

Introduction:
The most significant medical advancement in the previous 25 years has been deemed magnetic resonance imaging (MRI). The issue of anxiety in MRI patients and other claustrophobia-related symptoms has gotten worse and worse along with the rising frequency of diagnostics.
Due to its recent high prevalence, anxiety is a significant health issue. Anxiety can lead to stress, lack of focus and attention, learning difficulties, an increased risk of mistakes in work and actions, a decline in interpersonal relations, and a drop in work efficiency. Adding to these negative effects of anxiety on daily routines of people, it also affects human health negatively by paving the way for many diseases such as coronary problems. For this reason, healthcare professionals should protect patients from anxiety and stress as much as possible. Research shows that the prevalence of anxiety disorder or anxiety symptoms in the society is between 10–70%.

According to reports, being a patient, being admitted to the hospital, and being subjected to diagnostic and therapeutic procedures can all lead to stress and undesirable side effects like resentment, fear, and anxiety. MRI procedures are another thing that makes patients anxious. Anxiety in patients is known to be brought on by loud noise, pain phobia, the feeling of losing control, a lengthy examination, and the confined atmosphere of the MR tunnel. Magnetic resonance imaging (MRI) has become one of the most important diagnostic tools in many areas of medicine. Several studies have shown that MRI causes severe anxiety in 37% of patients, even those who state that they are not claustrophobic, and 5–10% cannot complete MRI due to claustrophobia.

Patients cannot provide effective cooperation since they feel “buried alive” “abandoned” and consequently, movement-induced artifacts cause deterioration of image quality and prolongation of processing time. To reduce anxiety during MRI, many approaches such as sedation, lying prone instead of supine, rehearsal with MRI simulator before MRI, relaxation exercises and information are recommended. Although all these approaches are valuable, sedation and lying prone may not be suitable for brain or spinal imaging.

The Objective of the study was to investigate the effect of written and verbal information on state anxiety in patients undergoing MRI.

2. Materials and Methods

2.1. Study Design and Population

This study was designed as a cross-sectional prospective. The study was carried out between March 2022 and May 2022 at the Radiology Department of the tertiary care hospital. Those who met the inclusion criteria were included in the study and written consent form was obtained from all participants.

The patients who underwent MRI for the first time were included in the study. The study inclusion criteria were as follows: (i) undergoing MRI for the first time (ii) being over 18 years old and (iii) undergoing thoracic or abdominal MR imaging.

On the other hand, the exclusion criteria were: (i) having psychiatric and neurological diseases that affect cognitive functions, (ii) having anxiety disorder, (iii) sedative drug or substance use, (iv) having claustrophobia, (v) illiteracy and (vi) undergoing MRI before.

2.2. Sample Size and Selection:

Patients scheduled for MRIs at the university hospital comprised the study's population. The formula \( n = \frac{t^2 \cdot p \cdot q}{d^2} \) was used to determine the appropriate sample size \( n \) for the investigation. The sample size was calculated to be 300 people because the prevalence of
anxiety was determined to be 30% during MRI. There were three participant groups intended for the study. Group 1 (control group), Group 2 (group given written information about MRI), and Group 3 were the study's intended groupings (Group with verbal counselling information about MRI). It was intended for each group to have at least 100 participants, taking into account the size of the sample.

The study included participants who requested an MRI and received an appointment date. The study did not accept any individuals who did not have an appointment. As a result, we had 300 volunteers overall and 100 patients in each group. Groups were formed by randomly dividing the participants.

The study's purpose was explained to group 1 participants, who were then requested to complete the demographic, State Anxiety Inventory (SAI), and Trait Anxiety Inventory (TAI) questionnaire. Written information brochures on MRI were prepared for the participants in group 2. After the participants were first informed about the study, written brochures were distributed to all participants in group 2. Participants were asked to read the brochures. After the participants read the brochures, all participants were asked to fill all questionnaire forms (socio-demographic, SAI and TAI forms) used in the study. Visual counselling information with the same content as written information form were communicated to the participants in group 3. Participants in group 3 were informed about the study. After the end of the verbal counselling, questionnaire forms (socio-demographic, SAI and TAI forms) were applied to the participants.

At the end of data collection, 6 participants who completed the questionnaire forms incompletely or incorrectly were excluded from the study. Finally, 294 participants were enrolled as Control group (group 1, n = 97), group 2 (Group with written information about MRI, n = 100) and group 3 (Group with verbal information about MRI, n = 97) All these procedures were performed in the waiting room before MRI.

