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SYSTEMATIC REVIEW

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The effect of music on pain in mechanically ventilated patients: A Systematic review

Abdullah Avcı[1] | **Emine Kaplan Serin**[2]

[1]Department of Nursing Services Coordinator, Mersin University Hospital, Mersin, Turkey

[2]Department of Medical Nursing, Faculty of Nursing, Mersin University, Mersin, Turkey

Correspondence
Abdullah Avcı, Department of Nursing Services Coordinator, Mersin University Hospital, 33343 Mersin, Turkey.
Email: abdullahavci@mersin.edu.tr

Abstract

Background: Mechanical ventilation is one of the most important supportive treatments used in critically patient care. The majority of patients dependent on mechanical ventilation experience pain. There are little data on the effect of music on pain in mechanically ventilated patients.

Aim: The aim of this review is to determine the effect of music on pain in patients connected to mechanical ventilation.

Methods: The protocol of this systematic review was registered with PROSPERO (CRD42024548456) and PRISMA guidelines were followed in reporting the study. The search was conducted in Pubmed, Web of Science, Scopus and Cochrane Library databases without year limitation. Inclusion and exclusion criteria were created considering the PICOS criteria. The selection of studies and the quality assessment of the studies reviewed were made by two independent researchers. The reviewed articles were analysed with the data extraction form developed by the researchers. The quality of the included studies was evaluated using the Joanna Briggs Institute tool.

Results: Ten studies ($n = 603$) were included in the scope of the review. In the majority of the included studies, it was found that music had positive effects on reducing pain in patients connected to mechanical ventilation. The studies included in the review showed differences in terms of sample size, music duration, type, and evaluation tools. Studies have not found any harmful effects of music application on patients.

Conclusion: In the studies included in this systematic review, it was determined that music had a positive effect on reducing pain in patients connected to mechanical ventilation.

Relevance to Clinical Practice: Managing pain in patients receiving mechanical ventilated support is extremely crucial, and considering the study results, it is thought that it is necessary to include music intervention in intensive care. As music intervention

is easy, safe and economical, it can be incorporated into nursing care by intensive care nurses.

KEYWORDS
critical care, mechanical ventilation, music, pain, systematic review

1 | INTRODUCTİON

Mechanical ventilation (MV) is one of the life-saving treatment methods used to treat patients experiencing respiratory failure.[1] Between 20% and 46% of patients admitted to intensive care require MV support.[2,3] MV brings with it many physiological and psychological problems for patients in intensive care units.[4] It is stated that 89.9% of patients receiving MV treatment experience pain.[5] According to the International Association for the Study of Pain, pain is defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage.[6] Practices such as endotracheal aspiration, nasogastric tube insertion, dressing change, positioning and oral care applied to patients on MV support not only provide healing but also cause pain.[5,7] It is emphasized that accurate assessment and effective management of pain not only reduces the duration of MV and intensive care stay, but also has positive effects on complications.[8,9] Therefore, pain assessment and management are of significant importance in patients connected to MV.

Pain management should be supported by complementary and integrated practices in addition to pharmacological treatments. Clinical practice guidelines recommend using non-pharmacological interventions, such as massage and music, to relieve pain in critically ill patients.[10] Music, which is among the complementary and integrated practices, is a non-invasive, safe and economical practice in pain management.[11] Music has many positive physiological and psychological effects on the human body.[12,13] It has been determined that live music intervention provides relief and leaves positive impressions on patients receiving treatment in intensive care.[14] Additionally, a recent study has shown that musical intervention adapted to individual preferences by a music therapist to patients receiving MV support reduces the cost of intensive care.[15] The neurobiological basis of the analgesic effect of music has been extensively examined in various studies.[16–18] Listening to music involves several cortical and subcortical areas involved in pain modulation, including the periaqueductal grey matter.[16] Music has been reported to alter brain activity in the presence of a painful stimulus.[17] In line with current evidence, it is stated that music can be used in all areas of health and is widely used in pain management because it is an easy method.[19–21] However, although there are some opinions about what criteria should be used to create the optimal positive effect of music on people, it has not yet been fully clarified. It is emphasized that in musical interventions, the type of music, duration, frequency, who chooses it and the way of presentation must be specified in detail.[22]

There are systematic reviews and umbrella reviews in the literature examining the effects of music intervention on pain in intensive care patients.[23,24] In these studies, patients who were not connected to a mechanical ventilator as well as patients who received mechanical ventilation were included. No studies have focused solely on patients receiving mechanical ventilation support. In this regard, it is thought that the findings of this study will guide the use of music in evidence-based pain-related care interventions in patients dependent on mechanical ventilation, which is one of the life-saving treatment methods.

