Review of Literature: A Need for MRI Safety

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Nurses have been voted the most trusted profession for the last 22 years, according to the Gallup poll of 2023 (Firth, 2024). This is no surprise, as nurses are advocates, educators, and caregivers to patients and families. Furthermore, they are recognized leaders of healthcare institutions, providing direct patient care through evidence-based practices. Often, nurses are the most knowledgeable about each patient's care.

As advocates, nurses educate and fight for the health and safety of the public, identifying problems and finding solutions through research and quality improvement projects. Likewise, nurses adapt to the continuous evolution of healthcare, creating new solutions and pathways to drive their care. Nurses are heroes, saving the day by putting their patients' and their families' needs well above their own (Freeman, 2024).

As nurses, we must continue to be the liaison between patients and their healthcare team. Patients and families trust nurses to deliver high-quality, safe, evidence-based care. In turn, nurses help patients and families make educated decisions and guide them toward health and wellness. Notably, patients and families rely on nurses to uphold the ethics of their profession, refusing to provide care that will have adverse outcomes or effects (ANA Center for Ethics and Human Rights, 2016).

As healthcare continues to change, nurses play a pivotal role in embracing the change and adapting procedures and care based on the needs of society. Nevertheless, there is always room for improvement in healthcare; as nurses, we can make a difference by looking at these areas of improvement and collaborating with other stakeholders to find ways to improve healthcare quality.

I currently function as a clinical supervisor in the sedation unit of a large pediatric teaching hospital. The sedation unit provides care for patients receiving sedation or general anesthesia for all radiology modalities in the hospital. As the supervisor, I oversee the unit's daily operations, ensuring we are staffed appropriately at all sites and radiology areas. I collaborate with the leaders of the other teams daily, including general anesthesia providers, sedation providers, and radiology. In addition, I partner with our clinical nurse expert on education needed for staff and aid in disseminating the education.

I am also the lead facilitator for our unit's annual sedation simulations. As the facilitator, I work with our sedation providers to create scenarios based on adverse events and provide educational experiences for our staff. My position allows me to continuously look at the function of our unit and how we can improve patient quality and safety outcomes.

Our unit is comprised mainly of senior staff, as we only hire nurses with ICU or ER experience. This seasoned staff has specialized knowledge and skills to provide the safest, most efficient care for patients needing sedation or anesthesia. We are a close-knit unit focused on teamwork and efficiency. We consistently have packed schedules and continuously pivot and adapt as changes occur with the schedule and patients daily. We are confident in our colleagues and know we have support whenever a patient emergency occurs.

Magnetic Resonance Imaging

Magnetic resonance imaging (MRI) uses magnetism and radio waves to create a high-resolution picture of the human body and its organs (Hossen et al., 2020). MRI can obtain multiplanar images without the use of ionizing radiation (Artunduaga et al., 2021). While MRI offers many advantages, some disadvantages include long scan times, loud noise in an enclosed space, immobilization of the patient, and potential for projectiles. MRI is a non-ferrous

environment, meaning no objects containing ferrous materials (metal) can enter. Due to the MRI bore being a giant magnet, any ferrous-containing object that enters the zone will become a projectile, ultimately ending by clinging to the bore (Mittendorff, 2021).

We are the only nurses in the institution who can provide these services for radiology. Exclusivity is necessary because MRI has specific safety protocols and regulations that require specialized training and knowledge. This makes our professionals the experts in the area; while being experts allows us to provide education to the rest of the institution, this expertise also prevents us from receiving staffing help when short-staffed. We cannot accept any float nurses as they cannot receive the proper training and orientation in our area in a short amount of time. Institutional management, however, seems to not fully understand the severe impact of short staffing on our unit and the safety of the patients and staff in the area.

Problem Identification and SWOT Analysis

When conducting the SWOT analysis, I collaborated with our unit's Safety and Quality Specialist (SQS) and my manager. We discussed what was going well for our unit and brought up topics that needed to be focused on for improvement.

Strengths

I identified three areas of strength: specialized knowledge, active partnership with Child Life Specialists, and the development of a behavior health committee. Since the professionals in our unit require specific training and expertise, we are specialists and true experts in our field. We understand the risks of MRI, CT, nuclear medicine, interventional radiology, and PET scanners. We have studied the different sedation medications and know how to maintain a patient's airway when sedated.

We also utilize Child Life to create plans to provide our young patients with the safest, least traumatizing experience. Furthermore, our unit's utilization of Child Life Services has allowed many patients to undergo their studies without sedation or general anesthesia.