2.3. Data Collection Tools
State-Trait Anxiety Inventory (STAI) and a structured questionnaire (created as a consequence of a review of the literature) were used to gather research data. Forms for the State-Trait Anxiety Inventory (STAI) and demographics (including sex, age, education, and marital status) were distributed to each participant. Each subdivision's score can range from 20 to 80, and higher numbers indicate greater worry. All participants completed the STAI form in English, the language of the region. In its initial research, STAI demonstrated validity and reliability.8

2.4. Information Method
Clinical personnel provided all patients with the standard radiology clinic information protocol before their MRI. Except for the regular radiology clinic procedure, written pamphlets and verbal counselling sessions were created to inform the attendees. The textual information booklet and the verbal counselling session shared a similar amount of educational information. It included details like the MRI, rules to be taken into account, how long it lasted, what the personnel did during the MR imaging procedure, whether there was pain, and whether there
was sound in both situations. Information was given by the same researcher during the study, and consisted of standard messages in both of the information methods:
- MRI is a safe and painless method even if they are in a closed tunnel.
- The officials are watching the patients from outside.
- You will hear sound during the procedure, but this sound can be heard routinely during MRI (This is the usual situation and is not dangerous).
- MRI will take about 20 min.

2.5. Statistical Analysis
Statistical analysis of the data was performed by IBM SPSS 22 statistics package program. Shapiro-Wilk test was used to determine whether the data showed normal distribution. Descriptive statistics of the data were expressed as mean ± standard deviation for variables with normal distribution in continuous data, (median (minimum: maximum)) for non-normal distribution variables, and frequency for categorical variables as percentage (n (%)). In comparison of more than two independent groups, One-Way ANOVA and LSD test for post-Hoc test were used for normal distributed continuous data, Kruskal Wallis test and Dunn test for post-Hoc test for non-normal distributed continuous data.

Pearson chi-square test was used to analyze categorical data. Significance level was $\alpha = 0.05$. Statistically significant significance values are indicated in bold in the tables.

3. Results
There were 294 patients enrolled in the study. One hundred of them in the written informed group (group 2), 97 of them in the verbally informed group (group 3) and 97 were control patients (group 1). The mean age of the participants included in the study was 42.99 ± 3.44 years. 50.7% (n = 149) of the participants were female and 49.3% (n = 49.3) were male. When the 3 groups were compared in terms of age, gender, marital status, education level, and chronic disease status, there was no statistically significant difference between demographic characteristics of 3 groups (Table 3)

### Sociodemographic characteristics of patients.

<table>
<thead>
<tr>
<th>Group 1n (%)</th>
<th>Group 2n (%)</th>
<th>Group 3n (%)</th>
<th>Total N (%)</th>
<th>PValue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 40.00 (21–75)</td>
<td>41.00 (18–70)</td>
<td>40.00 (18–75)</td>
<td>42.00 (18–75)</td>
<td>KW: $p = 0.52$</td>
</tr>
<tr>
<td>Male 4 (32.4 7 )</td>
<td>5 (35.2 1 )</td>
<td>4 (32.4 7 )</td>
<td>14 (49.3 5 )</td>
<td>$\chi^2$: 0.17 $p = 0.92$</td>
</tr>
<tr>
<td>Female 5 (33.6 0 )</td>
<td>4 (32.9 9 )</td>
<td>5 (33.6 0 )</td>
<td>14 (50.7 9 )</td>
<td></td>
</tr>
</tbody>
</table>
First, the trait anxiety states of each participant in the study were assessed. The participants' trait anxiety scores were as follows: group 1: 42.63 ± 7.87; group 2: 44.46 ± 6.89; and group 3: 44.07 ± 7.70. The trait anxiety scores of the individuals in all 3 groups did not differ statistically significantly from one another (p = 0.20).

Table 2

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>8 (35.0)</th>
<th>8 (35.0)</th>
<th>7 (30.0)</th>
<th>23 (80.6)</th>
<th>χ²: 5.30 p = 0.07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single/divorced</td>
<td>1 (24.6)</td>
<td>1 (29.8)</td>
<td>2 (45.6)</td>
<td>57 (19.4)</td>
<td></td>
</tr>
<tr>
<td>Income level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sufficient</td>
<td>7 (31.0)</td>
<td>9 (36.1)</td>
<td>8 (32.9)</td>
<td>25 (86.7)</td>
<td></td>
</tr>
<tr>
<td>Insufficient</td>
<td>1 (42.9)</td>
<td>5 (17.9)</td>
<td>1 (39.3)</td>
<td>28 (9.5)</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>6 (54.5)</td>
<td>3 (27.3)</td>
<td>2 (18.2)</td>
<td>11 (3.7)</td>
<td></td>
</tr>
<tr>
<td>Elementary school</td>
<td>4 (35.2)</td>
<td>4 (35.2)</td>
<td>3 (29.6)</td>
<td>12 (42.5)</td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>5 (31.4)</td>
<td>5 (33.1)</td>
<td>6 (35.5)</td>
<td>95 (32.3)</td>
<td></td>
</tr>
<tr>
<td>College</td>
<td>28</td>
<td>23</td>
<td>23</td>
<td>74 (25.2)</td>
<td></td>
</tr>
<tr>
<td>Chronic disease</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have</td>
<td>4 (33.9)</td>
<td>4 (33.9)</td>
<td>3 (32.2)</td>
<td>11 (40.1)</td>
<td></td>
</tr>
<tr>
<td>Have not</td>
<td>5 (32.4)</td>
<td>6 (34.1)</td>
<td>5 (33.5)</td>
<td>17 (59.9)</td>
<td></td>
</tr>
</tbody>
</table>

