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EFFECTIVENESS OF AUDIO VISUAL THERAPY IN REDUCING ANXIETY AND PAIN IN CHILDREN DURING MEDICAL PROCEDURES: REVIEW LITERATURE

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ABSTRACT
Children often experience anxiety and fear when undergoing medical procedures. Audiovisual educational media can be used as a distraction and an educational tool to reduce this problem. To review the empirical evidence on the development and effectiveness of audiovisuals in reducing children pain, and anxiety during medical procedures. This is a review literature and retrieved articles from PubMed, Scopus, ScienceDirect, and Wiley databases published between 2020 and 2025. A total of 8,077 articles were initially identified through the database search using keywords audiovisual OR Virtual reality AND paediatric OR children AND anxiety. The study selection process was conducted following the PRISMA flow diagram, which involved screening, eligibility assessment, and removal of duplicates. The 8 articles were reviewed using JBI RCT appraisal tool and showed moderate to high quality. The selection followed the PRISMA diagram, with thematic analysis applied for data synthesis. The audiovisual media is proven effective as a non-pharmacological intervention to reduce anxiety, pain, and increase positive behaviour of children when undergoing medical procedures. Audiovisual have rule to distract children from pain and effect on the reducing anxiety including increase positive behaviour during procedures.

Keywords: anxiety; audiovisual; children

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INTRODUCTION

Children have limited cognitive ability to understand explanations of medical procedures. This inability makes children more prone to anxiety before the procedure is performed. Fear of the unfamiliar clinical environment can exacerbate children's emotional responses (Igelström et al., 2023; Jin et al., 2021). Children often exhibit behaviours such as crying, resisting, or avoiding when confronted with medical devices. These responses are often triggered by a lack of understanding of what is about to happen. It can also reinforce the perception of pain during the procedure (Kolhe et al., 2024). In addition, children's anxiety makes it challenging for health workers to maintain a smooth course of action. This situation can prolong the procedure and increase the stress on the healthcare worker. Research shows that clinical fear in children can have a long-term impact on their compliance at subsequent care visits (Pujianti et al., 2025). Therefore, interventions that can reduce children's anxiety are important to implement in paediatric healthcare.

Audiovisual-based distraction strategies are widely used as a non-pharmacological approach to calm children during clinical procedures. The use of cartoons, animations, and music has been shown to distract children from the source of anxiety. Engaging audiovisual content can maintain a child's attention for a period of time. As each child has different preferences, the selection of cartoon or music type should be customised to achieve the optimal effect (Almarzouq et al., 2024; Jamil et al., 2023). This content customisation helps increase the child's sense of comfort and acceptance of the intervention. Audiovisuals can also provide a positive stimulus, making children more cooperative. In addition to distraction, audiovisuals can serve as a simple educational medium that helps children understand procedures. Visual-based education makes medical concepts easier to

understand. Thus, audiovisuals provide dual benefits as distraction and education (Lestari et al., 2025). This approach is becoming increasingly popular across various healthcare facilities.

Virtual Reality (VR) is evolving as a more immersive form of distraction for children in a medical context. It offers an immersive visual and audio experience so that the child feels as if they are in a different environment. This immersive effect can reduce perceptions of threat in the clinic environment (Sarkar et al., 2021). VR is often used in procedures that cause high anxiety, such as injections or dental procedures. Several studies have shown that VR can significantly reduce anxiety and pain. The use of VR also increases children's cooperation during the procedure (Appel et al., 2024). However, the effectiveness of VR is greatly influenced by the suitability of the content to the child's age. In addition, comfort while wearing the headset is an important factor to consider. VR technology also shows promise as an interactive medium for medical education that is easy for children to understand (Zaidman et al., 2023). This makes VR an attractive option for further development in modern paediatric practice (Malinti & Sulistiowati, 2025).

