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Complementary Therapies in Clinical Practice

Nursing music intervention: A systematic mapping study

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ABSTRACT

Objective: The present investigation analyses the studies of music intervention carried out by nurse researchers, or a research group including nurses, making use of a systematic mapping method to determine the trends in this field.
Method: In this study, based on a systematic mapping method, 68 out of the 809 studies published between 2013 and 2017, were evaluated.
Results: In 87.7% of the studies, Receptive Music Therapy was used while new age music was listened to in 23.9% of the studies. Music intervention was found to be effective in relieving anxiety and pain in 54% and 34.1% of the 44 studies examining the efficacy of receptive music therapy, respectively.
Conclusion: This study reveals that nurses use music intervention in all areas of health care services, and that the variables for which the effect of musical intervention is examined are mostly anxiety, vital signs and pain.

1. Introduction

Music is a familiar part of life for most people in the world [1]. Based on its ability to intensify emotions, its use has become common in the treatment of disease [2]. Today, music and musical activities are used in many areas of medical science to meet the physical, psychological, social and mental needs of individuals. Music intervention, which is known to have a positive effect on the treatment of disease, is a practice that is on the agenda of the healthcare system [3–5].

It has been stated in literature that music therapy can be applied effectively by health professionals in clinical environments [6]; that music therapy, when used as a complementary and alternative treatment method, may be included in nursing interventions; and these treatments may aid in the patient-oriented approach of nurses [7]. There have been numerous studies carried out by nurse researchers involving music intervention in the treatment and prevention of pain and anxiety, which are frequently encountered in the treatment and diagnosis processes of patients, and which affect both quality of life and compliance with treatment, as well as vital signs [8–13], the reduction of depression [14–16] and agitation [17,18], the management of dyspnea [19] and the improvement of quality of sleep [15,20,21] and life [22].

Nurses are one of the most extensively trained health care professionals in hospitals [23], and they also outnumber other healthcare providers and are in more frequent communication with patients [7,24]. These factors make nurses unique in terms of symptom management and in the provision of the most appropriate care for the patient [7]. Moreover, it is known that a direct relationship exists between the quality of nursing care and patient outcomes [24]. The effects of complementary and non-pharmacological methods like music therapy and their contribution to nursing care are very important, and so warrant analysis in terms of their ability to improve the health of patients, the quality of symptom management, the level of nursing care and the reduction of costs in these areas [1,25].

An analysis of recently performed studies involving music therapy identified a total of 9,926 studies carried out between 1919 and 2018, 6,910 of which were found to be published in medical journals and 1,585 published in nursing journals. Regarding the studies on music therapy specifically in the field of nursing, the number of studies conducted by nurse researchers in this field was found to be quite high, taking the form of original articles, reviews and systematic reviews examining the effects of music and music therapy. No systematic mapping study that presents all of the following subjects together was identified: years, journals and countries in which and when the studies were published, the discipline of nursing, inter- and multi-disciplinary team members, terminological differences, types of research, music intervention method examined and type of music, characteristics of the study sample, music intervention procedures, patient groups studied, variables examined, measurement methods used in measurement of variables, and study results.

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The present study examines studies of music intervention carried out by nurse researchers or research groups including nurses, and is based on a systematic mapping method. The intention in this regard is to reveal the trends and scientific content in this field, and to provide data that can guide nurses who want to carry out studies in this field in the future.

2. Material and methods

The systematic mapping method is a recognized research approach to the classification of the primary studies related to a particular research area. The purpose of this method is to classify research articles that respond to research questions on a specific subject, while also mapping and classifying current literature on a particular subject with a further review. In literature, the main goal of systematic mapping studies is reported as being to provide an overview of a research area, to provide information about the number, type and results of studies performed in the field, and to reveal time-dependent trends [26,27]. Although there have been studies in the field of nursing that include a systematic review of relevant literature, the systematic mapping method is a new research method that has only recently been adopted in the field of nursing.

In the present study, data on the features and characteristics of the methods used in music intervention researches carried out by nurse researchers, or research groups including nurses, between 2013 and 2017, was examined through the systematic mapping method. The method used in this study comprises three stages (Fig. 1).

2.1. Planning the systematic mapping study

In the planning phase of the study, research questions, a research protocol, and inclusion and exclusion criteria were determined, previous studies were reviewed and the reviews were classified.

2.1.1. Research questions determined within the scope of the study

Question 1: What is the distribution of the studies by years and countries?

Question 2: What is the distribution of the studies according to the journals in which they were published?

Question 3: What discipline is/are the researchers, and what is the distribution of this discipline according to other collaborated disciplines?

Question 4: What is the distribution of the studies based on the type of research?

Question 5: What is the distribution of the studies according to the applied music intervention method?

Question 6: What is the distribution of studies according to the music type used in the researches in which receptive music therapy is examined?

Question 6: What is the distribution of the studies according to the patient group included in the sample and the characteristics of the group?

Question 7: What is the distribution of the studies according to the field in which the music intervention is applied, its time, duration and the instrument used?

Question 8: What is the distribution of the studies according to the variables in which the effectiveness of music intervention methods is examined?

Question 9: What is the distribution of the studies according to the data collection tools used?

Question 10: What is the distribution of music intervention methods according to the variables that are determined to be affected by music intervention?

2.1.2. Determination of research protocol

To gain access to the studies that would be examined through systematic mapping method, three databases were used, being "Sciences Direct", "Scopus" and "EBSCOhost". The databases were searched for articles containing the following keywords: "music", "music therapy", "music medicine", "music listening", "music intervention", "nurse" and "nursing". The specified keywords were used in the same order in each database. When the same article was identified in more than one database, only was included in the review.