What is known about the topic

- Mechanical ventilation is one of the life-saving treatment methods used to treat patients experiencing respiratory failure.
- Pain is a very common symptom in patients receiving mechanical ventilation support.

What this paper adds

- Music may reduce pain in patients on mechanical ventilation.
- Music can be used as an easy, safe and economical nursing intervention for patients receiving mechanical ventilation support.

2 | AIM

The aim of this systematic review is to determine the effect of music on pain in patients connected to MV.

2.1 | Research questions

Does music intervention reduce pain in patients dependent on mechanical ventilation?

3 | MATERİALS AND METHODS

3.1 | Design

This study is a systematic review. The protocol of the study was registered in the PROSPERO database, which allows recording systematic reviews and meta-analyses in the world, with the ID number

CRD42024548456. PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) guide was used in creating the systematic review protocol.[25]

3.2 | Searching strategy

In this systematic review, the literature search was conducted in Scopus, Web of Science, PubMed and Cochrane Library databases without year limitation. The search was carried out in line with the English keywords determined by MeSH (Medical Subjects Headings) terms. The search was carried out between 3 and 7 June 2024, using combinations of words and phrases such as 'mechanical ventilation', 'music' and 'pain'. The search was carried out by two independent researchers. Then, evaluations that were made independently by the researchers were compared and a consensus was reached on the different opinions.

3.3 | Inclusion and exclusion criteria

The selection of studies included in this systematic review was determined according to the inclusion criteria established by the PICOS method: (1) Population: Patients aged 18 and over who are connected to MV; (2) Implementation: Patients who receive musical intervention; (3) Comparison group: Studies in which routine care or a different intervention is applied or studies in which no comparison is made; (4) Outcome: Studies evaluating the outcome related to pain after music intervention; (5) Study design: Randomized controlled and quasi-experimental studies in English with full text available.

Studies that are not in English, whose full text is not available, that are descriptive studies, qualitative studies, letters to the editor, case reports, systematic and traditional compilations are excluded from the scope of this study. Additionally, studies that used music intervention other than patients on MV were not included in this systematic review.

3.4 | Separation and analysis of data

The selection process of the studies was carried out in two stages. In the first stage, the articles accessed by searching by two researchers were independently evaluated according to their titles and abstracts in line with the inclusion and exclusion criteria. Later, the articles whose full text was available were examined in detail. In the last stage, the full texts of articles considered for inclusion were independently reviewed by two researchers. In case of any indecision or conflict, the choices were compared and a common decision was reached with different opinions. Studies that were decided to be included by the mutual decision of two researchers were examined.

A standard data extraction form was developed by the authors to summarize the data. The reviewed articles were analysed with the data extraction form developed by the researchers. Data extraction was conducted by two independent researchers. Using the data extraction form, data on the authors of the studies included in the systematic review, year, place of study, design, sample size, gender, age, characteristics of music interventions and measurement tool were collected (Table 2).

3.5 | Evaluation of methodological quality

The quality assessment of the studies included in this systematic review was made by The Joanna Briggs Institute with quality assessment tools prepared according to the research design. In the study, 'The Joanna Briggs Institute Critical Appraisal tools for use in JBI Systematic Reviews Checklist for Randomized Controlled Trials', consisting of 13 items, was used to evaluate the quality of randomized controlled trials. To evaluate the quality of quasi-experimental studies, 'The Joanna Briggs Institute Critical Appraisal tools for use in JBI Systematic Reviews Checklist for Quasi-Experimental Studies', consisting of nine items, was used.[26] In the checklists, each item is evaluated as yes, no, unclear and inapplicable. A high score indicates high methodological quality in the research. The quality assessment of the studies was made independently by the first and second researchers. Then, the evaluations made independently by the researchers were compared and a common decision was reached regarding the different opinions. The quality scores for each article are shown in Table 1.