Although evidence of the effectiveness of audiovisual and virtual reality is abundant, available research still shows variations. The heterogeneity of research methods limits the generalisability of findings. Some studies have small sample sizes that reduce statistical power. In addition, the type of cartoon or animation content used varies between studies. These variations may affect the effectiveness of the intervention for children. Inconsistent study designs also contributed to the differences in results. Therefore, a more comprehensive analysis through a systematic review of the literature is needed. This systematic literature review can bring together evidence from different studies and provide a more structured understanding. The focus of this review is the use of audiovisual and virtual reality in preschool and primary school-aged children in a medical context. By summarising the latest findings, this study is expected to provide a strong scientific basis for selecting distraction interventions in clinical practice.

METHOD

Eligibility criteria

The inclusion criteria for articles were randomised clinical trials (RCTs) that used audiovisual or virtual reality interventions as therapy or education for preschool to primary school-aged children. Selected studies had to be available in full text and present data on the intervention's effect on children's anxiety, behaviour, or comfort during the clinical procedure. A focus on early childhood was chosen because this developmental stage is the period most susceptible to procedural anxiety and most responsive to technology-based distractions. By limiting the review to RCT designs, the review ensured that the evidence analysed had high internal validity and provided the most robust picture of the effectiveness of Audio Visual (AV) or VR interventions in paediatric clinical contexts. Studies were excluded if the study did not use audiovisual or virtual reality interventions, did not include preschool or primary school-aged children, or did not use a Randomised Controlled Trial design. Articles without full text, non-empirical publications such as editorials and case reports, and studies in adult or animal populations were also excluded.

Information Sources

We retrieved articles from PubMed, Scopus, ScienceDirect, and Wiley.

Searching Strategy

We used databased from PubMed, Scopus, ScienceDirect, and Wiley with the keywords audiovisual OR Virtual reality AND paediatric OR children AND anxiety. Keyword addition and subtraction techniques were used to expand the search results. All articles obtained were then managed using Mendeley software to avoid duplication. First author who has experience as the paediatric nurse more than five years in clinical practice searched the articles based on the article’s criteria from 2020 to 2025.

Article Screening

Article selection was conducted through stepwise screening from the title and abstract to the full text. Studies that did not fit the focus of audiovisual or virtual reality interventions, did not involve preschool- to primary-school-aged children, or were not RCTs were excluded at each stage. Only articles that met all inclusion criteria in the full-text assessment were included in the final analysis. Articles were screened by the first authors, who have more than 5 years of expertise in paediatric nursing.

Data Extraction and Critical Appraisal

Data synthesis showed heterogeneity between studies, especially in the type of AV/VR intervention, variation in child age, differences in clinical settings, and anxiety measurement instruments. These differences made it difficult to combine results. However, the studies still showed thematic homogeneity in the main finding, which was the consistent effect of AV/VR in reducing children's anxiety.

The methodological quality of each study was assessed using the 13-item JBI Critical Appraisal Checklist for Randomised Controlled Trials (Tufanaru et al., 2020). The assessment included aspects of randomisation, allocation concealment, blinding, group equivalence, validity of outcome measures, completeness of data, and appropriateness of statistical analysis. The majority of articles met most criteria, although some showed limitations, especially in blinding and reporting of allocation methods. Overall, the selected studies were of adequate quality. The critical appraisal was evaluated by the first and third authors, both of whom have more than 5 years of practical nursing experience.

RESULT

The articles were selected according to the PRISMA flowchart shown in the following figure.