Finally, this year, we have seen an increase in behavioral health patients needing sedation services to complete procedures such as lab draws, EKGs, etc. For this purpose, we have created a Behavioral Health Committee that works toward finding best practices for our neurodivergent patient population. This team consists of staff members from different disciplines, such as child life, security, behavioral health, nursing, providers, etc.

Weaknesses

During my SWOT analysis, I discovered many weaknesses within our unit. We experience underutilization of Child Life Services and infrequent timely documentation. While it can often be helpful, parental presence in induction/procedures can also be time-consuming and create a certain degree of chaos.

Poor communication is an ever-present challenge, particularly with oncology, as is the effect of delayed schedules. We share many patients with oncology, and these patients tend to schedule their appointments all on the same day. Due to a lack of communication between the two units, we have continued to see an increase in patients requiring multiple IV sticks or central line access.

Staffing fluctuations are common in healthcare, and we are familiar with these issues. However, we often have ebbs and flows of staffing, which can significantly affect our daily operations as we function in a fast-paced environment with a lot of patient turnover.

Siloed communication between the sedation, general anesthesia, and MRI teams has caused communication errors, fractured staff relations, and increased the potential for patient

safety events. While we have a great relationship with our Child Life colleagues, there is still a great need to improve the utilization of their services. We continue seeing many day-of-service (DOS) cancellations due to patient illness, late arrivals, and not having fasted appropriately. A lot of these DOS cancellations have to do with lapses in communication.

Due to human factors, we also see an inconsistency in timely documentation. Not all sedation cases go smoothly, often requiring the nurse to be completely hands-on from receiving a patient until the time she is discharged. Since the nature of our unit is fast-paced, nurses typically receive another patient as soon as they discharge one, often having to delay documentation.

Delayed schedules are a consistent struggle in our unit. Many factors influence this delay, including late patient arrivals (inpatient and outpatient), sedation or anesthesia emergencies, difficult IV access, and scans taking longer than expected. One little misstep can throw off an entire schedule by at least an hour.

Perhaps most importantly, MRI safety needs to be addressed because of the inherent risk of causing catastrophic errors. As previously stated, the MRI environment requires specific knowledge and training to care for patients safely. In this paper, I will discuss the importance of MRI safety and the need for a quality improvement project in my unit.

Opportunities

Identified opportunities include the need for increased education about sedation and anesthesia services in our patients' families. They can also benefit by becoming more aware of our behavioral health services. Indeed, more families have become educated about sedation and anesthesia, allowing for open conversations about sedation medication usage. These conversations enable parents to feel more comfortable and trusting of our team. This knowledge also allows for more parents to be open to having their children attempt procedures without

sedation or anesthesia by utilizing Child Life Services. Additionally, knowledge about our behavioral health services has allowed patients who are neurodivergent or in need of behavioral health services to receive the necessary care safely and efficiently. Our program has reached parents from all over the tri-state area, allowing them to travel to our hospital and receive this care.

Threats

Threats include patients and families coming for their appointments while sick. When parents come to their appointments with a sick patient, they jeopardize the safety of their child. If the child outwardly shows upper respiratory symptoms, our team will cancel. However, if it is not as obvious, there is a chance that the patient will suffer from adverse events due to the nature of the sedation medications and their viral illness.

Another threat to the efficiency of our unit results from a lack of education about our unit by staff in the rest of the hospital. For this and other reasons, inpatients are often transported late for their procedures. Clearly, the rest of the institution needs to be more knowledgeable about the ins and outs of our unit. This includes how our schedules flow, the importance of MRI safety, the necessity of specific monitoring for inpatients, etc. This lack of education can cause schedule delays, possible patient or staff member injury, and inappropriate team communication. Finally, as with all technology, we often experience frustration and delay because of limitations to our electronic medical record program, EPIC.

Quality Improvement Project Identification

The safety of patients and the staff in the environment is paramount, and the staff's knowledge about risks associated with MRI procedures is essential. The main reason for this is that MRI magnetic fields are always on and can potentially pull any ferrous-containing metals to

the bore at a high rate. This has the potential for harm to anyone—staff or patient—in the MRI environment (Hossen et al., 2020). Ongoing education is a clear necessity.

Since I came to the sedation unit, at least five significant safety errors have occurred as a result of non-MRI-safe objects entering Zone 4. These include pens, keys, jewelry, watches, toys, and an IV pole. While no harm has been done to any patient, there was an incident wherein an anesthesia fellow was pinned to the bore by an IV pole. This incident caused harm to the provider, delayed patient care, caused a decant in the MRI, and required a 24-hour shutdown of the MRI machine.

