



Exploring Anxiety and Claustrophobia in MRI Scans: A Qualitative Investigation of Patient Experiences

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(Received: 16 March 2025

Revised: 20 April 2025

Accepted: 15 June 2025)

KEYWORDS

MRI,
Claustrophobia,
Anxiety, Qualitative
Study

ABSTRACT:

Background: Claustrophobia is a common issue affecting patients undergoing Magnetic Resonance Imaging (MRI) scans, leading to anxiety and discomfort. This study aimed to investigate the experiences of patients undergoing MRI scans and identify strategies to reduce claustrophobia.

Methods: A qualitative research design was employed, utilizing in-depth interviews with 28 patients who had undergone MRI scans at a diagnostic center. A purposive sampling approach was used to select participants with diverse demographic characteristics. Data was collected using semi-structured interview schedules and analyzed using thematic analysis.

Results: The study's findings revealed a significant prevalence of claustrophobia among patients undergoing MRI scans, with many participants reporting anxiety or discomfort. The primary causes of claustrophobia were the enclosed space and noise of the MRI machine. Strategies to reduce claustrophobia included using open MRI machines, providing friendly support and encouragement from staff, and offering relaxation techniques.

Conclusion: The study's findings highlight the importance of addressing claustrophobia and discomfort during MRI scans. By understanding the causes and consequences of claustrophobia, healthcare providers can develop strategies to improve the patient experience and reduce anxiety. The study's results have implications for practice, suggesting that patient-centered care and tailored interventions can help alleviate claustrophobia and improve patient outcomes.



Introduction

Magnetic Resonance Imaging (MRI) is a widely used diagnostic tool. However, many patients experience anxiety during MRI scans due to various factors such as enclosed space, loud noise, and uncertainty about the procedure (Wen et al., 2022). This anxiety can affect the quality of images, patient acceptance, and overall healthcare experience. Understanding the causes of anxiety and exploring effective interventions is crucial to improve patient care.

Research has shown that claustrophobia can hinder patient experience and image quality, emphasizing the need to understand claustrophobic patients' experiences to tailor interventions and improve health outcomes (Lawal et al., 2023). MRI anxiety can lead to incomplete examinations, motion artifacts, and misinterpretation, with factors such as loud machine noise, closed tunnel, and fear of the unknown contributing to anxiety (Alghamdi et al., 2022). Despite advancements in MRI technology, patient anxiety and discomfort remain a significant concern (Alvarez et al., 2024), potentially causing adverse reactions before, during, or after the examination.

Understanding the causes and effects of anxiety in MRI patients is crucial for providing effective care and improving the scanning experience (Almutlaq, 2018). Various strategies have been implemented to address MRI-related anxiety, including child life programs, preparatory manuals, and virtual reality (VR) interventions (Stunden et al., 2021). VR technology, in particular, has shown promise in providing a gradual and guided introduction to the MRI examination process (Liszio et al., 2020).

While existing research has explored MRI-related anxiety, there is a notable gap in the qualitative exploration of patients' experiences and the nuanced understanding of the factors that contribute to anxiety in this population. This study aims to address this gap by undertaking an in-depth exploration of the experiences of anxiety in patients undergoing MRI scans and identifying the associated factors that contribute to this anxiety.

The primary objectives of this study are:

To gain an in-depth understanding of the experiences of anxiety in patients undergoing MRI scans, including the emotional, cognitive, and behavioral aspects of anxiety.

To identify the factors that contribute to MRI-related anxiety, including patient-related, procedure-related, and environmental factors.

By employing a qualitative approach, this study aims to provide rich, contextual insights into the anxiety experiences of MRI patients, ultimately contributing to the development of targeted interventions and strategies that enhance patient care and outcomes.

Methods

Study Design

This study employed a qualitative research design, utilizing in-depth interviews to gather comprehensive insights into the experiences of anxiety in patients undergoing Magnetic Resonance Imaging (MRI) scans. The qualitative approach allowed for an in-depth exploration of participants' subjective experiences, providing a rich and nuanced understanding of the phenomenon under investigation.

