REVIEW PAPER, REVIEW ARTICLE (PREGLEDNI RAD)

The Role of Radiologic Technologist Empathy in Reducing Patient Anxiety Reactions and the Occurrence of Claustrophobia During MRI Examinations

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DOI: https://doi.org/10.55378/rv.50.2.7

Abstract

Magnetic resonance imaging (MRI) is one of the most important diagnostic modalities in modern medicine, however for some patients it can be a psychologically demanding experience accompanied by anxiety and claustrophobic reactions. The aim of this study was to examine the association between an empathetic approach by radiologic technologists and the reduction of these reactions during MRI examinations, as well as to analyse the factors that shape patients' experience of the procedure. The study is based on a review and critical analysis of the available scientific and professional literature. The literature search was conducted in March 2026 using the PubMed and Scopus databases, while Google Scholar and ResearchGate were used to identify additional sources and access full-text articles. Of the 836 studies initially identified, 84 were included in the final analysis after removing duplicates and screening titles and abstracts, followed by full-text assessment. The reviewed studies indicate that anxiety during MRI examinations arises not only from the technical characteristics of the scanner but also from how patients understand and experience the procedure. A perceived loss of control, uncertainty, previous negative experiences, and limited communication during the examination were identified as particularly important factors. Clear communication, timely preparation, and an individualised, empathetic approach by radiologic technologists may enhance patients' sense of safety, improve cooperation, and alleviate anxiety. Such an approach does not replace technical expertise; rather, it complements it and contributes to a safer examination process and a more positive patient experience.

Keywords: anxiety; empathy; claustrophobia; magnetic resonance imaging; radiologic technologist

Introduction

In the radiologic technologist's daily practice, an MRI examination follows a precisely defined workflow, from safety screening and patient positioning to the acquisition of planned sequences and assessment of image quality. However, what is considered a routine and technically controlled procedure from a professional perspective may be an unfamiliar and psychologically demanding experience for the patient. Being inside the MRI scanner, exposure to intense noise, restricted movement, and the need to remain still for prolonged periods may contribute to feelings of insecurity and loss of control. In some patients, initial discomfort may develop into pronounced anxiety or a claustrophobic reaction, making it difficult or, in some cases, impossible to complete the examination. Furthermore, a patient's ability to tolerate the examination depends not only on the technical characteristics of the scanner but also on previous experiences, expectations, the reason for referral, and the patient's perception of their own ability to maintain control during the procedure (1 – 6). Anxiety does not necessarily arise only upon entering the MRI scanner. In some patients, it may already be present during the waiting or preparation period, particularly when they are concerned about the examination itself or its potential findings. Signs of anxiety are not always overt. Repeated questions, hesitant responses, tense posture, or sudden silence may indicate discomfort that can easily go unnoticed during a brief interaction. If such a reaction is not recognised in time, the patient may find it more difficult to maintain the required position, increasing the likelihood of artefacts, repeated sequences, or premature termination of the examination. An unpleasant experience may also affect the patient's willingness to undergo future imaging examinations (7 – 12). The role of the radiologic technologist therefore extends beyond

obtaining high-quality images to encompass how the patient experiences and tolerates the examination. A brief conversation before positioning provides an opportunity to assess what the patient knows about the examination, how they have tolerated previous imaging procedures, and whether there are any difficulties that may require adjustments to the preparation process (13 – 18). Clear and timely information can reduce uncertainty by helping patients understand what to expect during the examination, approximately how long it will take, and how they can communicate with the radiologic technologist. Effective communication therefore requires adapting the language, pace, and amount of information provided, particularly for patients with lower health literacy, language barriers, or specific communication needs (19 – 23). An empathetic approach in the MRI setting does not imply minimising the patient's fear or reassuring them that there is no reason to feel uncomfortable. Rather, its value lies in recognising how the patient experiences the procedure and adapting the approach to the patient's response while maintaining professional objectivity (24 – 27).

Aim of the study

The aim of this study was to examine the role of empathy, communication, and an individualised approach by radiologic technologists in alleviating anxiety and claustrophobic reactions during MRI examinations.