Many inpatients are transported and monitored by an inpatient team unfamiliar with the MRI environment. While our team does its best to educate in real-time, the full effect of the importance of ferrous-free in the environment is not retained. In addition to this lack of knowledge, there is variability in the people required to be in the pediatric MRI environment. The general anesthesia teams, sedation teams, and inpatient teams constitute a large pool of people, and consistent education of all is difficult. This continues to increase the risk of an MRI safety event (Sotardi et al., 2021).

Education and developing a standardized procedure of care for inpatients being transferred to the MRI environment are imperative to decreasing the likelihood of an MRI safety event. A project to accomplish this aligns with the institution's mission of safety as a priority and the National Patient Safety Goals (Division of Healthcare Quality Evaluation and Improvement, 2024).

Baseline and Benchmark Data

I plan to utilize the data collected from my institution through our *Keeping All Patients Safe* (KAPS) files. These are non-punitive reports that documented any error. We can track trends

and pull data from any timeframe. I also plan to utilize data from Apparent Cause Analyses (ACAs) and Cognitive Systems Analyses (CSAs) that have occurred due to previous MRI safety events. Our institution does have MRI safety programs in place, such as MRI Safety Officers (MRSOs) and daily safety huddles, as suggested by some of the literature (Sotardi et al., 2021). However, there is still apparent room for improvement.

Regarding benchmark data, I plan to use the literature that emphasizes the importance of MRI safety knowledge and education. I plan to look at other institutions' policies and procedures regarding MRI safety and see if our institution has differences in practice. Healthcare continues to evolve, as does the size of our unit, continuously causing us to look at our current processes and find ways to revamp and improve them for the safety of our patients and staff.

Potential Quality Improvement Project

MRI images are necessary in many patients' care plans as they provide soft tissue images without radiation exposure (Mittendorff et al., 2021). However, the need for these scans in complex patients increases the risk of injury if a well-suited MRI safety plan is not in place. Our institution has had frequent MRI safety mishaps within the last few years, resulting in a need for another look at our current MRI safety plan. This literature review will describe the nature and prevalence of increased MRI safety errors and events. It will also include current evidence-based strategies that could be implemented to improve MRI safety education for staff outside of the MRI environment and stricter MRI safety plans for the pediatric teaching hospital in which I practice.

MRI Safety Risks

Understanding the safety risks involved with patient care in the MRI environment is crucial in lowering MRI unanticipated events (UEs) and increasing staff compliance. In 2021,

Artunduaga et al. published a review of safety risks and benefits related to general anesthesia and sedation use in the pediatric population undergoing MRI studies. Multiple pediatric institutions were used for reference and guidelines.

This review discussed the need for sedation and general anesthesia during MRI studies in the pediatric population, the nuances associated with pediatric sedation and anesthesia, and the safety risks. These researchers explored strategies and the benefits of lessening the need for sedation and general anesthesia. Key strategies for lessening the need for sedation and general anesthesia include using Child Life Services, staff collaboration, and standardizing pediatric MRI protocols to minimize unnecessary images.

Several benefits of lessening the need for sedation of anesthesia use include decreasing MRI wait times, avoiding adverse clinical emergencies, and decreasing costs for patients and families. Finally, Artunduaga et al. (2021) offered advice for the use of sedation and general anesthesia in the pediatric population for MRI studies in the future. The key takeaway message was to evaluate the risk versus benefit for each patient to undergo sedation or anesthesia and receive optimal MRI results.

Based on the *Johns Hopkins Evidence-Based Practice Model for Nurses* (Dang et al., 2022), this Level V B work by Artunduaga et al. (2021) is credible. It has the potential to contribute to the evidence-based nursing practice of increasing the knowledge of MRI safety in a pediatric hospital. Translating this evidence into practice must be done with due caution, however, as there was no explicit discussion of limitations in the literature.

At about the same time that Artunduaga et al. (2021) discussed the risks associated with the use of sedation and anesthesia on patients in the MRI environment, Betz et al. (2023)

published an article acknowledging the safety risks associated with implanted medical devices in MRI.

This review focused on the pediatric population with implanted medical devices undergoing MRI procedures at Cincinnati Children's Hospital. The researchers discussed the following topics: MRI safety related to the physics of MRIs, the importance of the metal screening process, the necessity of accurate medical histories, and the considerations and management of implanted medical devices in MRI patients. This review provided insight into ways to ensure pediatric patients' safety with implanted medical devices. The researchers considered gaps in knowledge and acknowledged this population's challenges.