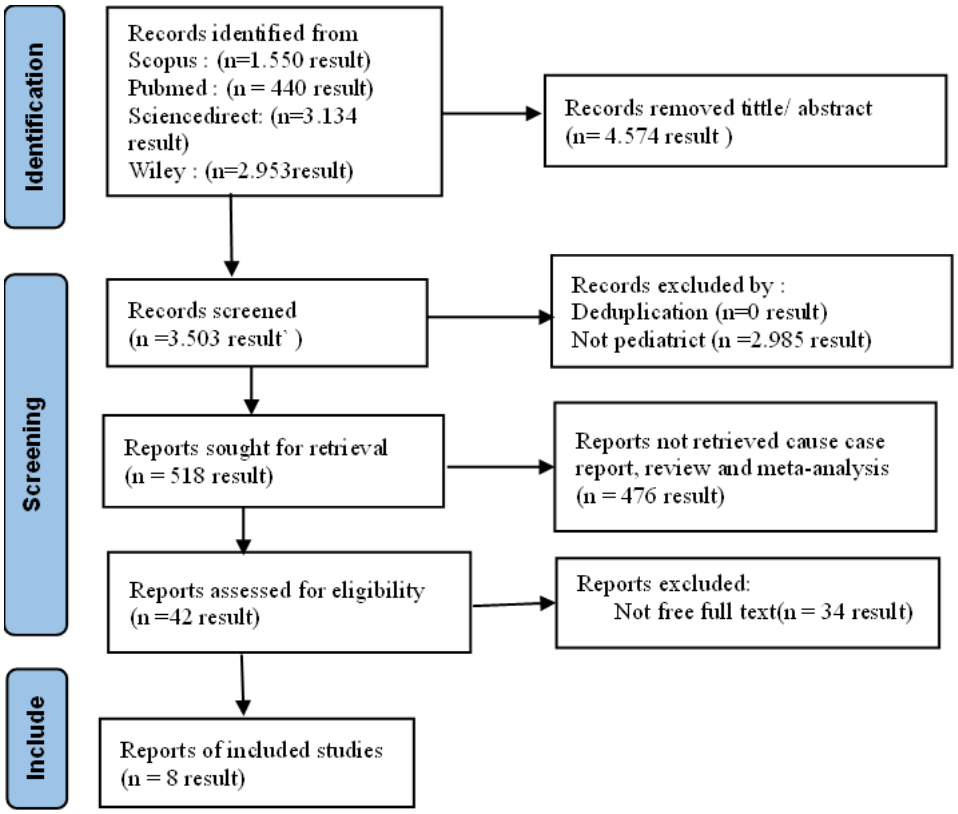

Figure 1. Prisma flowchart article selection

A total of 8,077 prospective articles were identified, with 8 selected for review using the JBI RCT appraisal tool. The results of the quality appraisal can be seen in the Table 1.

Table 1.
Quality assessment with JBI appraisal tool for RCT

Author / year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q 10	Q 11	Q 12	Q 13	Total score	Quality articles
Gozin et al., 2022	Yes	Yes	Yes	No	No	NA	Yes	Yes	Yes	NA	Yes	Yes	Yes	11/13	High
Delgado et al., 2021	Yes	No	Yes	No	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	9/13	Moderate
Bhusari et al., 2025	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	12/13	High
Oktay et al., 2025	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	11/13	High
Linthoingambi et al., 2022	Yes	No	Yes	No	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	8/13	Moderate
Van der Vleuten-Chraibi et al., 2025	Yes	No	NA	No	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	7/13	Moderate
Zaidman et al., 2023	Yes	NA	Yes	No	No	NA	Yes	Yes	NA	Yes	Yes	Yes	Yes	8 / 13	Moderate
Bahrololoomi et al., 2024	Yes	NA	Yes	No	No	NA	Yes	Yes	NA	Yes	Yes	Yes	Yes	9 / 13	Moderate

Table 2.
Characteristics study overview

Authors (Year, Country)	Study Design	Total Sample	Sample Distribution	Intervention	Control	Outcome measured	Conclusions
Gozin, Tabe-Bordbar & Esmaeili (2022, Iran)	RCT 3-group	45 children aged 6 to 9 years	Storytelling = 15 Tell Show Do (TSD)= 15 control = 15	Audio-visual storytelling	Tell-Show-Do & no intervention	Venham Picture Test (VPT), Facial Image Scale (FIS)	Storytelling and TSD both decreased anxiety significantly compared to controls.
Delgado et al. (2021, USA)	Parallel RCT (2 group)	100 children aged 4 to 6 years	Audio visual distraction (AVD) = 61 control = 39	Audio visual distraction (AVD)	Treatment without audiovisual	Wong-Baker FACES, Frankl, HR	AVD decreased anxiety and improved behavior, but effects were moderate and without blinding.
Bhusari et al. (2025, India – Binaural Beats RCT)	Triple-arm RCT 3 group	75 children aged 6 to 12 years	Binaural beats = 25 Music of choice = 25 Headphone silent = 25	Binaural auditory beats	Regular music & no music	Heart rate frequency, VPT, behavior	Binaural beats most effective; methodology excellent and groups balanced.
Oktay et al. (2025, Turki – MRI AV Intervention)	Two-arm RCT multicenter, 2 group	48 children aged 7 to 11 years	AV group = 24 control = 24	Disney-based AV content during MRI	Standard MRI without AV	MRI quality, sedation, anxiety score	AV decreased anxiety & improved image quality (minimal movement).
Linthoingambi et al. (2022, India)	RCT 3-group	108 children aged 5 to 12 years	ICG = 36 AV = 36 Stress ball = 36	Intellectual Color Game (ICG) or AV distraction	Stress ball or no distraction	Child Behavior Check Scale (CBCS), Gag reflex index	ICG most effective, followed by AV; both better than stress ball.