4 | RESULTS

4.1 | Selection of studies

In this systematic review, a total of 179 studies were found as a result of the first screening. Seventy-one of these studies were eliminated as a result of duplication. As a result of title and abstract review, 85 studies were eliminated because they were irrelevant to the subject. In the full-text review, 13 studies were eliminated because they did not meet the inclusion and exclusion criteria. Because of the small number of studies to be evaluated in full text, the agreement rate among independent researchers was found to be high. It was determined that 10 studies were conducted to determine the effect of music applied to patients connected to MV on pain. The PRISMA flow diagram showing the selection process of studies is given in Figure 1.

4.2 | General characteristics of the studies and participants

In the systematic review, 10 studies with sample sizes ranging from 24 to 118 and a total of 603 participants were found suitable for review. Although the sample group of these studies consists of patients connected to MV in intensive care, it is seen that male gender is predominant in all studies. Eight of the studies included in the systematic review were randomized controlled studies, and two had a

TABLE 1 Characteristics of included studies.

Author (Year), Country	Study design	Sample (IG/CG)	Age Mean (SD or Minimum-Maximum or IQR)	Male/Female % Distribution	Duration of MV (SD or IQR)	Assessment tool	Main findings	JBI score
Aktaş & Karabulut (2016), Turkey	Single-blind randomized controlled trial	*N* = 66 (33/33)	65 (12)	73/27	IG: 3.81 (1.48) CG: 4.28 (1.54)	CPOT (0–8)	It was found that the CPOT score during endotracheal aspiration in the music group was lower than the control group ($p < .001$).	10
Jacg et al., (2018) France	Not randomized controlled study	N = 60 (30/30)	69 (60;80)	52/48	IG: 5 (3;13) CG: 5 (3;12)	BPS (3–12)	Music significantly reduced pain intensity during morning bed bath in mechanically ventilated patients ($p < .0001$).	8
Ettenberger et al., (2024) Colombia	RCT	*N* = 24 (8/8/8)	24–84	17.4/82.6	MAR: 2 (1;3) PTML: 6 (2;9) CG: 8 (7.5;12.5)	VAS (0–10)	No statistically significant difference was observed in pain scores between the groups ($p = .624$).	10
Golino et al. (2023) USA	RCT	*N* = 118 (57/61)	18–89	62.5/37.5	NS	CPOT (0–8)	The CPOT score of patients receiving live music therapy was found to be statistically lower ($p = .002$) than the control group.	8
Dallı et al., (2023) Turkey	A single-blind, randomized, controlled trial	*N* = 36 (12/12/12)	54.5 (13.5)	50/50	MG: 9.16 (4.32) NTG: 16.6 (9.82) CG: 18.5 (8.89)	CPOT (0–8)	It was determined that there were statistically significant decreases ($p < .05$) in the CPOT score in the music group compared with the other groups.	10
Yaghoubinia et al., (2016) Iranian	RCT	N = 60 (30/30)	50 (8)	50/50	NS	BPS (3–12)	It was observed that there was a decrease in the pain intensity of patients connected to mechanical ventilation after the music intervention ($p < .0001$).	9
Çalışkan et al., (2024) Turkey	Experimental research	N:24	64.8 (14)	66.7/33.3	18.79 (20.6)	CPOT (0–8)	It was observed that there was a decrease in CPOT scores ($p = .000$, $p = .000$) after the intervention of Western Classical Music and Turkish Art Music.	5
Aktaş & Karabulut (2019) Turkey	Prospective, randomized controlled trial	*N* = 80 (40/40)	IG: 64.7 (9) CG: 67.1 (9.2)	65/35	IG: 3.90 (1.49) CG: 4.25 (1.49)	CPOT (0–8) BPS (3–12)	During endotracheal aspiration, CPOT and BPS scores were determined to be lower in the music group than in the control group ($p = .000$, $p = .000$).	10
Mateu-Capell et al., (2019) Spain	Randomized crossover clinical trial	*N* = 75 (36/39)	69 (14)	73/27	GA: 1 (1;3) GB: 2 (1;4)	BPS (3–12)	There was no decrease in the pain level of the patients after music application.	10
Kyavar et al., (2016) Iranian	RCT	*N* = 60 (30/30)	60 (8)	77/23	NS	CPOT (0–8)	It was determined that music reduced pain levels ($p < .001$) in patients connected to mechanical ventilation.	7

Abbreviations: BPS, Behavioural Pain Scale; CG, Control group; CPOT, Critical-Care Pain Observation Tool; GA, Group A; GB, Group B; IG, Intervention group; IQR, interquartile range; MAR, Music-assisted relaxation; MV, Mechanical ventilation; NS, not specified; PTML, Patient-preferred therapeutic music listening; RCT, randomized controlled trial; VAS, Visual Analogue Scale.