Based on the *Johns Hopkins Evidence-Based Practice Model for Nurses* (Dang et al., 2022), this Level V A work by Betz et al. (2023) is credible. It has the potential to contribute to the evidence-based nursing practice addressing the need to increase the knowledge of MRI safety in a pediatric hospital. While Artunduaga et al. (2021) and Betz et al. (2023) discussed scenarios in which unintended events (UEs) could occur in the MRI environment, elsewhere in earlier literature, Sadigh et al. (2017) reviewed the effects of UEs on patient safety and experience.

In 2017, Sadigh et al. published an observational study that detailed UEs in MRI departments in multiple facilities of a single healthcare system over 17 months. These researchers analyzed data from reports made by MRI technologists through a hospital-wide reporting system. Categorizing the UEs provided insight into the quality and safety of the MRI environment. The main categories of UEs included scheduling or ordering issues resulting in cancellation, delayed scans due to human error, accidental non-MRI compatible foreign bodies, contrast-related issues, patient emergencies, and technical issues.

Likewise, the researchers discussed MRI safety, how UEs affected the patient experience and operational challenges. Important components of this were acknowledging the need for improved communication with the patient or inpatient teams regarding the patient's status (body habitus, claustrophobia, etc.). Screening the patient for these issues could also aid in lessening outpatient cancellations as issues could be caught ahead of time.

Finally, Sadigh et al. (2017) highlighted the importance of education and training of staff outside of MRI to avoid delays, cancellations, and harm to the patient while in MRI. Utilizing a UE reporting system can allow healthcare institutions to implement safety protocols based on reported events and utilize the data as benchmarking.

Based on the *Johns Hopkins Evidence-Based Practice Model for Nurses* (Dang et al., 2022), this observational study yielded Level III B evidence that can be generalized with some caution because the study was conducted in a single healthcare system. The fact that data were collected by self-reporting also adds to this caution.

MRI Safety Education

Risks associated with MRI studies have the potential to cause harm to patients and staff, and acknowledging these risks creates the opportunity for staff education. In 2020, Hossen et al. published the results of their study evaluating the awareness and attitudes of MRI technologists toward MRI safety. This was a descriptive cross-sectional study of 50 MRI technologists who worked in various hospitals and diagnostic centers in Dhatka City, Bangladesh. The researchers utilized self-administered questionnaires and verbal interviews.

The results of this study revealed an overall lack of knowledge of MRI zones, emergency situations, and safety signs. The researchers discussed these knowledge gaps and recommended increasing employee training and professional development. However, the subjects did know

about the continuous working MRI magnet and the prohibition of ferrous-containing items in the magnet room. There was no significant correlation between the level of education or work experience and the awareness of MRI safety.

This study was conducted in Bangladesh, where healthcare differs from our practices in the United States. Nonetheless, there is little reason to believe that MRI safety is significantly different and anecdotally, I have made similar observations in my place of work. Based on the *Johns Hopkins Evidence-Based Practice Model for Nurses* (Dang et al., 2022), this study is Level III B evidence that can be generalized with caution as this was a small sample (N=50).

The findings of this study from Hossen et al. (2020) were supported by similar findings in a study by Monga and Aran (2023), which examined the MRI safety knowledge of radiology residents. In 2023, Monga and Aran published findings of a study to increase radiology resident knowledge about MRI safety at a medical center. A small sample of residents (N=35) were offered a 10-question baseline test. Those who completed the pre-test (n=10, 28.6%) were given a PowerPoint presentation summarizing articles about MRI safety that they could review independently.

The same quiz was given again, and scores were compared to the pre-test. The researchers stated that only nine residents completed the post-test, but there was a statistically significant difference between the pre-test and post-test scores (p=0.03). The limitation of this study was the small sample size (N=9), with only subjects in the early years of their radiology residency.

Based on *The Johns Hopkins Evidence-Based Practice Model for Nurses* (Dang et al., 2022), this quasi-experimental study yielded Level IIB evidence. The evidence is good but can be generalized with considerable caution due to the limited sample.

This study by Monga and Aran (2023) revealed the need for MRI safety education in residents, further supported by Mittendorff et al.'s expert opinion (2022). These authors published an expert opinion based on the literature. In turn, this contributed expertise on which to base MRI safety educational programs. This expert opinion was conducted in medical institutions in Australia and New Zealand. The purpose of this expert opinion was to review current and developing MRI safety issues, educate MRI technologists, enhance clinical decision-making, and encourage safe practices within the MRI environment.