Authors (Year, Country)	Study Design	Total Sample	Sample Distribution	Intervention	Control	Outcome measured	Conclusions
Van der Vleuten-Chraibi et al. (2025, Europe)	Block-Randomized RCT, 2group (multicenter)	175 children aged 6 to 9 years	AV group = 88 control = 87	Disney-based AV animation during MRI	Standard procedure MRI	MRI success workflow, anxiety score, movement index	AV decreased stress & improved MRI success, though not significantly across all parameters.
Zaidman et al. (2023, Israel)	Randomized crossover, 2 group	29 children aged 4 to 12 years	All children get VR and non-VR alternately	VR goggles (Oculus GO)	Standard treatment without VR	Wong-Baker FACES Pain Rating Scale and Modified Behavioral Pain Scale (MBPS	VR was more effective in reducing pain during rubber dam insertion than local anesthesia.
Bahrololoomi et al. (2024, iran)	Split-mouth crossover RCT,2 group	30 children aged 6 to 8 years	All children receive VR and control on different sides	Mini VR headset during pulpotomy	Standard pulpotomy without VR	Modified Child Dental Anxiety Scale (MCDAS), pulse rate	VR decreased anxiety and pain, but did not significantly change pulse rate.

DISCUSSION

The articles reviewed discuss audiovisual distraction interventions across various types of audiovisual stimuli. The eight articles analysed showed that different forms of audiovisual interventions and behavioural distraction techniques consistently provided benefits in reducing anxiety and increasing children's cooperation during medical procedures. Research by Gozin et al. (2022) showed that audiovisual storytelling and tell-show-do techniques were equally effective in reducing anxiety compared with no intervention, confirming the role of structured distraction in children's emotion regulation. This finding is in line with a study (Delgado et al., 2021) which reported that the use of video goggles improved behaviour and reduced children's anxiety during restorative dental treatment, although its effectiveness was moderate due to limitations of embalming.

In the context of audio interventions, Bhusari et al. (2025) found that binaural auditory beats were more effective at reducing anxiety than both regular music and controls, and their findings were supported by robust methodology and multiparameter measures. Meanwhile, studies in MRI environments by Oktay et al. (2025) and van der Vleuten-Chraibi et al. (2025) showed that child-friendly audiovisual content reduced stress, reduced body movements, and improved imaging quality, confirming the clinical value of AV in high-anxiety diagnostic procedures.

The use of VR as an immersive distraction also yielded positive findings. A crossover study by Zaidman et al. (2023) showed that VR reduced pain, especially during rubber dam placement, while research by Bahrololoomi et al. (2025) showed that VR significantly reduced anxiety and pain during pulpotomy, although it did not affect physiological parameters such as heart rate. The consistency of these findings reinforces the evidence that VR offers a higher level of sensory engagement, thereby more effectively diverting children's attention from anxiety-inducing stimuli.