2.1.3. Determination of study inclusion and exclusion criteria

Studies into music intervention carried out by nurse researchers between 2013 and 2017, written in Turkish and English, and of which full text was available, were included in the study. Studies of which the full text was not available, those that were not carried out between the specified dates, and those which were not carried out by nurse researchers were excluded from the study. Of the 809 researches identified in the "Sciences Direct", "Scopus" and "EBSCOhost" databases using the keywords "music", "music therapy", "music medicine", "music listening", "music intervention", "nurse" and "nursing", 68 were included in the study after being found to meet the inclusion criteria (Fig. 2).

2.1.4. Classification of reviews

In the classification of the studies, an examination protocol comprising seven main sections was developed based on the research questions. In line with the protocol developed, an Article Classification Form was created and the studies were classified according to the
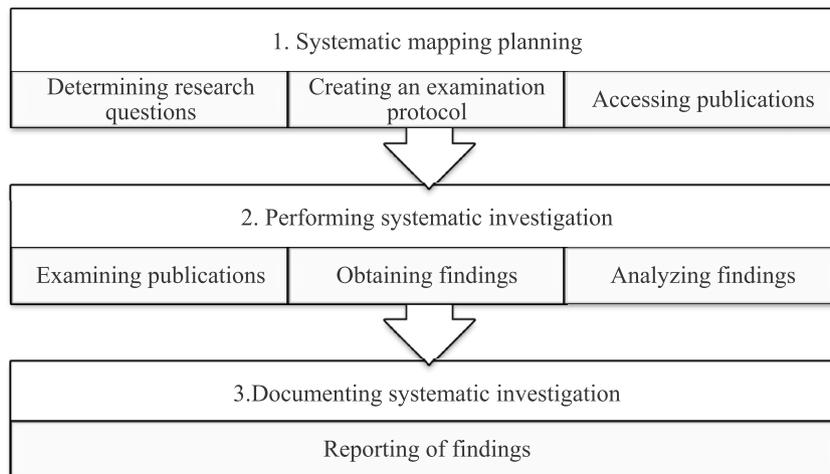

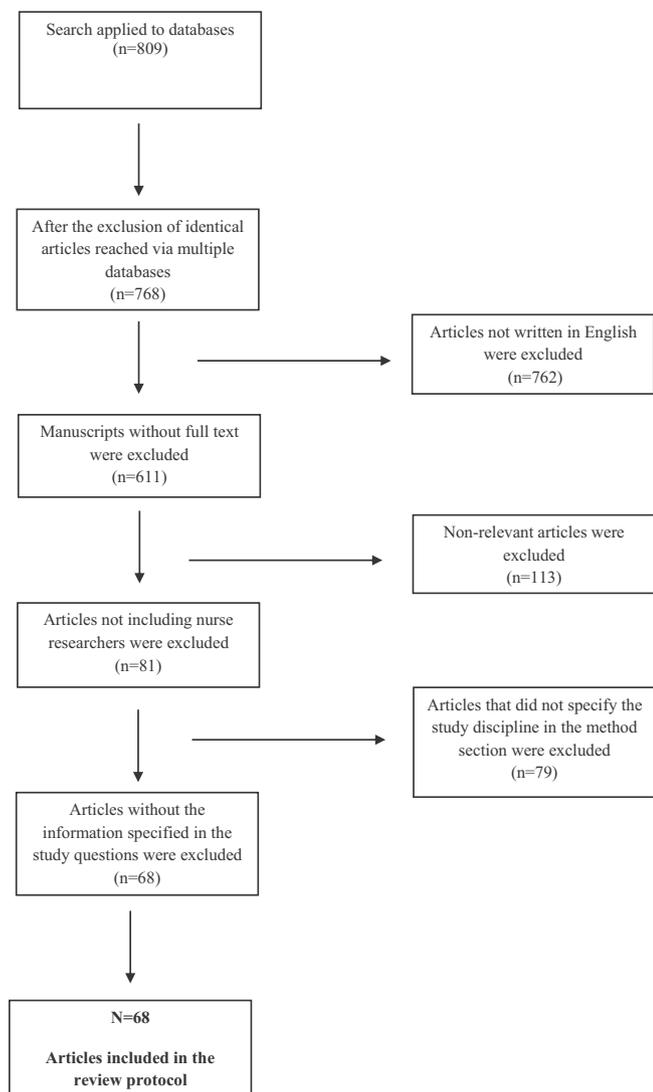**Fig. 1.** Systematic mapping study process.

Search applied to databases
(n=809)

↓

After the exclusion of identical
articles reached via multiple
databases
(n=768)

↓

Articles not written in English
were excluded
(n=762)

↓

Manuscripts without full text
were excluded
(n=611)

↓

Non-relevant articles were
excluded
(n=113)

↓

Articles not including nurse
researchers were excluded
(n=81)

↓

Articles that did not specify the
study discipline in the method
section were excluded
(n=79)

↓

Articles without the
information specified in the
study questions were excluded
(n=68)

↓

N=68

**Articles included in the
review protocol**

Fig. 2. Number of included articles during the study selection process.

following features and categories.

Article ID: Including descriptive information, such as the year and country of the study and the discipline studied.

Research Type: Covering information on the research protocol applied in the studies.

Objectives of the Research: Including information on the purpose of evaluating the effectiveness of the methods used in the research.

Participants: Including information on the characteristics of the sample group included in the studies.

The Method the Effectiveness of Which Was Evaluated: Covering information on the music intervention method the effectiveness of which was evaluated, and its method of application, place and duration.

Data Collection Methods: Methods used in data collection, data collection tools, the music intervention method, the effectiveness of which was evaluated on a sample group, the patient group included in the sample group and its characteristics, and the variables in which music intervention methods were determined to be effective.

Research Results: Including information on the results of the variables in which the music intervention methods were determined to be effective.