n: number, %: percent, * Kruskal Wallis test statistic (KW), **Pearson Chi-square test statistic (χ²).
All participants' state anxiety levels were assessed before receiving written or verbal information in the case group and after receiving no information in the control group. Group 1 had a state anxiety score of 56.00 (30.0-74.0), group 2 had a score of 44.00 (30.0-62.0), and group 3 had a score of 34.00 (20.0-60.07), respectively. Between the three participant groups, there was a statistically significant difference in the state anxiety score (p 0.001). Participants who received written and verbal information had lower state anxiety scores than those who did not (p 0.001). Individuals who received verbal information reported lower levels of state anxiety than participants who received written information (p 0.001). (Table 3).

Table 3
State anxiety scores of participants.

<table>
<thead>
<tr>
<th>Groups</th>
<th>$p$ Value *</th>
<th>$p$ Value **</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td></td>
<td>F = 1.071–3: 0.09 ***</td>
</tr>
<tr>
<td>Group 2</td>
<td>F = 1.61 p=0.20</td>
<td>F = 1.081–3: 0.18 ***</td>
</tr>
<tr>
<td>Group 3</td>
<td></td>
<td>F = 1.072–3: 0.72 ***</td>
</tr>
</tbody>
</table>

* multiple comparison p value, ** binary comparison p value, *** One-Way ANOVA test statistic.

4. Discussion
This study looked at how textual and verbal information affected MRI-related anxiety. State Anxiety Inventory was used to gauge participants' feelings of anxiety during the MRI (SAI). Participants in both study groups received information in the form of customary messages. For the participants in the control group, no information was provided.
Anxiety in patients is a result of MRI and BT testing, according to earlier studies. Numerous medical professionals concur that anxiety during an MRI results in movement artefacts and insufficient processing. The diagnostic utility of MRI is reduced by prolonged and repeated MRI procedures, which also worsen image quality. As a result, artefacts will hinder the effectiveness of MRI, wasting important time for staff and equipment and raising expenses. With our interventions, we sought to lessen the fear experienced during the MRI in this situation.

According to the current study, receiving written and verbal information during an MRI helped patients feel less anxious. The group's anxiety level was shown to have decreased when Gray et al. distributed informational booklets to the individuals who would undergo MRI [11].

Similarly, it has been demonstrated in two independent trials that providing patients with written information prior to a gastroscopy reduces their anxiety. In our investigation, it was discovered that the group receiving written brochures had lower anxiety scores than the control group. In this regard, our findings concur with the research's conclusions. As a result, providing written information to patients before to an MRI can help them feel less anxious.

Our study also sought to determine how verbal information affects anxiety. Verbal information was found to lessen anxiety in two studies that looked at how it affected anxiety during MRIs. The SAI scores of the group that received verbal information were significantly lower than those of the control group, according to Acay et al. [12] Tazegul et al. evaluated participants' SAI and cortisol levels to examine how verbal information affected anxiety during MRI. According to Tazegul et al., the verbal information group had considerably lower cortisol levels and SAI scores than the control group. The anxiety level of the group receiving verbal information was also found to be statistically lower than that of the control group in our investigation. Informing patients about MRIs before to them may lessen their anxiety states, according to research in the literature and our findings. Individual textual and verbal information's impact on anxiety during MRI was stressed in earlier investigations. State anxiety levels were shown to be statistically lower for the group that received verbal information in the current study than for the group that received written information. We can conclude that verbal information is more successful in lowering state anxiety prior to MRI in addition to the results in the literature. We believe that our study is the first to combine written and verbal data.

5. Conclusions
In conclusion, anxiety during MRI can be reduced by both written and verbal information. Verbal counselling information was found to be more effective in reducing anxiety before MRI than written information. By applying cheap and easy information methods, we can perform more effective MRI so that we can reduce both labor loss and costs.

REFERENCES
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