Overall, all studies show a consistent pattern of effects despite considerable variation in interventions, ranging from digital storytelling to VR headsets. These results support the view that audiovisual distraction and VR are effective non-pharmacological approaches that can be easily integrated into paediatric healthcare services (Gozin et al., 2022; Delgado et al., 2021; Bhusari et

al., 2025; Oktay et al., 2025; Linthoingambi et al., 2022; Zaidman et al., 2023; Bahrololoomi et al., 2024). However, several studies have limitations such as a lack of blinding, variations in randomisation methods, and limited sample sizes, so the strength of the evidence must be interpreted with caution.

Further evidence of the effectiveness of audiovisual distraction comes from clinical studies using VR for basic dental procedures, not just for invasive anaesthesia. For example, a study by Bagher et al. (2023) evaluated the effects of Virtual Reality Distraction (VRD) on anxious children undergoing preventive dental treatment, using biological measures such as salivary cortisol levels and heart rate. This study was an open-access RCT that reported that the VRD group showed a significant decrease in cortisol levels after the procedure compared with the control group, which only watched cartoons on a regular screen. However, despite the decrease in biochemical aspects, behaviour and subjective anxiety scales (such as the Venham Anxiety Scale) showed no significant differences between the groups. This indicates that a reduction in physiological anxiety does not always align with children's subjective perceptions or clinical behavioural assessments. These findings are important because they highlight the complexity of VR distraction's effects: it not only reduces physiological stress but may also have a lesser impact on how children report their anxiety (Bahrololoomi et al., 2024). This study also shows that VR techniques are relatively safe and can be applied to children aged 6–14 years, which is a fairly wide age range. Because the study used a randomised design, its internal validity is quite strong. However, the use of VR may be limited by the cost of the equipment and by children's discomfort while wearing VR glasses during long sessions. Furthermore, the effects of long-term VR use or its impact on subsequent clinical visits have not been thoroughly explored (Zaidman et al., 2023).

Although there are ample positive evidence, meta-analyses and systematic reviews indicate that the quality of RCT studies on AV in children remains limited. A meta-analysis concluded that AV distraction is effective in reducing heart rate during local anaesthesia in children, but many studies are at high risk of bias and exhibit substantial heterogeneity (Almarzouq et al., 2024). In addition, systematic research on AV interventions shows that some clinical trials have weak methodological designs or small sample sizes, so the results must be interpreted with caution. The meta-analysis also noted that although most behavioural and anxiety scales showed improvement with AV, not all studies reported physiological outcomes such as oxygen saturation, making the integration of clinical evidence difficult. This suggests that although AV provides benefits, strong, consistent, and generalisable evidence remains limited. Bias assessment in systematic reviews indicates inadequate blinding and insufficient reporting of allocation concealment in many RCTs, which reduces the strength of conclusions (Kolhe et al., 2024; Shekhar et al., 2022; Singh et al., 2023). Furthermore, crossover or follow-up designs are rarely used, making it difficult to assess long-term effects. The implementation burden of AVs (such as VR devices and goggles) is rarely evaluated in public health contexts. The meta-analysis summary emphasises the importance of further research with higher methodological standards and more uniform outcomes.

In a practical clinical context, the use of AV as a distraction tool offers several key advantages. First, AV is a non-pharmacological intervention that avoids the risks of sedation or drug side effects in children (Jamil et al., 2023). Second, AV can be tailored to the child's preferences, for example, by selecting the type of cartoon or music, making the experience more engaging and effective. Third, consumer technologies such as smartphones, tablets, and VR glasses are becoming more affordable, enabling the integration of AV in clinics with limited resources. Fourth, AV distraction can improve the procedural experience for children while helping clinic operators' complete treatments more smoothly (Bali et al., 2025; Cunningham et al., 2021). Fifth, this intervention can increase children's collaboration, reduce difficult behaviour management, and decrease stress on clinic staff. Due to these benefits, AV distraction has the potential to be adopted as an additional standard in managing children's anxiety in dental, radiology, and other clinics. Interestingly, some

studies also show that AV affects biological parameters such as heart rate or cortisol, indicating non-subjective effects. The use of AV is also relevant in modern healthcare practices that are increasingly digital (Almarzouq et al., 2024; Bahrololoomi et al., 2024). However, to achieve widespread adoption, AV usage protocols must be standardised and harmonised to ensure consistent results across clinical settings. Thus, despite its promising clinical benefits, routine implementation of AV requires an evidence-based framework.