Participants and methods

This study was conducted as a review and critical analysis of scientific and professional literature on anxiety, claustrophobia, and patient experiences during MRI examinations, with particular emphasis on communication, empathy, and the professional approach of radiologic technologists. The literature search was conducted in March 2026 using the PubMed and Scopus electronic databases. PubMed was used as the primary database because it yielded a larger number of studies relevant to the topic, while Google Scholar and ResearchGate were used to identify additional literature and access full-text articles. Two predefined search strategies were applied in both databases. The first strategy included terms related to MRI examinations, anxiety, and patient support: MRI, Magnetic Resonance Imaging, claustrophobia, anxiety, communication, empathy, and patient support. The second strategy focused on radiologic technologists and their communication with patients: radiographer, radiologic technologist, communication, empathy, and patient interaction.

Studies published in English with full-text availability ("Open Access" or "Free Full Text") were included. No publication date restriction was applied in order to include all relevant studies related to the topic of this review.

Results

Using the "Open Access" filter and restricting the search to studies published in English, the first PubMed search strategy identified 434 studies. Following title screening, 289 studies were excluded, and a further 112 were excluded after abstract screening, resulting in 33 studies being included in the analysis. The second search strategy identified 221 studies. After removing 6 duplicates, 154 studies were excluded based on title screening and a further 31 following abstract screening, resulting in 30 studies being included in the analysis. The first Scopus search strategy identified 130 studies. After removing 16 duplicates, 93

Table 1. Factors Associated with Anxiety Levels During MRI Examinations

AUTHORS AND YEAR (REFERENCE NUMBER)	FACTOR	PSYCHOLOGICAL EFFECT	POTENTIAL CONSEQUENCE
Fakes, 2024. (7); Masalma et al., 2024. (8); Hudson et al., 2022. (11); Lawal et al., 2023. (12); Carlsson and Carlsson, 2013. (31); Evans et al., 2017. (42)	ENCLOSED SCANNER SPACE	DISCOMFORT AND A SENSE OF CONFINEMENT	CLAUSTROPHOBIC REACTIONS
Fakes, 2024. (7); Kang et al., 2024. (9); Lawal O. et al., 2023. (12); Glans et al., 2024. (51)	INTENSE NOISE	INCREASED TENSION	DIFFICULTY TOLERATING THE EXAMINATION
Masalma et al., 2024. (8); Kang et al., 2024. (9); Lawal et al., 2023. (12); Lei et al., 2025. (23); Carlsson and Carlsson, 2013. (31); Evans et al., 2017. (42)	PROLONGED IMMOBILITY	RESTLESSNESS AND FRUSTRATION	MOVEMENT DURING IMAGE ACQUISITION
Alghamdi, 2024. (3); Yakar and Pirinçci, 2020. (13); Hyde et al., 2018. (22); Lei et al., 2025. (23); Sosna, 2024. (55); Inhestern et al., 2024. (83)	INSUFFICIENT INFORMATION	UNCERTAINTY AND CONCERN	HIGHER LEVELS OF ANXIETY
Alamri, 2026. (4); Masalma et al., 2024. (8); Kamphuis et al., 2024. (24); Shah et al., 2025. (25); Carlsson and Carlsson, 2013. (31); Alsharif et al., 2026. (39)	UNCERTAINTY REGARDING THE RESULTS	PSYCHOLOGICAL DISTRESS	HEIGHTENED EMOTIONAL RESPONSE

Source: analysed studies.