TABLE 2 Music intervention characteristics.

Author	Music type	Duration (min)	Tempo	Timing	Session/Day	Provider	Music Selection	Delivery
Aktaş & Karabulut (2016)	Turkish Sufi Musical	40	60–80	Endotracheal suction	1	NS	Researcher and lecturer in music field	Music pillow, MP3 player
Jacg et al., (2018)	Passages by Mozart	Before, during and up to 30 minutes after bed bath	60	Bed bath	1	Researcher	Researcher	MP3 player
Ettenberger et al. (2024)	Vallenato, Boleros, Religious, Ballads, Rancheras	MAR: 26.5 PTML: 27.5	NS	NS	1/ Most 4	Music therapist	Music therapist and Patient	Live
Golino et al. (2023)	NS	30	NS	Daytime	1	Music therapist	Music therapist and family members	Live
Dallı et al. (2023)	MusiCure compositions	60	60–80	10.00–11.00 13.00–14.00	2/5	Researcher	Araştırmacı	Headphones, MP3 player
Yaghoubinia et al. (2016)	Beach Walk by Arnd Stein	30	NS	Rest	1/3	Researcher	Researcher	Headphones, MP3 player
Çalışkan et al. (2024)	Western Classical Music and Classical Turkish Music in Nihavent makam	60	NS	Rest	1	Researcher	Researcher	MP4 player, earphones
Aktaş & Karabulut (2019)	Turkish Sufi Musical	20 pre- and 20 post-ETS	60–80	Endotracheal suction	1	NS	Music therapist	Music pillow, MP3 player
Mateu-Capell et al. (2019)	Reikid Merlin's magic	60	NS	Rest	1	Researcher	Music therapist	Headphones, MP3 player
Kyavar et al. (2016)	Classical, instrumental and traditional music as well as Quran recitation	30	NS	Dressing change	1	NS	Participant chose from selection	Headphones

Abbreviations: MAR, Music-assisted relaxation; NS, not specified; PTML, Patient-preferred therapeutic music listening.

quasi-experimental study design. All of the studies included in the analysis were published in 2016 and later, and four of them were published in the last 2 years. The studies were conducted in Turkey ($n = 4$), Iran ($n = 2$), France ($n = 1$), Colombia ($n = 1$), United States ($n = 1$) and Spain ($n = 1$). Three different measurement tools were used to assess pain in the included studies. In nine of the included studies, pain was assessed by observation of behavioural responses to pain (Intensive Care Pain Observation Scale and Behavioural Pain Scale). In one study, it was evaluated using the Visual Analogue Scale (Table 1).

4.3 | Characteristics of music interventions

In the studies examined, the minimum duration of implementation of music interventions was 26.5 min and the maximum was 60 min. Music in the range of 60–80 beats per minute was used in three studies, and slow to medium tempo music was used in one study. In six studies, no information was given about the tempo of the applied music. When the frequency of intervention was evaluated in the studies examined, it was determined that there was a single application ($n = 7$) or multiple applications ($n = 3$). The frequency of music interventions appears to be a one-session intervention in seven studies. In one study, a total of three sessions were applied, once a day, and in another study, two sessions a day, for a total of 10 sessions. In one study, it was stated that a maximum of four sessions were applied, once a day. In the four studies included in this systematic review, musical intervention was applied during painful procedures specific to the intensive care unit (endotracheal suctioning, in-bed positioning, bed bathing). It was determined that it was applied during rest in three studies, between 10.00–11.00 and 13.00–14.00 in one study, and at any time in one study. In two studies, no information was given on the subject. Practitioners involved in the delivery of the music intervention included not only researchers ($n = 5$) but also music therapists ($n = 2$). In three studies, no information was given about who presented the music. It is seen that in five of the included studies, the music selected by the researcher was applied to the participants, and in one of them, the music selected by the researcher and a lecturer in the field of music was applied to the participants. Apart from this, it was determined that the music chosen by the music therapist ($n = 2$), the music therapist and the participant ($n = 1$), and the music therapist and family members ($n = 1$) was applied to the participants. In one study, it was found that the participant chose the song herself/himself from the created music list. Among the devices used in the transmission of music, headphones ($n = 4$) and mp3 players ($n = 6$) received significant attention, while tools such as live music ($n = 2$),