Participants

The study involved patients who had undergone MRI scans at a diagnostic center. A total of 28 patients participated in in-depth interviews. The sample size was determined by the principle of data saturation, where data collection continued until no new themes or insights emerged from the interviews.

Sampling Strategy

A purposive sampling approach was used to select participants who had undergone MRI scans and were willing to share their experiences. This approach allowed for the selection of participants with diverse demographic characteristics, including age, gender, marital status, education, and occupation. The purposive sampling strategy enabled the researcher to capture a wide range of experiences and perspectives, enhancing the study's validity and generalizability.



Data Collection

Data was collected using semi-structured interview schedules. The interview guide consisted of open-ended questions focusing on patients' experiences of anxiety during MRI scans. The questions were designed to be flexible and adaptable to the individual experiences of each participant. The interviews were conducted in a manner that allowed participants to freely express their thoughts and feelings, providing rich and detailed data. The interviewer used probing techniques to gather more information and clarify participants' responses, ensuring that the data collected was comprehensive and meaningful.

Procedure

The study procedure involved recruiting patients who had undergone MRI scans at a diagnostic center using a purposive sampling approach. Potential participants were approached and informed about the study's purpose, methodology, and potential benefits. Those who expressed willingness to participate were provided with detailed information about the study, and informed consent was obtained. Participants then took part in in-depth interviews, which were guided by a semi-structured interview schedule consisting of open-ended questions focusing on their experiences of anxiety during MRI scans. The interviews were conducted in a comfortable and private setting, allowing participants to share their experiences freely. A total of 20 patients participated in the interviews, which were audio-recorded with their consent to ensure accurate capture of their responses. The recorded interviews were then transcribed verbatim, and the transcripts were reviewed for accuracy. The data was subsequently analyzed using a qualitative analysis approach to identify patterns, themes, and meanings related to anxiety experiences during MRI scans.

Data Analysis

Qualitative data was analyzed using Braun and Clarke's (2006) thematic analysis framework. The analysis involved:

1. Transcription: Audio recordings of interviews were transcribed verbatim.

2. Familiarization: Multiple readings of transcripts were conducted to ensure familiarization with the data.

3. Initial Coding: Initial codes were generated based on interview probes.

4. Theme Identification: Broader categories were identified, and codes were grouped into relevant themes.

Trustworthiness

Several measures were taken to ensure the trustworthiness of the findings:

1. Cross-Verification: Codes and themes were cross-verified with the study supervisor to ensure credibility and validity.

2. Standardized Procedures: Data collection procedures were standardized to minimize bias.

Ethical Considerations

Written informed consent was obtained from all individual participants.

Results

Sample Characteristics

The study sample consisted of 28 participants who had undergone MRI scans at a diagnostic center. The demographic characteristics of the sample are presented below, providing insight into the age, gender, marital status, education, and occupation of the participants.

The age distribution of the study sample is presented in Table 1. The results show a diverse range of participants, with ages spanning from 17 to 67 years. The majority of participants (57.1%) are between 32 and 55 years old, with 14.3% of participants in each of the 32, 55, and 60 age groups. The median age appears to be around 32-55 years, indicating a relatively middle-aged sample.



Table 1. Frequencies as per Age

Age	Counts	% of Total	Cumulative %
53	1	3.60%	3.60%
32	4	14.30%	17.90%
60	4	14.30%	32.10%
55	4	14.30%	46.40%
25	2	7.10%	53.60%
67	1	3.60%	57.10%
17	1	3.60%	60.70%
23	2	7.10%	67.90%
19	1	3.60%	71.40%
65	1	3.60%	75.00%
63	1	3.60%	78.60%
37	1	3.60%	82.10%
35	1	3.60%	85.70%
33	1	3.60%	89.30%
30	1	3.60%	92.90%
29	1	3.60%	96.40%
28	1	3.60%	100.00%

The study sample consists of more males (71.4%) than females (28.6%), indicating a gender imbalance in the sample (Table 2). This may be due to various factors, such as sampling bias or differences in willingness to participate.

Table 2. Frequencies of Gender

Gender	Counts	% of Total	Cumulative %
Male	20	71.40%	71.40%
Female	8	28.60%	100.00%

The majority of participants (67.9%) are married, while 28.6% are unmarried, and a small percentage (3.6%) are widowed (Table 3). This suggests that the sample is predominantly composed of individuals with family responsibilities.

