
MRI Patients Anxiety: Can Technological Advances Influence Patient Experience?



MRI is generally well-tolerated, although it may induce physiological stress responses and anxiety in patients. Authors recently published in the [Journal of Magnetic Resonance Imaging](#), a systematic review with meta-analysis to investigate the psychological, physiological, and behavioural responses of patients to MRI, their evolution over time, and influencing factors. Can advancements in MRI technology eliminate anxiety in patients undergoing MRI and increase healthcare provider efficiency?

Anxiety events can decrease care efficiency and increase revenue loss

MRI is a widely used diagnostic imaging technique, with 145 MRI examinations per 1000 inhabitants in Germany in 2018. While generally well-tolerated, MRI can induce stress and anxiety in patients. Technological advancements, such as open MRI designs, aim to improve patient experience, although some studies question their effectiveness. Women tend to experience higher levels of anxiety during MRI scans, but there is no reported difference in physiological stress responses based on sex. Age's influence on MRI-related anxiety is inconclusive, with conflicting findings regarding its impact. Prone positioning of patients in MRI scanners may reduce anxiety, but recent research challenges this notion. Stress and anxiety not only affect patient experience but also impact healthcare providers' operational efficiency, leading to increased procedural times and revenue loss due to unexpected patient-related events like premature scan terminations. The study authors focused on providing a holistic overview on patients' psychological, physiological, and behavioural responses to MRI; assessing whether the patients' psychological, physiological, and behavioural responses to MRI have improved over time along with technological advancements; and investigating the impact of the following factors: Instruments used for assessment, sex, age, and positioning.

Meta-analysis methodology

The search resulted in 14,503 articles (1942 duplicates). During the initial screening, 12,439 articles were excluded. Full-texts were retrieved for 294 studies, of which 104 were included in the quality assessment. The methodological quality was sufficient for 56 studies. Of these, seven studies reported qualitative data exclusively, four studies did not report an outcome that could be included in meta-analysis, and one study that was originally included in meta-analyses had to be excluded from all analyses as all values exceeded the respective thresholds for outliers. Therefore, 44 studies were included in the quantitative review (N = 181,371 patients).

Faster and quieter MRI technology has limited impact on patient anxiety

Studies indicate that patients experience the highest levels of anxiety before MRI examinations, which tend to decrease afterward, though not significantly in some cases. Despite this decrease, average anxiety levels still exceed clinically relevant thresholds. However, the change in anxiety levels from pre- to post-MRI did not reach statistical significance in some analyses, possibly due to small changes or issues with statistical power and study heterogeneity. A notable finding is that almost 4% of patients were not willing to undergo MRI again. Furthermore, this level of anxiety and unwillingness to repeat MRI did not show improvement over the years, suggesting persistent issues in patient experience. The prevalence of Unexpected Patient-Related Events (UPEs) during MRI, such as no-shows, failed scans, sedation requirements, and motion artifacts, remains high, with no decrease over time. In fact, there was an increase in overall UPEs over time, possibly due to broader definitions of unexpected behaviours in newer studies.

Despite advancements making MRI quieter, faster, and less confining, they haven't significantly alleviated patient anxiety or improved procedural outcomes. This contrasts with previous reports suggesting that newer, more patient-friendly technologies would enhance the patient experience. Possible reasons for this discrepancy include underpowered analyses, limitations in directly comparing old and new MRI technologies due to missing scanner information, and the possibility that current technological advancements may not adequately address patient needs.

While prone positioning has been proposed to reduce anxiety in MRI, recent challenges to its efficacy and mixed findings in analyses suggest a need for reassessment. Similarly, age showed minor effects on MRI-related responses, with older patients having a higher need for sedation but

no significant moderation effect.

Paving the way for a better patient experience

The study acknowledges several limitations, such as small sample sizes, heterogeneity in study populations, and measurement variability, indicating a need for standardisation in outcome measurements and consideration of publication bias in future research. Future research should address various unanswered questions, including comparisons of patient responses to MRI with other phobias, the impact of contrast agents on patient responses, and the generalisation of findings to different regions and populations.

Efforts to improve patient experience beyond standard care are crucial, possibly through additional information provision, relaxation techniques, and staff training in communication. Direct interventions targeted at patients, simple as they may be, have shown value but are not consistently applied. Incorporating patient insights into MRI technology development and considering factors such as claustrophobia and sex differences are essential.

Despite technological advancements, patient anxiety levels and unexpected patient-related events during MRI have not decreased over time. Enhanced efforts to improve patient experience are warranted, possibly through tailored interventions and improved communication, to reduce the rates of unexpected behaviours and enhance overall scan quality and service efficiency.

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