The evaluation protocol was finalized after being reviewed by three domain experts, and after a preliminary assessment was carried out involving five studies, selected at random, by the researchers. Accordingly, the validity of the review protocol was tried to be ensured.

2.2. Performing systematic mapping

The "music intervention", "music therapy", "music medicine", "music listening", "nurse" and "nursing" keywords were used in a search of the "Sciences Direct", "Scopus" and "EBSCOhost" databases. Of a total of 809 studies, 68 studies were found to meet the inclusion criteria, and were included in the study. Examination of the studies was performed by the researchers by following a process of repetition. The total of 68 studies which fitted the criteria for inclusion in the study was examined by each researcher independently, a classification was made and then a decision was made on its final state by comparing the classification.

2.2.1. Analysis of the findings

The statistical analysis was performed using SPSS version 20.0 software (Armonk, NY: IBMCorp). A data analysis set with characteristics and categories that complied with the specified research questions and classification protocol was created, and the studies carried out by nurse researchers on music intervention practices were analyzed for the systematic mapping study. The data were evaluated in terms of frequency and percentages.

3. Results

3.1. Years, countries and journals

Of the 68 studies carried out by nurse researchers or research groups including nurses between 2013 and 2017 on music intervention practices, 29.4% were performed in 2017, 23.5% in 2013 and 22.1% in 2016. In terms of countries, 32.35% of the studies were carried out in the United States, 19.11% in Turkey and 16.17% in Taiwan (Fig. 3), and the majority were observed to be have been published in the Pain Management Nursing (13.2%) and Complementary Therapies in Medicine (11.8%) journals (Table 1).

3.2. Nursing discipline studied and other disciplines collaborated

The disciplines of internal medicine (28%), clinical nursing (23.5%) and surgical nursing (19.1%) were found to be the most prominent in the researches (Fig. 4), in collaboration with the disciplines of nursing (97.1%), doctors of medicine (32.4%) and music therapiest (10.3%).

3.3. Distribution of the terms used in the studies

In the studies examined, it was seen that the terms used to relate to music intervention practices differed. The terms "music therapy", "music", "music intervention", "music listening" and "music stimulation" were used in 41.2%, 23.5%, 19.1%, 11.8% and 2.9% of the studies, respectively, while no expression was used in a single study (1.5%) due
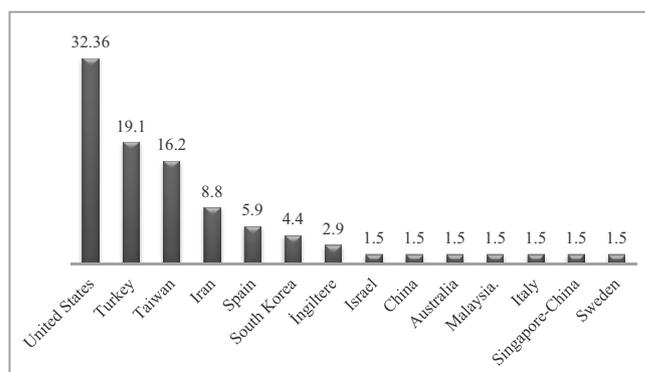

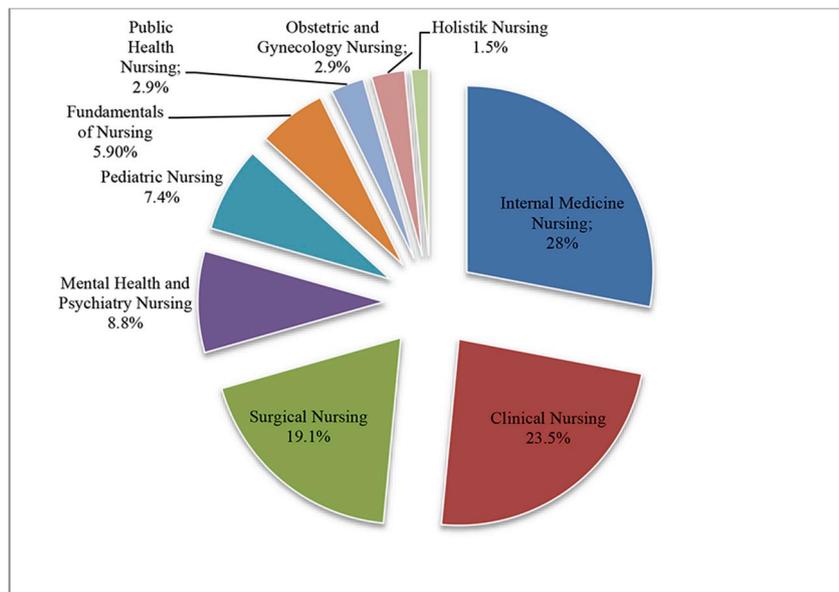**Fig. 3.** Distribution of studies by country.

Fig. 4. Distribution of the studies according to the nursing discipline.

Table 1
Distribution of studies according to by journal of publication.

Article	n	%
Pain Management Nursing	9	13.2
Complementary Therapies in Medicine	8	11.8
Applied Nursing Research	4	5.9
International Journal of Nursing Studies	3	4.4
Complementary Therapies in Clinical Practice	3	4.4
The Journal for Nurse Practitioners - JNP	2	2.9
Journal of PeriAnesthesia Nursing	2	2.9
Asian Nursing Research	2	2.9
Journal of Pediatric Nursing	2	2.9
Journal of Clinical Nursing	2	2.9
Heart & Lung	2	2.9
Oncology Nursing Forum	2	2.9
Art & Science	1	1.5
Other Nursıng Journals[a]	18	27.0
Other Medicine Journals[a]	8	12.0

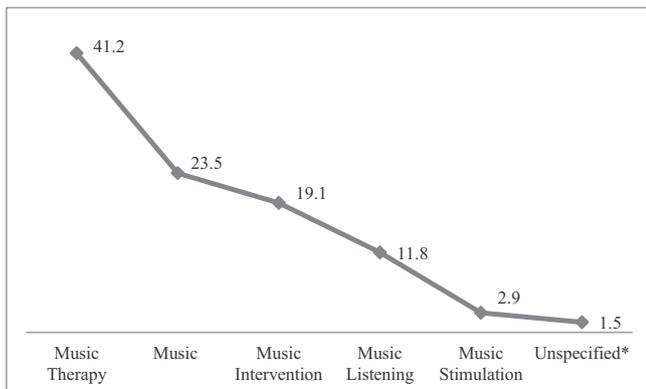[a] Studies published in different journals (n = 1) are grouped.