Table 3. Frequencies of Marital Status

Marital Status	Counts	% of Total	Cumulative %
Married	19	67.90%	67.90%
Unmarried	8	28.60%	96.40%
Widow	1	3.60%	100.00%

The educational background of the participants varies, with the majority (57.1%) being graduates (Table 4). Additionally, 10.7% of participants have completed 10th grade, 10.7% have completed 12th grade, and 3.6% have completed postgraduate studies. This suggests that the sample has a relatively high level of educational attainment.

Table 4. Frequencies of Education

Education	Counts	% of Total	Cumulative %
10 th	3	10.70%	10.70%
Graduate	16	57.10%	67.90%
8 th	2	7.10%	75.00%



5 th	3	10.70%	85.70%
Postgraduate	1	3.60%	89.30%
12 th	3	10.70%	100.00%

The occupational distribution of the participants shows a diverse range of professions (Table 5), including students (28.6%), retired individuals (17.9%), farmers (14.3%), and housewives (7.1%). Other occupations represented in the sample include teaching, engineering, nursing, and office staff. This diversity suggests that the sample is representative of various occupational groups.

Table 5. Frequencies of Occupation

Occupation	Counts	% of Total	Cumulative %
Security	1	3.60%	3.60%
Housewife	2	7.10%	10.70%
Retired	5	17.90%	28.60%
Farmer	4	14.30%	42.90%
Teacher	2	7.10%	50.00%
Engineer	1	3.60%	53.60%
Student	8	28.60%	82.10%
Staff	2	7.10%	89.30%
Office staff	1	3.60%	92.90%
Nurse	1	3.60%	96.40%
Self-employed	1	3.60%	100.00%

Results of Qualitative Analysis

The thematic analysis of the qualitative data revealed several key themes related to the experience of undergoing an MRI scan. The results are presented

below, along with interpretations and quotes from participants.

Procedure

The majority of participants reported experiencing claustrophobia during the MRI scan, with varying levels of severity. Claustrophobia is a type of anxiety disorder that involves a fear of enclosed or small spaces. In the context of MRI scans, claustrophobia can manifest in different ways, including:

- Feeling trapped or confined
- Panic or anxiety
- Discomfort or unease
- Fear of being in a small space
- Difficulty breathing or feeling suffocated

The procedures that seemed to alleviate anxiety included open MRI machines, noise reduction measures, and support from staff.

Claustrophobia Severity

The severity of claustrophobia experienced by participants varied, with some reporting mild discomfort and others experiencing severe anxiety. Participants who underwent open MRI scans reported reduced claustrophobia severity compared to those who underwent traditional closed MRI scans.

Discomfort Cause

The primary causes of discomfort reported by participants were:

- The enclosed space of the MRI machine
- The noise of the machine
- Vibration
- Feeling trapped or confined

Symptoms of Claustrophobia

Participants reported experiencing a range of symptoms during the MRI scan, including:



- Anxiety or panic
- Rapid heartbeat or palpitations
- Sweating or trembling
- Nausea or dizziness
- Feeling of suffocation or difficulty breathing

Suggestions

Participants provided several suggestions to improve the MRI experience, including:

- Using open MRI machines or noise-reducing measures
- Providing friendly support and encouragement from staff
- Offering soothing music or comfort talk during the scan
- Ensuring better lighting and patient preparation
- Providing calm instructions and relaxation techniques

The results suggest that addressing claustrophobia and discomfort during MRI scans is crucial to improving the patient experience. By implementing measures such as open MRI machines, noise reduction, and staff support, healthcare providers can reduce anxiety and make the experience more comfortable for patients.

The thematic analysis revealed that participants' experiences were influenced by various factors, including the MRI machine's design, staff support, and individual differences in anxiety levels. The findings highlight the importance of tailoring the MRI experience to individual needs and preferences.

Overall, the results provide valuable insights into the experiences of patients undergoing MRI scans and suggest potential strategies for improving the experience. By prioritizing patient-centered care and addressing claustrophobia and discomfort, healthcare providers can enhance the quality of care and improve patient outcomes.