Challenges and obstacles

However, significant challenges remain in implementing AV in paediatric clinics. One obstacle is access to equipment: not all clinics have VR glasses, 3D devices, or i-theatre systems, especially in areas with limited resources. Additionally, staff training is required to use AV correctly and integrate it into workflows without disrupting clinical procedures (Sarkar et al., 2021). Logistical changes and preparation time may add to the workload of clinic staff. There are also issues of child comfort: not all children enjoy wearing VR headsets or goggles during lengthy procedures, and nausea or adjustment difficulties may occur. Furthermore, the costs of maintenance, content updates, and device sanitation (e.g., goggles) must be considered to ensure safe shared use (Loveys et al., 2023; van Dalen et al., 2022). From a research perspective, many studies still use small sample sizes or single visits, which do not adequately reflect long-term clinical reality. Risks of bias, such as inadequate allocation concealment and inadequate blinding, further limit the strength of the evidence. Heterogeneity in AV content, duration, and outcome measurement methods also makes generalisation difficult. Thus, although AV shows promise, real pragmatic challenges must be addressed for large-scale integration in clinical settings.

The novelty of AV research in paediatrics lies in its modern approach and personalised interventions. Recent studies, such as mobile music and VR applications, show that consumer technology can be adapted for clinical needs, not just entertainment. Mobile music applications, for example, combine active distraction with audio analgesia to provide a participatory, adaptive approach (Bali et al., 2025; Kolhe et al., 2024). Meanwhile, VR with immersive glasses enables experiences that alter children's perception of space and time during procedures, reflecting progress from classical methods like TSD (tell-show-do) to digital media-based interventions (Bahrololoomi et al., 2024). Additionally, outcome measurements now include not only behavioural reports but also biological parameters such as cortisol. This allows interventions to be re-optimised based on children's preferences, like choosing specific videos or games. Such technology integrates paediatrics, psychology, and digital advances—highly relevant in the era of digital health—and supports safer care by reducing reliance on pharmacological interventions. Thus, modern AV research provides significant innovation in clinical anxiety management for children.

Future research directions

Despite recent advances, significant gaps remain in the field of paediatric distraction audiovisuals, chiefly the lack of standardised intervention protocols. There is no consensus on optimal duration, type of content (cartoons, music, games), or timing of interventions during clinical procedures (Appel et al., 2024; Jamil et al., 2023; Oudkerk Pool et al., 2022). Inconsistent application makes it difficult to evaluate outcomes and hinders consistent clinical use. Furthermore, the long-term effects of AV interventions remain under-explored, as does comparative research with pharmacological interventions. Few studies assess AV use among special needs populations or examine physiological outcomes such as cortisol or skin response (Cunningham et al., 2021; Mahmoudi et al., 2024; Shields et al., 2025; Singh et al., 2023). Evaluations of cost-effectiveness are also limited. Therefore, well-designed research is urgently needed to address these issues (Shields et al., 2025; Wu et al., 2023).

Ethical and child comfort considerations are increasingly important in future research, especially with VR devices. Studies should assess potential side effects, tolerability, and children's preferences

for devices such as headsets or AV goggles (Zaidman et al., 2023; Appel et al., 2024; Gómez-Polo et al., 2021). Ensuring content is appropriate and not overly stressful also addresses privacy. Additionally, hygiene protocols and the logistics of preparing AV devices between patients need to be integrated into research and clinical guidelines to facilitate adoption.

From the perspective of health policy research and implementation, AV as a distraction intervention offers great potential for public health efforts. Because AV is relatively inexpensive and non-invasive, it can be integrated into community clinics, schools, and children's health centres (Almarzouq et al., 2024). Using mobile phone or tablet applications that patients already own can be an efficient way to implement distraction without a major investment in specialised equipment. This is particularly relevant in resource-limited settings, where sedation may not be routinely available (Bali et al., 2025; Cunningham et al., 2021; van Dalen et al., 2022). Additionally, the use of AV can reduce the need for sedation or mild tranquillisers, thereby lowering the risks and costs of care (Gorowska et al., 2022; Villarreal-Zegarra et al., 2022). Health institutions and hospitals should include AV interventions in child anxiety management packages, and policymakers should prioritise staff training, device maintenance, and public health impact evaluations in their implementation plans. Proving cost-effectiveness and user acceptance should be key goals for broad policy adoption.