Fig. 5. Distribution of terms used in studies ([*]study of white noise).

to the type of music used (Fig. 5).

3.4. Research Type of the studies

Considering the research methods applied in the studies, 53 studies were quantitative (38 were Randomized Controlled Trials and 15 were
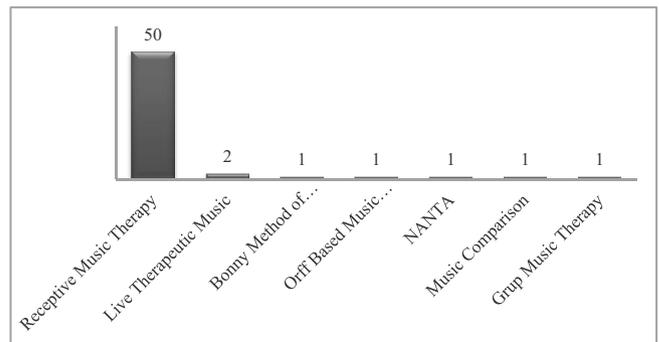

Fig. 6. Distribution of studies according to music therapy method.

Table 2
Distribution by music type in receptive music therapy studies.

	N	%
New age music (relaxation and soul relaxation, sedating nature, soft, meditation, crystal, soothing music and nature based sound)[a]	21	23.9
Traditional music (classical Turkish music, classical Turkish folk music, Turkish art music, Turkish arabesque music, classical Persian music, Persian lullaby (from man), classical mixed with salsa music, traditional Taiwaese songs, country music)[a]	14	15.9
Classic music	13	14.8
Instrumental music (piano, harp, orchestra, saxophone)[a]	8	9.1
Pop music (Turkish, Korean and Mandarin pop)	7	8.0
Religious music (Buddhist music/music videos, Turkish Sufi Music)	7	8.0
Other (music brought by the patient, any music, other common musical genre, intrauterine sounds, white noise, radio sounds)	7	8.0
Jazz music	4	4.5
Ambient music (synthesis music)	2	2.3
Rock music	2	2.3

[a] More than one type of music was used in the studies.

Quasi-Experimental), two studies were qualitative, eight studies were systematic reviews, three studies were reviews and two studies were meta-analyses.

3.5. Music intervention method used in the studies

The most examined music intervention method in the studies was found to be Receptive Music Therapy (87.7%), followed by Live

Table 3
Sampling characteristics of the studied studies and music therapy procedures.

Group	Sample Group	Characterization of The Group	Place	Music Therapy/Intervention/Listening Instruments	Process and Time
SURGEY	Surgical patients receiving spinal anesthesia	Music (and control group	Post-anesthesia care unit (PACU)	MP3 player and over-ear headphone	Postoperative Session, 30 Min.
	Elective surgery patients	Music and control group	Preoperative setting	Background music	Before surgery in the waiting room, 30 Min.
	Day surgery patients	15-min music and 30-min music and control group (no music)	Preoperative setting	MP3 player and headphone	Before surgery in the waiting room, 15–30 Min.
	Patients undergoing awake craniotomy	Music and control group	The operating room	Unspecified	During surgery
	Postoperative patients	Music and control group	Patient's room	MP3 player	3 consecutive days, 30 Min.
	Patients after open heart surgery- undergoing coronary artery surgery	Music and control group	ICU	Portable cassette player and earphones	Between 3.00 p.m. and 4.00 p.m. on the first postoperative day 1, 30 Min.
			ICU and Patient's room	MP3 and headphones	One hour 30 min before the patients were taken to the operation, once for 30 min in the ICU, and every day for 30 min in the ward, until discharge.
	Patients after thoracic surgery	Music and control group	Unspecified	MP3 players with earphones	3 days (on post-operative day 1.,2. and 3. Day), 30 Min.
	Patients with cardiac rehabilitation after cardiothoracic surgery	Same group (pre-test and post-test)	In a quiet hospital room	Bonny method of guided imagery and music	6–15 weeks after cardiothoracic surgery, for 6 weekly, 2 Hours
	Patients undergoing crossectomy with stripping of the great saphenous vein	Music and control group	The surgery room	MP3 player and headphones	Throughout the surgical Procedure
	Adolescents undergoing spinal fusion surgery	Music and control group	Their hospital room	Live music	All the participants, as they were sitting on their chair after the surgery, had d a music therapy session on postoperative day 2 for about 30 min Then, they had 5 min of breathing and 10–15 min of guided autogenic relaxation and "safe place" imagery. At the final stage, the music therapist played the songs preferred by the participants for 10–15 min, 30–35 Min. (Totaly)
	Total Knee Replacement Patients	Music and control group	The private room	CD, head phone, and DVD player	Post-operative day1.,2. and 3. 4h in a day.
	Intra-operative patients undergoing regional anesthesia	Same group (pre-test and post-test)	Operating room	MP3 player and headphones	During surgery (approximately 30–40 min)
	Burn patients	Music and control group	The patient's room	A cassette, CD player, or MP3 player with earphones	During surgery
				The CD player was placed on bedside tables, with speaker	Every morning, over five days (before dressing 15 min, during dressing and after dressing 30 min) totaly 60–90 Min.
				MP3 player and headphone.	Once a day for three consecutive days before the wound care process, 20 Min.