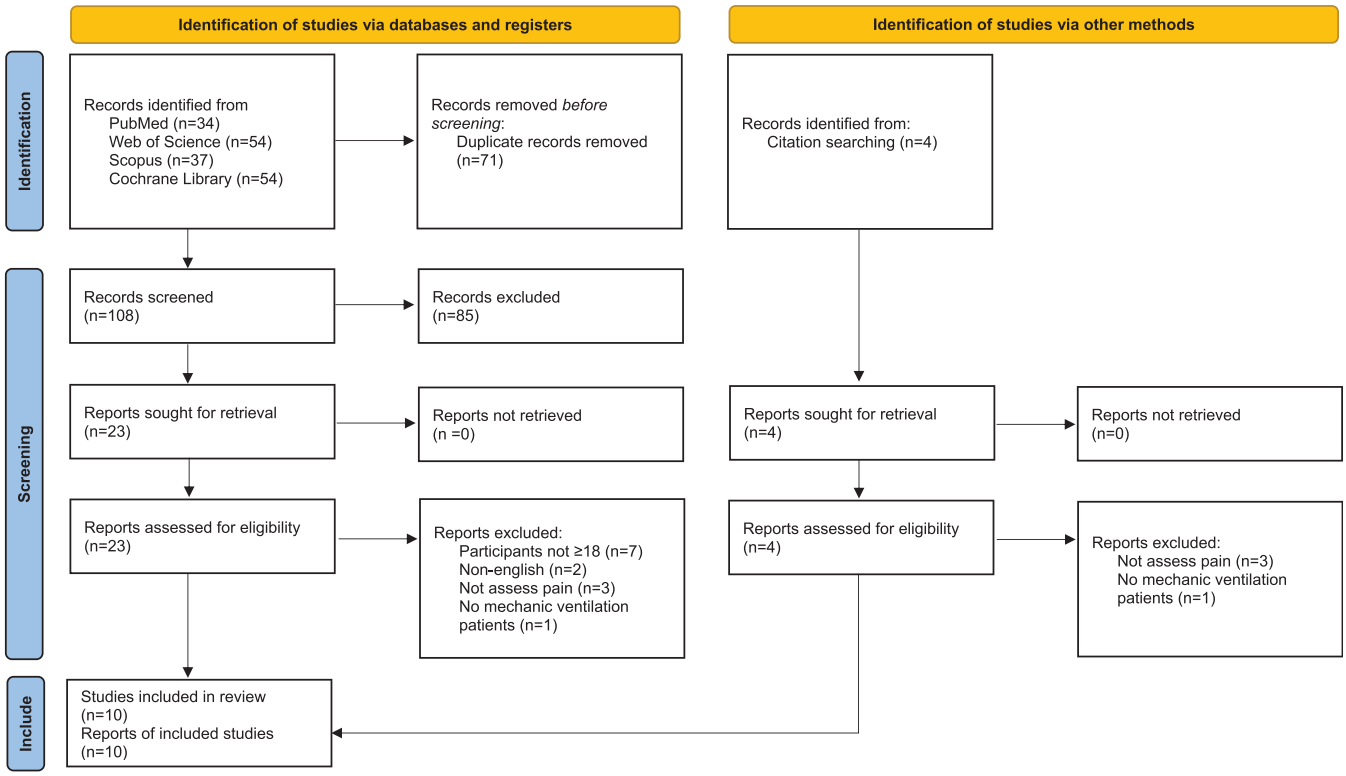

FIGURE 1 PRISMA 2020 flow diagram for new systematic reviews, which included searches of databases, registers and other sources.

mp4 player ($n = 1$) and music player pillow ($n = 2$) were also found to be used.

4.4 | Methodological quality assessment

It was observed that the quality score of randomized controlled studies was 7 as the lowest and 10 as the highest. A double-blind design was not applied in any of the studies. The quality score of quasi-experimental studies was determined as 5 as the lowest and 8 as the highest (Table 1).

4.5 | Comparison group

In seven of the studies examined, the control group received standard care,[27–33] while in one study, the control group was isolated from sound through headphones.[34] One study had a randomized cross-over design and patients were placed in music and sound isolation groups.[35] In one study, there was no control group.[36]

4.6 | The effect of music on pain

In eight of the 10 studies reviewed, music interventions were found to have a statistically significant effect on reducing pain (Table 1).