The key takeaway points made by these experts include:

- MRI technologists must stay up to date with new implantable devices and MR conditional devices to keep the patient and environment safe

- MRI technologists need to understand how burns can occur in MRI and how to avoid them (change patients out of street clothes, avoid skin-to-skin and skin-to-bore touching, etc.).

- Technologists should be aware of patients' thermoregulatory systems and how they will be affected by the ordered scan

- MRI Technologists must provide all patients with appropriately fitted earplugs and coverings for hearing protection

Based on the *Johns Hopkins Level of Evidence* appraisal, this level IV A work by Mittendorff et al. (2022) is credible and has the potential to contribute to evidence-based MRI safety knowledge and practice. However, this translation to practice can be made cautiously as this expert opinion is not based in the US. Nonetheless, I have no reason to believe that MRI safety differs significantly in Australia and New Zealand as they are countries with healthcare that is similarly sophisticated to ours in the U.S.

MRI Safety Programs

An MRI Safety program is created by healthcare professionals to oversee the operations and safety guidelines of the MRI environment. This group can include MR medical directors (MRMDs), MR safety officers (MRSOs), and MR safety experts (MRSEs). These positions comprise a council that creates and edits policies and procedures for the operations in the MRI environment.

Just as significant as educating staff about the risks of MRI, implementing MRI safety programs can decrease the likelihood of a safety mishap occurring in the MRI environment. In 2021, Sotardi et al. published clinical practice guidelines for developing and implementing an MRI safety program in pediatric facilities. These guidelines drew information from three institutions: The Children's Hospital of Philadelphia, Massachusetts General Hospital, and Children's Mercy Hospital.

The guidelines developed by these clinicians discussed best practices for establishing a pediatric MRI safety program. They also emphasized the need for a specific safety council, comprehensive policies and procedures, adherence to national guidelines, and continuing education and communication among all staff in the institution. These authors asserted that for this program to be successful, all MRI staff must buy in.

Based on the *Johns Hopkins Evidence-Based Practice Model for Nurses* (Dang et al., 2022), this Level IV A work by Sotardi et al. (2021) is credible and has the potential to contribute to the evidence-based nursing practice in the development of MRI safety programs in pediatric hospitals.

Time Out Protocol

One of the strategies suggested by Sotardi et al. (2021) is the communication and accurate transmission of information about procedures. Utilizing a time-out protocol for patients undergoing MRI procedures is an intervention that can increase the safety of those involved in a procedure. This intervention aimed at improving MRI safety became the topic of a quality improvement project by Joselyn et al. (2022), whose study was conducted in a hospital in South India. These authors discussed the challenges of MRI safety and the necessity for a time-out protocol.

A time-out protocol is characterized by a full stop at the entrance of Zone 4, all hands off the patient, and attention directed to the MRI technologist who will be performing the study. The technologist identifies the patient, the ordered study, and the care team present. Next, the technologist ensures that all personnel are "clear" from metal and non-MRI items entering Zone 4. This safety time-out allows all members to become aware of their environment and focus on the patient's safety.

Using the Plan, Do, Study, Act (PDSA) implementation cycle, the researchers implemented education and practices to improve time-out compliance rates. Joselyn et al. discussed compliance challenges and the need for continuing education and training. Based on the *Johns Hopkins Evidence-Based Practice Model for Nurses* (Dang et al., 2022), this quality improvement project yielded Level V B evidence. I will translate it with some caution, however, because the study was conducted at one hospital in India. Caution is due because of differences between healthcare in India and the United States. Nonetheless, my observations about time-out practice in the U.S. lead me to believe they are necessary procedures to uphold the safety of all involved.

Reporting Unexpected Incidents

While Joselyn et al. (2022) discussed the importance of implementing a time-out process to help diminish the likelihood of a UE, Mansouri et al. (2015) shared findings on the importance of reporting UEs. These researchers published an observational study of incident reporting related to MRI procedures at a large-scale medical center over multiple years. Utilizing observational data, Mansouri et al. (2015) identified potential areas for improvement. These researchers discussed the incident reporting rate, reasons for reporting, and the difference in the report rate of inpatients versus outpatients.

Key takeaway points from this study include the most commonly reported UEs being diagnostic test orders, contrast/medication reactions, and medication/IV safety. The authors also discussed the overall problem of underreporting, most likely due to the fear of punishment. However, there is a difference in reporting between inpatients and outpatients. It was noted that this difference could be related to the complexity of an inpatient's illness.