Table 3 (*continued*)

Group	Sample Group	Characterization of The Group	Place	Music Therapy/Intervention/Listening Instruments	Process and Time
INTENSİVE CARE UNİT	Patients in medical intensive care unit	Music and control group	ICU	CD player	At nocturnal sleep time, 45 min
	Patients Receiving Mechanical Ventilatory Support	Music and control group	ICU	MP3 player headphones CD and headphones	Listened to music from 4:00 to 4:30 p.m., 30 Min. During the afternoon or early evening, 90 Min.
		Self-initiated patient-directed music group, self-initiated use of noise-canceling headphones and control group		CD/MP3 player with comfortable, noise abating headphones	Patients remained on protocol up to 30 days as long as they were receiving ventilatory support. The decision to listen was determined by the patient. Patients listened to music for a mean (SD) of 79.8 (126) minutes/day (median, 12 [range, 0–796] minutes/day).
	Patients during the weaning of mechanical ventilation	Music and control group	ICU	MP3 media player and headphones	At 20 min intervals throughout the procedure, immediately after the procedure, 20 and 30 min after extubation, 50 Min (Totaly) Provision of music was alternated for 6 days (in 3 music and 3 no music days) During the weaning, 60 min
	Endotracheal suctioning of mechanically ventilated patients	Music and control group	ICU	MP3 player and ergonomic audio pillow (contained two loudspeakers)	Before and after suctioning, 20 Min.
PEDİATRY	Neonates in NICU	Music and control group	NICU	MP3 player and headphones	During 3 days and daily, 20 Min.
	Vaccination for premature infants	Music And Control Group	NICU	MP3 players placed at the head of the infants' open crib	1 min before vaccination and continued until 1 min after the vaccination, 2 Min.(Total)
	Premature infants undergoing venipuncture	Intrauterine sounds, covered eyes and control group	NICU	MP3 player and a speaker systemand	15 min before venipuncture, during venipuncture, and for 15min after the venipuncture, 30 Min (Totaly)
UNDERGOİNG ANY İNTERVENTİON	Patients undergoing coronary angiography	Music and control group	A private room	MP3 media players and headphones	Thirty minutes before angiography, 20 Min.
	Extracorporeal shock wave lithotripsy patients	Stress ball, music interventions group and control group	The ESWL unit	A headset	The music intervention started 5 min before ESWL and continued during the whole procedure
	Patients undergoing Haemodialysis	Music and control group	Haemodialysis unit	Live saxophone music	4 weeks, undergoing haemodialysis, 30 Min.
PEDİATRY	Patients During Screening Mammography	Music and control group	Mammography unit	Mp3 player	During screening mammography.
	School-aged Children Undergoing Intravenous Placement	An educational photo book about iv placement before the procedure and having them watch their favorite music video during the procedure and control group	An IV placement room	Watching music videos	During the IV placement.
	Children during phlebotomy	Distraction cards group, music group, distraction cards + music group and control group	Unspecified	Tablet PC	Throughout the phlebotomy process. Average of 3 min (range, 1–5 min)

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Table 3 (*continued*)

Group	Sample Group	Characterization of The Group	Place	Music Therapy/Intervention/Listening Instruments	Process and Time
MENTAL HEALTH AND PSYCHIATRY	Hospitalised psychiatric patients with different levels of anxiety	Mild, moderate and severe levels of anxiety groups	The treatment room	Stereo system and headphone	Every Day At The Same Time For 10 Days, 20 Min.
	Forensic Inpatients with Schizophrenia	Music and control group	Psychiatric clinic	NANTA-Program	Total of 12 sessions, once a week for 12 weeks, 90 Min.
	Patients with Chronic Schizophrenia	Music And Control Group	Unspecified	The group music therapy (three music elements (singing, playing, and listening.) and cognitive stimulation training, interaction, and physical activity)	13 sessions over twice a week for 7 weeks, 50 Min.
	Elderly persons with dementia	3 months before music- 3 months during music group and 12 months before music-3 months during music group	The dining room	MP3 player	During and after lunch, and again during and after dinner, every day, 2 h
	Older adults with insomnia	A music intervention/brisk walking sequence or a brisk walking/music intervention sequence	At home	MP3 player	Listen to the music for 30 min just before their sleep time. Two times a 2-week, 30 Min.
	Adults with sleep disturbances	Music group, music video group and control group	At home	The mobile phones	During the 4 test days (Days 2–5), for 30 min before nocturnal sleep, 30 Min.
OBSTETRIC & GYNECOLOGY	Women undergoing in vitro fertilization-embryo transfer	Music and control group	In Vitro Fertilization Unit	MP3 player and headphones	60 Min.before the embryo transfer and after the embryo transfer.
	Pregnant women with preeclampsia	Music and control group	Patient's room and whilst lying down.	MP3 player and headphones	Each day for a period of 7 days (5 days before and 2 days after labor), 30 Min.
	The third trimester of pregnancy	Music and control group	At home	Their own music players	Three times a week at the same time of day. Totaly 14 sessions, 40 Min
PAIN	Patients with neuropathic pain	Same Group (Pre-Test And Post-Test)	Unspecified	MP3 and headphones	At different times during the day, 60 Min.
	People diagnosed with fibromyalgia	Music And Control Group	At home	Used two types of CDs.	Once a day for 4 consecutive weeks (The initial session of music was applied by the researcher. During the therapy which lasted 2 weeks, the patients were instructed to play a CD for 4 days at home in the first week, while they played the CD everyday in the second week. Following the 2-week application, the patients were provided another session by the researcher to get the second CD)
INPATIENT	Patients with cerebral damage	Music And Control Group	Unspecified	MP3 player and headphone	18 sessions, being performed once a day, twice weekly at the same hour, 20 Min.
	Patients undergoing blood and marrow transplantation.	Art Making Group, Diversional Music (Comparison) And Control Group.	At Treatment romm	IPad mini and headphone	Only once (before blood and marrow transplantation process or during process or post-process), 60 Min.
	Hypertensive elderly patients Inpatients	Music and control group Live therapeutic music group and comparison group	A sitting position. At the bedside,	MP3 format, using headphones Live therapeutic music	The study protocol was a 28-day trial, 25 Min. 1 day, 30 Min.
	People living with HIV	Reiki With Music Group And Music Only Group.	A private room	CD	6- and 10-week, 30 min each week.
	Oncology patients	Music And Control Group	The radiology waiting room	Headphone	Before radiotherapy, 15 Min.
	Hospitalised Children	Music Listening, Music Composition And Orff-Based Active Engagement	Unspecified	An iPod, music composition using the computer, or an Orff-based approach	All three conditions were 45 Min.
	Palliative care patients	Music (n = 100) and control (n = 100) group	Patient's room	Played the harp	A single 20-min music
	Elderly people living in nursing home	Music and control group	In a lounge of the nursing home	Background music	Three days in a week for 8 weeks (Monday, Wednesday, Friday morning). 40 min (Turkish Traditional Music for 20 min, 10 min break, and Turkish Sufi Music for 20 min)