4.7 | Adverse and undesired effects

No adverse effects were reported in any of the 10 studies included in the systematic review. However, there are some reports of undesirable effects. In one study, seven participants who received music intervention stated that they did not like music and earplugs.[29]

5 | DISCUSSION

To our knowledge, this study is the first systematic review reporting the effect of musical interventions on pain in mechanically ventilated patients. Although several studies conducted in the past have focused on the effect of musical intervention on pain in patients in the intensive care unit, these studies did not evaluate patients who were solely on MV. For example, Richard-Lalonde et al. evaluated the effect of musical interventions on pain applied to adult intensive care unit patients, while Widiastuti et al. examined the effectiveness of music therapy in alleviating the symptom experiences of intensive care unit patients.[23,37] In this systematic review, we focused on the effect of music on pain in patients connected to MV. In this regard, a comprehensive literature review was conducted and the results of 10 studies that met the inclusion criteria and included 603 patients were included. The included studies were conducted in six different countries and four different continents. The differences in the regions where the study was conducted show that music interventions can be

applied in different countries and cultures all over the world. The studies included in the systematic review show significant heterogeneity in terms of sample size, study design and characteristics of the music intervention. Because of these differences, the study's findings should be interpreted with caution. The fact that the sample and intervention characteristics of the included studies are different also reduces the possibility of generalizability of the results obtained. In this regard, the development of music intervention protocols is of great importance in order to ensure standardization of music intervention. These protocols will facilitate evaluations of music interventions and ultimately contribute to conducting higher quality systematic reviews with reduced heterogeneity.

The most reliable indicator in pain assessment is the patient's own pain expression. However, in intensive care units, patients may have difficulty in defining their pain levels because of reasons such as lack of verbal communication due to MV, changes in consciousness level and sedation. In cases where pain cannot be expressed verbally, observing behaviour is a valid approach to pain assessment.[38–40] In the studies included in this systematic review that used behavioural pain assessment scales, it was determined that music intervention reduced the pain severity of patients. Studies in the literature also report that musical intervention reduces the severity of pain in intensive care patients.[23,37,41] Considering the studies in the literature and our study findings, music may be one of the applicable methods in controlling the pain intensity of patients under MV. Importantly, international guidelines for patients in intensive care units recommend musical intervention to reduce pain and strongly recommend further investigation of non-pharmacological interventions for pain management.[10] In the guide published by Robb et al. in 2011, it was emphasized that music application should be based on individual cultural values and patient selection.[22] In this regard, the cultural values of the participants should be prioritized in the selection of music for future studies.

When the included studies are examined, many different application procedures regarding music interventions are encountered. The most important reason for this difference is the lack of consensus regarding the standardization of the features of music enterprises. It is thought that the lack of standardization regarding the interventions implemented and, accordingly, the existence of interventions with different characteristics are a significant obstacle to the production of information at the evidence level. For this reason, 'Reporting Guidelines For Music-Based Interventions' was created in 2011 to ensure that music initiatives are reported in a transparent manner.[22] In this guideline, it is recommended that exposure be clearly defined in order to evaluate the effectiveness of the intervention. In particular, it was emphasized that the type of musical initiative, its duration, frequency, who selected the music and the way of presentation of the music must be specified. The fact that many parameters related to the intervention characteristics specified in the guide was explained in all the studies we evaluated can be considered as a positive finding in the reporting of the studies. However, there appear to be significant differences in these described parameters. In one study included in the review, the choice of music was left to the patients, while in other studies, the patients were made to listen to music determined by the researcher or music therapists. In studies in the literature where patients choose music, it has been found that music significantly reduces the severity of pain.[42–44] Garza-Villarreal and colleagues reported that the music chosen by participants showed positive results because the response to the music was relatively individualized and depended on the person's previous experience. In the same study, it was also stated that the music chosen by the participants may create difficulties in standardizing music therapy.[44] In other studies on the subject, the music that patients listened to by choosing from a music list created by the researchers was associated with a beneficial effect on pain.[19,45] Studies investigating researcher-selected music and patient-selected music would make it easier to draw definitive conclusions about the importance of individual preferences. For this reason, it is very important to conduct studies of high methodological quality examining the effectiveness of music selection. In addition, in the studies examined, it was seen that musical practices were made by different people. In terms of standardization of practices, it is thought that it would be appropriate for individuals trained in the field of live music to be practitioners. It is thought that recorded music interventions can be performed by practitioners, researchers or health professionals, provided that the music therapist is involved in the music selection.