Table 2. Methods for Reducing Anxiety During MRI Examinations

AUTHORS AND YEAR (REFERENCE NUMBER)	METHOD	MECHANISM OF ACTION	EFFECT
van Vuuren et al., 2021. (6); Hyde et al., 2018. (22); Santarém Semedo et al., 2020. (28); Carlsson and Carlsson, 2013. (31); Beardmore et al., 2024. (34); Newton-Hughes and Strudwick, 2023. (37)	CLEAR COMMUNICATION	EXPLANATION OF THE PROCEDURE	IMPROVED PATIENT COOPERATION
Alghamdi, 2024. (3); Yakar and Pirinçci, 2020. (13); Hyde et al., 2018. (22); Lei et al., 2025. (23); Sosna, 2024. (55); Inhestern et al., 2024. (83)	EDUCATIONAL PREPARATION	FAMILIARIZATION WITH THE EXAMINATION	REDUCED UNCERTAINTY
Oktay et al., 2025. (2); Castro et al., 2022. (16); Saron et al., 2023. (68); Festari et al., 2024. (70); Bonfitto et al., 2024. (80); Johnson et al., 2025. (82)	AUDIOVISUAL TECHNIQUES	DISTRACTION DURING IMAGE ACQUISITION	REDUCED STRESS
Oktay et al., 2025. (2); Stogiannos et al., 2022. (45); Stogiannos et al., 2023. (46); Festari et al., 2024. (70); Bonfitto et al., 2024. (80); Johnson et al., 2025. (82)	VIRTUAL REALITY	SIMULATION OF THE EXAMINATION	REDUCED FEAR
Castro et al., 2022. (16); Makanjee et al., 2021. (27); Carlsson and Carlsson, 2013. (31); Lawal et al., 2024. (32); Stogiannos et al., 2022. (45); Stogiannos et al., 2023. (46)	INDIVIDUALIZED APPROACH	ADAPTATION TO THE PATIENT	IMPROVED TOLERANCE OF THE EXAMINATION
Marshall et al., 2007. (15); Castro et al., 2022. (16); Stogiannos et al., 2022. (45); Stogiannos et al., 2023. (46); Oktay et al., 2025. (2); Johnson et al., 2025. (82)	SEDATION/ANESTHESIA	PHARMACOLOGICAL MANAGEMENT OF REACTIONS	FACILITATION OF EXAMINATION COMPLETION

Source: analysed studies.

studies were excluded based on title screening and a further 12 following abstract screening, resulting in 9 studies being included. The second search strategy identified 51 studies. After removing 9 duplicates, 24 studies were excluded based on title screening and a further 6 following abstract screening, resulting in 12 studies being included. Of the 836 studies identified overall, 31 duplicates were removed, 560 studies were excluded based on title screening, and a further 161 were excluded after abstract screening. A total of 84 scientific studies were included in the final analysis. Patient preparation and the manner of communication influenced how well patients tolerated the MRI examination. Clear information and a patient-centered approach were associated with lower levels of anxiety and better patient cooperation (Table 1).

Patients varied in their tolerance of the imaging conditions, ranging from mild discomfort to pronounced claustrophobic reactions and premature termination of the examination. Various preparation and support methods were used to alleviate these reactions, as shown in Table 2.

Discussion

The role of empathy during MRI examinations is difficult to separate from communication, patient preparation, and how radiologic technologists approach patients. In the available studies, these factors generally occur together, making it difficult to assess their individual effects on patient responses (28 – 36). The same applies to clinical practice, where patients experience the examination as a whole rather than as a series of individual procedures. Empathy is therefore more appropriately viewed as an integral part of the patient–technologist relationship than as a separate technique whose effects can be easily measured. Studies indicate that providing a greater amount of information does not, in itself, necessarily result in better patient preparation. What matters is when and how the information is provided, as well as how much a patient experiencing anxiety can understand and process (37 – 43). Standardized instructions provide essential information about the examination but cannot address the needs of every patient. Some patients may require additional explanation, whereas others may respond better to brief and clear instructions. These differences are even more pronounced among patients with sensory, cognitive, or communication-related needs (44 – 51). Comparison across studies is further complicated by differences in methods and timing of anxiety assessment, patient populations, and outcomes evaluated. The *STAI* and *MRI-DS* questionnaires do not measure exactly the same dimension of psychological distress (4, 9, 52 – 58), while the experience of MRI may also be influenced by uncertainty related to the expected diagnosis, a phenomenon described in the literature as *scanxiety* (24, 25). In addition to anxiety levels, studies commonly assess examination termination, patient cooperation, imaging artefacts, and image quality (59 – 64). Although these indicators