Table 3 (continued)

Group	Sample Group	Characterization of The Group	Place	Music Therapy/Intervention/Listening Instruments	Process and Time
OTHER	Nursing students	Music and control group	Conference room The Laboratory.	Noise canceling headphones CD player and background music	Before simulation, 30 Min. During their first blood draw experience, during the process

Therapeutic Music (3.5%), the Bonny Method of Guided Imagery and Music (1.8%), Orff-based (1.8%), Nanta-Program (1.8%), Music comparison (1.8%) and group music therapy (1.8%) (Fig. 6).

3.6. Music type used in the researches in which receptive music therapy is examined

Of the studies in which receptive music therapy was examined, 23.9% were found to use new age music while traditional music, instrumental music and pop music were used in 15.9%, 14.8%, and 9.1%, respectively (Table 2).

3.7. Patients included in the sample group and their characteristics, and the music intervention application protocol

Detailed data on the sample group in the studies, their characteristics and the applied music intervention protocol are presented in Table 3.

3.8. Variables in which the effectiveness of music intervention methods was examined

In terms of the variables in which the effects of music intervention were examined, anxiety, heart rate, blood pressure (systolic and diastolic blood pressure) and pain were found to be examined in 33, 26, 24 and 21 studies, respectively. The data related to the other variables examined according to the applied music intervention method is presented in Table 4.

3.9. Data collection tools used in the studies

Considering the distribution of the data collection tools used in the studies, the tools developed for the evaluation of the variables in which the effectiveness of music therapy were examined, with the majority being anxiety and pain scales. Detailed information on the data collection tools used in the studies is presented in Table 5.

3.10. Variables in which the effectiveness of music therapy methods was examined

It was concluded that in 44 studies examining the efficacy of receptive music therapy, that music therapy was effective on anxiety and on pain in 54% and 34.1% of the cases, respectively. The studies reported that this method was particularly effective on heart rate (34.1%) and blood pressure (31.8%) parameters (Table 6).

4. Discussion

Patients face many health problems associated with their illness or its treatment, and so nursing care should include practices to minimize such problems and their causes [5]. Music intervention is a complementary and alternative treatment method that can be applied to patients in all age groups treated in inpatient or outpatient clinics for various clinical conditions [28,29]. It is a non-invasive, well-tolerated, cost-effective and non-pharmacological intervention with low-risk [1,6,29], and so can be used as an effective nursing intervention to facilitate treatment [1,6,29,30].

In the present study examining researches of music intervention in nursing via a systematic mapping approach, the terms "music therapy", "music" and "music intervention" were found to be used in the majority of studies. In a systematic review by Robb et al. (2018) the terminology used in the studies was examined and were reported the differences in terminology. This result, which concurs with the findings of the present study, indicates that the terminology used in music intervention is diverse and inconsistent among healthcare professionals. Inconsistent and incorrectly used terminology can be an obstacle to interdisciplinary

Table 4
Variables in which the effectiveness of music therapy methods are examined.