Based on *the Johns Hopkins Evidence-Based Practice Model for Nurses* (Dang et al., 2022), this observational study yielded Level III B evidence. Acknowledging limitations such as using a single hospital entity for data, underreporting of incidents, and the fact that no incidents related to metal safety were mentioned, I can translate the findings of this study with some caution.

MRI Zones

The MRI environment is broken into four zones, each presenting a different level of risk. Zone 1 is the public areas outside the MRI environment, such as registration. Zone 2 is the in-between of the general public space and the control room (zone 3); MRI-trained staff work in this area. Zone 3 constitutes the control room, which is where MRI technologists sit to perform

the scans. Finally, zone 4 is the actual scanner room that houses the MRI. Badge access is required to enter zone 2, zone 3, and 4. Non-MRI staff entering zones 3 and 4 require direct supervision, and all ferromagnetic material must be removed before entering zone 4. When ferromagnetic material or electronics enter zone 4, this is considered an MRI zone breach.

In 2018, Parra et al. published a quality improvement project that aimed to decrease incidents related to zone breaches. The authors discussed the concern about wide-range MRI access and lack of training. They also emphasized the need for reinforcement of training for staff who are not routinely in an MRI environment and how errors by these individuals relate to reported MRI safety incidents.

This project was accomplished by limiting MRI access to non-MRI essential staff members in a single healthcare facility. The purpose of this approach was to decrease MRI zone breaches and protect untrained staff from the dangers of the MRI environment. Parra et al. (2018) used a structured method that included multidisciplinary collaboration, evaluation of current practices, implementing changes based on prior evaluation, and continued monitoring of implemented changes.

The key applicable points made by these clinicians were:

- Limiting access to the MRI environment to only the necessary roles such as MRI staff, anesthesia, radiology nursing, etc.

- Utilizing a magnetic imaging safety officer to monitor the list and keep it up to date.

- Providing required annual education and training to staff with access to the MRI environment's risks through online modules and hands-on training.

Based on the *Johns Hopkins Evidence-Based Practice Model for Nurses* (Dang et al., 2022), this quality improvement project yielded Level V B evidence. I can translate this

evidence, although with some caution, because the study was conducted at one hospital and did not utilize a formal QI framework such as PDSA or SQUIRE 2.0.

Consistencies Within the Evidence

I found many consistencies within evidence uncovered by the research studies and promoted by clinical practice guidelines. The most common included the need for education on MRI safety risks, the importance of implementing an MRI safety program, and the vital nature of reporting UEs. A common thread running through all these variables is that staff understanding of the safety risks of the MRI environment is imperative to building of a solid safety culture.

Consistent education and demonstration of knowledge about safe practices is crucial because breaches in practice jeopardize the safety of both the patient and staff members. As Hossen et al. (2020) stated, "A thorough knowledge of the MRI equipment, imaging principles, contrast media used in MRI, adherence to safe practices, written guidelines, and standardized protocols that can be used center-wide is ultimately the goal in creating an MRI safety culture" (p. 18). With this knowledge comes the need for continuing education as there are continuous technological advancements and changes to policies and procedures (Mittendorff et al., 2022; Betz et al., 2023).

The literature supports the necessity of an MRI safety program to guide the education and implementation of safe practices such as time outs, limiting zone 4 access, educating staff about the risks of the MRI environment, and creating policies and procedures for care provided in the MRI environment (Hossen et al., 2022). These programs should also educate all clinicians on the importance of reporting UEs, which is essential in recognizing gaps in safety, addressing the need for education, and implementing changes in practice (Joselyn et al., 2022).

Inconsistencies Within the Evidence

While there were few inconsistencies in the literature, I noticed that Sadigh et al. (2017) stated that UEs were quite common based on the reported UEs in their study. However, Mansouri et al. (2015) stated that UEs were uncommon. I am unsure whether this was due to low UE reporting or because of only using results from a singular hospital. In addition, data from both pieces of evidence are dated. They are, however, the only such data I could find in the literature.

Conclusion

The purpose of this review of literature has been to appraise the research and other evidence that addresses the problem of MRI safety and the errors that affect patients and staff. As the supervisor of the sedation unit, I consider MRI safety a top priority. This problem area interests me, and I am considering it for a quality improvement process that will ultimately become my leadership project. My goal is to improve the MRI safety education that is provided to staff outside of our unit, as well as fine-tune the safety plans that are already in place

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