reflect the course and technical success of the examination, they do not necessarily capture how well the patient tolerated the experience. A patient may remain cooperative and complete the examination despite experiencing considerable distress, meaning that their psychological burden may go unrecognised (65 – 69). Consequently, a completed examination is not necessarily a well-tolerated examination. Non-pharmacological approaches may facilitate MRI examinations in such cases, but selection should depend on each patient's needs and responses. Studies describe various forms of patient preparation, audiovisual content, virtual reality, and other adaptations; however, their findings are not equally applicable across all clinical circumstances (70 – 75). In cases of severe claustrophobia, pain, or inability to maintain the required position, sedation or anaesthesia may still be appropriate options. Their use does not indicate that prior preparation or communication was unsuccessful; rather, it demonstrates the limitations of non-pharmacological approaches. Findings obtained under controlled conditions cannot always be directly translated into everyday clinical practice, where time constraints, staff availability, and opportunities for individualised patient preparation often determine what is realistically feasible (76 – 80). Simulation-based and communication training allow radiologic technologists to practice managing a range of situations, but cannot encompass every patient response they may encounter during MRI examinations (81 – 84). The technical and communicative aspects of the examination occur simultaneously; therefore, learned communication strategies cannot replace the assessment of each individual clinical situation. This review also has a limitation due to the broad scope of the included studies. Some studies directly address anxiety and claustrophobia during MRI examinations, whereas others examine the topic through communication, education, safety, artificial intelligence, and patient-centred care. Consequently, it is difficult to isolate the effects that can be specifically attributed to the empathetic approach of radiologic technologists. Future research should more precisely assess patient responses during individual stages of the MRI examination to better distinguish between factors that contribute to successful completion of the examination and those that help patients tolerate the experience more easily.

Conclusion

Patients experience MRI examinations differently, and therefore, anxiety and claustrophobic reactions cannot be attributed to a single cause or addressed with a single solution. Radiologic technologists should therefore be able to recognise when standard preparation is sufficient and when a patient requires a different approach. Technology may continue to advance, but the way patients experience the examination still depends on the person guiding them through it.

All data in this paper are part of the results of the master's thesis "The Role of Radiologic Technologist Empathy in Reducing Patient Anxiety Reactions and the Occurrence of Claustrophobia During MRI Examinations", written at the Faculty of Health Sciences, University of Split (85).

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Uloga empatije radiološkog tehnologa u ublažavanju pacijentovih anksioznih reakcija i pojave klaustrofobije tijekom MR pregleda

Sažetak

Magnetska rezonanca (MR) jedna je od najvažnijih dijagnostičkih metoda suvremene medicine, ali za dio pacijenata predstavlja psihološki zahtjevno iskustvo praćeno anksioznošću i klaustrofobičnim reakcijama. Cilj rada bio je prikazati povezanost empatijskog pristupa radiološkog tehnologa sa smanjenjem tih reakcija tijekom MR pregleda te analizirati čimbenike koji oblikuju pacijentov doživljaj postupka. Rad se temelji na preglednoj i kritičkoj analizi dostupne znanstvene i stručne literature. Pretraživanje je provedeno tijekom ožujka 2026. godine u bazama PubMed i Scopus, dok su Google Scholar i ResearchGate korišteni za pronalaženje dodatnih izvora i pristup cjelovitim tekstovima. Od ukupno 836 identificiranih radova, nakon uklanjanja duplikata, pregleda naslova i sažetaka te procjene cjelovitih tekstova, u konačnu su analizu uključena 84 rada. Studije pokazuju da anksioznost tijekom MR pregleda ne proizlazi samo iz tehničkih obilježja uređaja, nego i iz načina na koji pacijent razumije i doživljava postupak. Osjećaj gubitka kontrole, neizvjesnost, prethodna negativna iskustva i ograničena komunikacija tijekom snimanja izdvojeni su kao osobito važni čimbenici. Jasna komunikacija, pravodobna priprema i individualiziran empatijski pristup radiološkog tehnologa mogu povećati osjećaj sigurnosti, poboljšati suradljivost i ublažiti anksioznost. Takav pristup nikako ne zamjenjuje tehničku stručnost, nego je nadopunjuje i pridonosi sigurnijem provođenju pregleda i povoljnijem iskustvu pacijenta.

Ključne riječi: anksioznost; empatija; klaustrofobija; magnetska rezonanca; radiološki tehnolog