Variables	Method[a]							TOTAL
	Receptive Music Therapy	Live Therapeutic Music	Bonny Method Of Guided Imagery And Music	Nanta-Program	Group Music Therapy	Orff-Based	Music Comparison	
	n	n	n	n	n	n	n	N
Anxiety	33	-		-	-	1	1	33[b]
Blood Pressure	24	1	-	-	-	1	1	25
Pain	21	2	-	-	-	1	1	23
Heart Rate	26	1	-	-	-	1	1	27
Respiratory Rate	15	-	-	-	-	-	-	15
SPO$_2$	11	1	-	-	-	1	1	12
Mean Arterial Pressure	4	-	-	-	-	-	-	4
Depression	4	-	-	-	-	-	-	4
Agitation	2	-	-	-	-	-	-	2
Sleep Quality	3	-	-	-	-	-	-	3
Environmental Noise	2	-	-	-	-	-	-	2
Fetal Heart Rate	2	-	-	-	-	-	-	2
Fetal Movement	2	-	-	-	-	-	-	2
Newborn Anthropometric Measurements	1	-	-	-	-	-	-	1
Analgesics Amount	3	-	-	-	-	-	-	3
Bıs İndex Measures	1	-	-	-	-	-	-	1
Sedative Dose	1	-	-	-	-	-	-	1
Sedation Level	1	-	-	-	-	-	-	1
Dyspnea	1	-	-	-	-	-	-	1
Plasma adrenaline and noradrenaline levels	1	-	-	-	-	-	-	1
Salivary alpha-amylase- salivary cortisol	2	-	-	-	-	-	-	2
Brain Wave,	1							2
Patients Mind	-	-	1	-	-	-	-	1
Cognitive Function	-							1
Mood Level	-	1	-	-	-	-	-	1
Behavior	-							1
Fear Level	1	-	-	-	-	-	-	1
Itching	-	1	-	-	-	-	-	1
Performance Enhancement	2	-	-	-	-	-	-	2
Body temperature	2	-	-	-	-	-	-	2
Blood sugar level	-	1	-	-	-	-	-	1
Fall	1	-	-	-	-	-	-	1
The symptoms	1	-	-	-	-	-	-	1
Self-sufficiency	1	-	-	-	-	-	-	1
Relaxation								1
Facial expressions	1	-	-	-	-	-	-	1
Quality of life	-	-	-	1	-	-	-	1
Pregnancy rate	1	-	-	-	-	-	-	1
Interpersonal relationships	-	-	-	1	-	-	-	1
Psychiatric symptoms	-	-	-	1	-	-	-	1
Satisfaction Level With The Nursing Care	1	-	-	-	-	-	-	1
Patient Satisfaction	1	-	-	-	-	-	-	1
Hemoglobin level	1	-	-	-	-	-	-	1

[a] The effects of more than one method were investigated.
[b] More than one variable was examined in the studies.

communication and the conversion of research results into patient care. In relevant literature, it has been further reported that the term "music therapy" should not be used to describe interventions made by healthcare professionals with no training in music therapy [31].

The use of music with any therapeutic target is known as music therapy, and it is usually diverse into active or receptive music therapy. Active music therapy includes a large group of interventions that require the active participation of the patient in activities like singing, composing, playing an instrument and active music imagery. However, receptive music therapy (listening to music) only requires the patient to listen to music [32–34]. Of the researches examined in the present study, 87.7% were determined to be receptive music studies. The reason why receptive music therapy studies are so widely used in nursing may be attributed to its status as a cost-effective, easily-accessible, easy-to-apply and non-pharmacological method, and also to the fact that the method allows nurses to be autonomous in nursing interventions for the control of symptoms of the patient, and to be involved in the care of their patients.

Regardless of the disease, hospitalization, diagnostic procedures and, particularly, the surgical interventions to be applied cause anxiety in patients [35]. Studies in literature suggest that a relationship exists between preoperative anxiety and acute postoperative pain [36]. Furthermore, high preoperative anxiety levels increase incidences of high postoperative pain in patients, as well as the need for analgesics and anesthetics, causing a delay in recovery and discharge [1,37,38]. It is one of the independent roles of nurses to determine and eliminate causes of stress and anxiety in patients who are to undergo surgical procedures. Accordingly, the nursing care to be provided to patients should include interventions that can determine the causes of stress and anxiety, and to reduce them [5]. In literature, music intervention

Table 5
Distribution according to the data collection tools used in the studies.

Anxiety and Depression Scales	N	%	Pain Scales	n	%	Sleep Scales	n	%	Other Scales	n	%
STAI S	17	16.0	Visual Analog Scale	8	7.5	Pittsburgh sleep quality index	2	1.9	Relaxation Visual Analog Scale	1	0.9
STAI T	3	2.8	Numeric rating scale	6	5.7	Sleep quality Visual Analog Scale	1	0.9	Dyspnea Visual Analog Scale	1	0.9
Visual Analog Scale	6	5.7	Faces Pain Scale (FPS)	1	0.9	Verran and Synder-Halpern (VSH) sleep scale	1	0.9	Itching Visual Analog Scale	1	0.9
Numeric rating scale	3	2.8	McGill Pain Questionnaire-Short Form	1	0.9				Cognitive Function Visual Analog Scale	1	0.9
Faces Anxiety Scale (FAS)	2	1.9	McGill Pain Questionnaire-Long Form,	1	0.9	**Fear Scales**			Bispektral (BIS) index	1	0.9
Wong-Baker FACES Anxiety rasting scale	2	1.9	Unidimensional Verbal Pain Intensity Scale	1	0.9	Fear Numeric rating scale	1	0.9	Newcastle Satisfaction with Nursing Scale	1	0.9
Beck Anxiety Inventory	1	0.9	Premature Infant Pain Profile (PIPP)	1	0.9	Children's Fear Scale (CFS)	1	0.9	Nurses' Observation Scale for Inpatient Evaluation	1	0.9
STAI S Korean version	1	0.9	Neonatal Infant Pain Scale (NIPS)	1	0.9				Mini-Mental State Examination	1	0.9
Hospital Anxiety and Depression (HAD) scale	1	0.9	The Persian version of burn specific pain anxiety scale (BSPAS)	1	0.9	**Sedation Scales**			Therapy-Related Symptoms Checklist	1	0.9
Hamilton Anxiety scale	1	0.9	Critical-care pain observation tool	1	0.9	Richmond Agitation Sedation Scale (RASS)	2	1.9	General Self-Efficacy Scale (GSES)	1	0.9
Chinese Version of the State-Trait Anxiety Inventory (C-STAI)	1	0.9	The Functional Pain Scale	1	0.9	Ramsay sedation scale	1	0.9	Nursing Simulation Performance Scale (NSPS)	2	1.9
Geriatric Depression Scale	1	0.9				Sedative Exposure Using Mixed-Effects Models	1	0.9	APGAR score	1	0.9
Spielberger State-Trait Anxiety Inventory for Adults (STAI-AD)	1	0.9							APACHE III	1	0.9
State-Trait Anxiety Inventory for Children (STAIC)	1	0.9				**Measurement**			The Face, Legs, Activity, Cry, Consolability Scale	1	0.9
Center for Epidemiological Studies Depression Scale (CES-D)	1	0.9				Polysomnography	1	0.9	Hospital's patient satisfaction survey	1	0.9
Taiwanese Depression Scale	1	0.9				Electroencephalograph	4	3.8	Brief Psychiatric Rating Scale	1	0.9
Depresyon Visual Analog Scale	1	0.9				Non Stress Test (NST)	1	0.9	Relationship Change Scale	1	0.9
						Cardiotocograph	1	0.9	Subjective Well-being under Neuroleptics Scale	1	0.9

* More than one data collection tool was used in the studies.