Furthermore, integrating AV with other digital health technologies opens the door to innovative research and implementation. For example, applications that combine biofeedback with AV videos could enable children not only to watch but also to learn to control their physiological responses, such as heart rate and breathing (Orgil et al., 2024). This combination could strengthen emotional regulation and provide long-term effects beyond just temporary distraction. Future research should test AR as a lighter, potentially more comfortable alternative to VR, and explore AI-driven adaptation of AV content to children's real-time responses (Chittaro et al., 2024). Researchers should prioritise cross-disciplinary collaboration and develop translational models to clinically test these adaptive platforms. Advancing these innovations requires coordinated research to transform AV into an interactive, child-responsive intervention.

Designing future research requires stronger methodologies, including randomised studies with concealed allocation, blinded assessors, and intention-to-treat analysis. Transparent protocols and reporting, as well as larger, multi-centre trials, will increase the generalisability of results. Standardised subjective and physiological outcomes (Kolhe et al., 2024) and demographic reporting enable meta-analyses and subgroup insights. Long-term follow-up, cost-effectiveness, and implementation aspects such as staff training and device sanitation should be evaluated to ensure clinical and economic value. Such methodology will support robust, widely applicable evidence.

It is important to consider the patient's perspective in AV research and application. Because children have individual preferences, future research must assess how content type affects distraction effectiveness and involve children in selecting content (Gökoğlu & Sukut, 2025). Researchers should routinely measure comfort, satisfaction, and future willingness to use AV. Evaluation of parent and clinician acceptance is also recommended, as their perspectives influence clinical adoption. Qualitative surveys, interviews, or focus groups should be standard to understand stakeholder experiences and inform best practices. Integrating these patient-centred insights into AV protocols is crucial for ensuring broad acceptance and real-world impact.

From a clinical education perspective, AV can also be a training tool for paediatric healthcare professionals. Institutions should use VR simulations or educational videos to train staff to recognise and manage children's anxiety (Bernaerts et al., 2021; Putnam et al., 2021). Clinicians should be encouraged to use AV with real patients to refine communication and behaviour management skills. Training programmes must incorporate feedback from clinicians and children to

enhance relevance and realism. AV's integration into academic curricula can speed adoption in clinical practice and drive ongoing improvement. Prioritising AV-based education will cultivate a proactive approach to paediatric anxiety management among healthcare professionals.

Clinical implications

In summary, audiovisual interventions offer great potential as a strategy for managing anxiety in children in clinical settings. Evidence from RCTs and other studies shows that AV can reduce subjective anxiety, improve cooperative behaviour, and even lower physiological stress parameters. However, significant challenges such as equipment, cost, blinding, and protocols need to be addressed for widespread implementation. The novelty of the research lies in integrating popular digital technologies into the clinical management of children and in more comprehensive physiological monitoring. Nevertheless, research gaps such as standardisation of AV content, long-term effects, and cost-effectiveness remain substantial. Future AV research should emphasise stronger methodological design, large sample sizes, and patient involvement in content selection. With a holistic, clinically practical approach, AV could become an integral part of more child-friendly, effective care. If well-designed and implemented, AV has the potential to revolutionise how we manage childhood anxiety in medical and dental therapy care.

CONCLUSION

This review shows that audiovisual and virtual reality interventions consistently help reduce anxiety in preschool- to primary-school children during various clinical procedures. Their effectiveness is evident in both subjective and physiological measurements, although study quality and methodological variations introduce substantial heterogeneity. Implementation barriers such as device limitations, staff training requirements, and integration into clinical workflows remain major challenges. Overall, the available evidence supports the use of AV or VR as an effective and safe non-pharmacological approach to improve children's clinical experiences.

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