Discussion

The study's findings reveal a significant prevalence of claustrophobia among patients undergoing MRI scans, with many participants reporting anxiety or discomfort. This is consistent with existing literature, which highlights claustrophobia as a common issue in MRI settings.

Previous studies have explored the causes and consequences of claustrophobia in MRI patients. For example, Lawal (2023) used a qualitative descriptive approach to investigate the experiences of claustrophobic patients undergoing MRI scans. The study identified four key themes: examination preparation, information provision, coping mechanisms, and MR scanner design. Participants reported that the confined space in the MRI scanner bore was a primary contributor to their anxiety. However, many believed that advance preparation, such as being shown the MRI scanner and understanding the procedure, would help alleviate their anxiety.

Dewey (2007) conducted a large-scale cohort study in an outpatient setting, enrolling over 55,000 patients referred for MRI scans. The study compared the rates of claustrophobic reactions between conventional and newer MR scanners with reduced acoustic noise and a short bore. The results showed that the rate of claustrophobic reactions was significantly lower with the newer scanner (0.7%) compared to the conventional scanner (2.1%). Female and middle-aged patients were more likely to experience claustrophobia.

These findings suggest that MRI scanner design and patient preparation are critical factors in reducing claustrophobia and anxiety in patients undergoing MRI scans. By understanding the causes and consequences of claustrophobia, healthcare providers can develop strategies to improve the patient experience and reduce anxiety.

The enclosed space and noise of the MRI machine were identified as primary causes of claustrophobia, which is in line with previous research. These findings underscore the need for healthcare providers to address claustrophobia and discomfort during MRI scans.

One of the key findings of this study was that participants who underwent open MRI scans reported reduced



claustrophobia severity compared to those who underwent traditional closed MRI scans. This suggests that using open MRI machines or wide bore MRI scans can be an effective strategy for managing claustrophobia. Open MRI machines provide a more spacious and less confining environment, which can help reduce feelings of anxiety and discomfort. Additionally, the use of open MRI machines can improve patient outcomes by reducing the need for sedation or repeat scans.

In addition to the use of open MRI machines, other strategies were identified as helpful in managing claustrophobia. Providing friendly support and encouragement from staff, offering soothing music or comfort talk during the scan, and ensuring better lighting and patient preparation were all reported to be beneficial. These findings highlight the importance of patient-centered care and the need for healthcare providers to tailor the MRI experience to individual needs and preferences.

The study's results also emphasize the importance of effective communication between healthcare providers and patients. Patients who are well-informed about the MRI procedure and have their concerns addressed are more likely to feel comfortable and relaxed during the scan. MRI technicians play a crucial role in providing emotional support and guidance to patients experiencing claustrophobia. Therefore, training programs for MRI technicians should focus on developing their communication and patient care skills.

Implications

The findings of this study have implications for practice. Healthcare providers should prioritize patient-centered care by offering options for open MRI machines, sedation, and relaxation techniques. Patients should be empowered to make informed decisions about their care, and healthcare providers should work collaboratively with patients to develop personalized care plans. By providing patients with options and support, healthcare providers can reduce anxiety and make the experience more comfortable, leading to improved patient outcomes and increased satisfaction with care.

Future research directions

Future research directions should focus on investigating the effectiveness of different strategies for managing claustrophobia during MRI scans. This could include the use of virtual reality technology, music therapy, or other innovative approaches. Additionally, studies should explore the impact of claustrophobia on patient outcomes and healthcare utilization. By advancing our understanding of claustrophobia and its management, we can improve the care and experience of patients undergoing MRI scans.

Conclusion

In conclusion, the study's findings contribute to our understanding of claustrophobia and its impact on patients undergoing MRI scans. By prioritizing patient-centered care and addressing claustrophobia and discomfort, healthcare providers can improve the experience and outcomes of patients undergoing MRI scans. The use of open MRI machines, friendly support and encouragement from staff, and effective communication are all important strategies for managing claustrophobia. By implementing these strategies, healthcare providers can reduce anxiety and improve patient satisfaction, ultimately leading to better health outcomes.

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