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Table 6
Distribution of music therapy methods according to determined variables.

Variables	Method							
	Receptive Music Therapy		Bonny Method of Guided Imagery and Music [BMGIM])		Group Music Therapy		Live Therapeutic Music	
	n	%	n	%	n	%	n	%
Anxiety	24	54.5	-	-	-	-	-	-
Blood Pressure	15	34.1	-	-	-	-	-	-
Pain	15	34.1	-	-	-	-	2	100.0
Heart rate	14	31.8	-	-	-	-	-	-
Respiratory rate	6	13.6	-	-	-	-	-	-
SpO$_2$	5	11.4	-	-	-	-	1	50.0
Mean arterial pressure	3	6.8	-	-	-	-	-	-
Depression	2	4.5	-	-	-	-	-	-
Agitation	2	4.5	-	-	-	-	-	-
Sleep Quality	2	4.5	-	-	-	-	-	-
Environmental noise	2	4.5	-	-	-	-	-	-
Fetal Heart rate	2	4.5	-	-	-	-	-	-
Fetal movement	1	2.3	-	-	-	-	-	-
Newborn anthropometric measurements	1	2.3	-	-	-	-	-	-
Analgesics amount	1	2.3	-	-	-	-	-	-
BIS index measures	1	2.3	-	-	-	-	-	-
Sedative dose	1	2.3	-	-	-	-	-	-
Sedation level	1	2.3	-	-	-	-	-	-
Dyspnea	1	2.3	-	-	-	-	-	-
Preoperative and postoperative adrenaline and noradrenaline plasma levels	1	2.3	-	-	-	-	-	-
Salivary alpha-amylase- salivary cortisol	1	2.3	-	-	-	-	-	-
Brain Wave,	1	2.3	-	-	1	100.0	-	-
Patients mind	-	-	1	100.0	-	-	-	-
Cognitive Function	-	-	-	-	1	100.0	-	-
Mood level	-	-	-	-	-	-	1	50.0
Behavior	-	-	-	-	1	100.0	-	-
Fear level	1	2.3	-	-	-	-	-	-
Itching	-	-	-	-	-	-	1	50.0
Performance Enhancement	1	2.3	-	-	-	-	-	-
Satisfaction level with the nursing care	1	2.3	-	-	-	-	-	-
Patient satisfaction	1	2.3	-	-	-	-	-	-
Total number of studies examining MT methods	**44**		**1**		**2**		**2**	

* More than one variable was examined in the studies.

applied to reduce stress and anxiety of patients has been reported to reduce the level of cortisol in the body, which increases in the presence of stress, to make physiological changes in the body, to ensure the stability of vital signs and to accelerate the healing process [35,39–41]. Music has been further reported to have an anxiolytic and analgesic effect, and to reduce the heart rate, respiratory rate and blood pressure of patients in the perioperative period [7,42,43]. As a result of its abovementioned effects, it is recommended music therapy be applied to patients who will undergo surgery, to those in intensive care units, and in all other healthcare areas as a means of reducing anxiety, stress and postoperative pain perception [25,44–48]. There have been many studies conducted in the fields of nursing and medicine reporting the beneficial effects of music on anxiety [6,9,10,32,35,49–51]. In the present study, the effect of music on anxiety was investigated in 33 articles and 24 studies, in which music was reported to have a beneficial effect on reducing anxiety.

Pain is defined as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage" [52]. The pain that humankind has been trying to explain, prevent and treat for centuries is a subjective experience [29,52], and is one of the most important symptoms leading patients to refer to healthcare professionals [53]. It is further reported that quality of life of patients decreases, the duration of hospital stay is prolonged and mortality rates increase due to untreated pain [53]. Music intervention, which is an effective method of pain relief when applied together with opioids [1], is widely used for the treatment of acute and chronic pain. Nurses have the opportunity to help the patients, being closer to them as part of their duty to provide continuous care [7]. In

this regard, nurses play a central role in the treatment of patients with pain. Considering the importance of the nurses' role in pain management, it is important to investigate such complementary non-pharmacological methods as music for the treatment of pain [25]. In the majority of studies carried out by nurses on the effects of music intervention included in our study, music was reported to be effective in the management/control of pain. A systematic review and meta-analysis studies examining the effects of music on pain have reported similar results [1,34,49,51,54].

5. Conclusion

In conclusion, the findings obtained from this systematic mapping study have revealed that American nurses have published more studies on this subject; that receptive music therapy is the primary music intervention method used in most of the studies; that the most preferred music genre is new age music; that nurse researchers use music intervention in all areas of health care services; and that the variables in which the effects of music intervention were investigated are anxiety, vital signs and pain. It can be further understood that no common terminology is used in such studies, and no common method is followed in music intervention practices, although similar sample groups have been studied. The originality of the present study is based on its analysis of the broad range of research methodologies used in music intervention studies conducted by nurse researchers within a five-year period. We believe that this study will serve as a resource for researchers carrying out studies in this field in the determination of a methodology.

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