Despite the consistency of the positive effect of music in most of the studies reviewed, studies differed in terms of timing, duration, frequency and presentation of music application. These findings prove that music as an intervention is highly variable and complex, so reproducibility will be difficult. The number/duration/frequency of sessions of music application is an important criterion for the desired effect to ocur.[22] In most of the included studies, the duration of the music appears to be 30 min. However, in only two of the studies, music intervention was applied more than once. According to the results of a meta-analysis, it was determined that 20–30 min of musical interventions was effective in reducing pain in patients treated in the intensive care unit.[37] According to Poulsen and Coto, it has been reported that music applied at least twice a day and for at least 15–30 min may be more effective.[46] In another study, it was determined that music intervention should not exceed 30 min per session, and if it is applied for more than 1 day, it will be effective for 14–30 days.[47]

Based on the findings from this systematic review, future study should consider examining the effects of specific types of music on pain in patients on MV support. However, the small number of included studies that selected music according to a specific method indicates that evidence-based music selection should become standard practice. Therefore, it is crucial that future studies adhere to reporting guidelines for music-based interventions.[22] This methodology will facilitate evaluations of music interventions and ultimately contribute to the conduct of higher quality systematic reviews with reduced heterogeneity.

6 | LIMITATIONS

Our study has a number of limitations and offers suggestions for topics that could be addressed in future study. First, the literature

search was limited to Pubmed, Cochrane Library, Scopus and Web of Sciences databases and only in English language. This may have caused us to miss some studies. Second, because of the nature of the music intervention, many studies examined were not designed to be double-blind. Whether participants or practitioners were aware of the effect of music during the intervention could be considered in future studies to reduce the placebo effect. Third, the results should be interpreted with caution because of differences in type, intensity, duration and genre of music. Finally, due to the differences in country and culture in which the included studies were conducted, this increased the difficulty of generalizing the findings for the population in this study.

7 | IMPLICATIONS FOR PRACTICE AND FURTHER RESEARCH

Based on our findings, intensive care nurses compliance with music may be beneficial in the following ways. Music can be used by intensive care nurses as an easy, safe and economical nursing intervention in MV patients. It is recommended that intensive care nurses who play a crucial role in the management of pain integrate music into their care plans for patients who are MV. Based on the findings from this systematic review, future study should consider examining the effects of specific types of music on pain in patients on MV support. Also, the cultural values of the participants should be prioritized in the selection of music for future studies. It is advised to carry out more studies on music usefulness in mechanical ventilation patients, using blinding and randomization techniques, with larger sample sizes and excellent methodological quality.

8 | CONCLUSION

Findings from this systematic review suggest that music may have beneficial effects on pain management in mechanically ventilated patients. Additionally, studies have not found any harmful effects of music application on patients. Music, which is a simple, safe and effective method, is recommended to be added to the care of patients connected to MV in intensive care as a non-pharmacological treatment. In the light of the data obtained as a result of the study, more studies with high methodological quality investigating the effect of music practices on pain are needed. Randomized controlled studies alone may not be sufficient to evaluate the benefits of music. For this reason, it is very important to conduct qualitative and mixed type study that tries to shed light on the qualitative aspects of music. Finally, in terms of the quality of future studies, the content of the music, the rhythm and melody of the music, whether it is live or recorded, the number of sessions/duration/frequency of the intervention, the qualifications of the practitioner and the location of the intervention must be specified.

AUTHOR CONTRIBUTIONS

We assure you that the authors of this article are Abdullah Avcı and Emine Kaplan Serin, respectively. The considered research is original and has not previously been published elsewhere (either partly or totally), and is not in the process of being considered for publication in another journal. All authors listed meet the authorship criteria according to the latest guidelines of the International Committee of Medical Journal Editors. All authors are in agreement with the latest version of the manuscript. The authors declare that they have no competing interests.

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CONFLICT OF INTEREST STATEMENT

No conflict of interest has been declared by the authors.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

No ethical approval is required as this research is a systematic review of previous studies.

PATIENT CONSENT STATEMENT

No patient consent declaration is required as this research is a systematic review of previous studies.

ORCID

Abdullah Avcı https://orcid.org/0000-0002-3696-8414
Emine Kaplan Serin https://orcid.org/0000-0002-7327-9167

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