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The Music Therapy Effect on Lowering Blood Pressure In Elderly With Hypertension: A Systematic Review

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ABSTRACT
Hypertension is a major risk factor for cardiovascular disease, morbidity, and also mortality world wide, especially in the elderly. Music therapy provides many benefits for people with hypertension such as lowering blood pressure, and lowering anxiety, stress, and pain. The study aimed to assess music therapy's effectiveness to provide beneficial effects for the elderly with hypertension. We systematically searched from six English language databases (Scopus, CINAHL, Science Direct, Google Scholar, Proquest, and PubMed) published from 2011 to 2021. Twelve articles included Randomized control trials (RCTs), quasi-experiment, and case reports were reviewed using PRISMA protocol and methodological quality and result. Seven articles from ten articles showed music therapy's effectiveness for lowering blood pressure in elderly with hypertension. This review suggests that music therapy could be done as a part of complementary therapy to lower blood pressure.

Keywords: Hypertension, Music Therapy, Blood Pressure, Elderly

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BACKGROUND

Hypertension is a major risk factor for cardiovascular disease, morbidity, and mortality worldwide, especially in the elderly(Lionakis, Mendrinos, Sanidas, Favatas, & Georgopoulou, 2012). Hypertension is diagnosed based on multiple measurements on blood pressure in sitting position for 2-3 times examination by office visits for interval one until four weeks(Do Amaral et al., 2016). Based on ISH *Global Hypertension Practice Guidelines*, a person is diagnosed with hypertension when the result showed the systolic blood pressure (SBP) is ≥140 mmHg, and the diastolic blood pressure (DBP) is ≥90 mmHg(Unger et al., 2020).

The prevalence of hypertension in 2010 worldwide was estimated at approximately 31.1% of adults (1.39 billion) and has increased, especially in low-middle income countries(Mills, Stefanescu, & He, 2020). It is predicted will always increase to 42% by 2025(Kühlmann et al., 2016). The studies conducted in South Asia with 12,504 participants who completed two years follow-up showed hypertension present in men 30.1% and 26.8% in women. There is increasing in average systolic BP 2.6 mmHg and diastolic BP 0.7 mmHg(Prabhakaran et al., 2017). According to JNC-7 (*Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure*), hypertension more likely to occur in the elderly after age 65 in ratio 2:3(Lionakis et al., 2012). According to NCH (*National Center for Health Statistics*) from CDC, the prevalence of hypertension increases with age; less age has less hypertension percentage prevalence and vice versa. Adults aged 18-39 have a hypertension prevalence 7.5%, aged 40-59 (33.2%), and aged 60 and above has a prevalence of around 63.1%(Fryar, Cheryl D., Ostchega, Yechiam, Hales, Craig, Zhang, Guangyu, and Kruszon-Moran, 2019).

Environmental and genetic factors are responsible for hypertension. The environmental factors, such as high intake of Natrium, poor sleep quality, excess alcohol intake, and stress, contributed to increasing high blood pressure into hypertension. Besides that, hypertension can occur due to aging, where there is the stiffness of the arteries. It can happen because there is a change of collagen and increases in atherosclerosis, leading to the high pressure of the vessels that becomes hypertension(Dominiczak, Grassi, Jordan, & Poulter, 2019). The most common sign and symptoms are headaches, hot flushes, dizziness, and mood disorders. Some hypertensive people feel chest tightness, palpitations, constipation backache, reduced vision, episodic sweating, muscle weakness, and increased urine volume (Goodhart, 2016). Uncontrolled hypertension that does not manage properly could cause stroke, other cardiovascular diseases, and death.

On the other hand, the use of drugs has a side effect, and it has a more significant impact on the elderly rather than the younger age. The elderly may has a high sensitivity towards drugs such as allergic response, excessive use, and toxicity (Tarigan, 2013). The condition of concomitant diseases in the elderly led to multiple prescriptions drugs that might cause potentially inappropriate medications. Based on systematic review elderly, aged 65 years or older, may discontinue some drugs and do deprescribing without harm(Burnier, Polychronopoulou, & Wuerzner, 2020). So, complementary therapies are needed to help the elderly with hypertension, especially to lower their blood pressure.

Music could help the body feels relaxation and pleasure because it can reduce the hypothalamus-pituitary axis (HPA) and sympathetic adrenal axis (SAM axis)'s activity. Music can also decrease cortisol secretion and altering fatigue perception(Sugiharto, Susanto, Merawati, & Andiana, 2019). Because of this theory, many studies have examined the benefits of music, one of which is for hypertension. The music therapy is known provides many benefits for people with hypertension such as lowering blood pressure, and lowering

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anxiety, stress, and pain (P Mitrovic et al., 2011) The complementary therapy is needed in addition to the use of drugs to control and reduce hypertension. One of the complementary therapy to reduce blood pressure is music.

Based on that, we are interested in conducting a systematic review to find out the music therapy's effectiveness in the elderly with hypertension through some studies conducted around the world. This systematic review aimed to assess music therapy's effectiveness to provides beneficial effects for the elderly with hypertension.

METHODS

Research Design

This systematic review was carried out using PRISMA guidelines on searching and selecting the articles.

Searching Strategy

A systematic search was performed from six English databases to identify relevant articles published from 2011 to 2021. The following databases are Scopus (11 articles), CINAHL (2 articles), PubMed (41 articles), Google Scholar (1,109 articles), Science Direct (61 articles), and Proquest (18 articles). Those articles were collected using keywords: ((hypertension OR high blood pressure) AND (music therapy OR music intervention) AND (elderly OR older adults OR geriatric)).

Data Extraction

Published studies reporting on reducing blood pressure due to music therapy in people with hypertension were filtered with PICO formula as shown in table 2. The eligible article is based on the inclusion criteria: (i) types of study: randomized controlled trials (RCTs), clinical trials, quasi-experiments, and case reports. (ii) participants: men or women who suffer from hypertension and there were participants aged 60 or above (iii) Intervention: music therapy or music therapy with combined others intervention (iv) Date: articles published from 2011 to 2021, and (v) Language: articles in English.

The exclusion criteria were: (i) articles were published before 2011; (ii) articles were using other languages except for English; (iii) there was no participant minimal in aged 60 years old and ; (iv) articles were dissertations and conference proceedings or review article; (v) no outcome was listed that showed beneficial effect for people with hypertension. The result of the engine search and independent selection articles were captured in figure 1.

Quality assessment and bias risk assessment

The reviewers assessed the feasibility of all studies independently by filtering out the titles and abstracts based on the inclusion criteria: (i) study design, (ii) participants, (iii) intervention, (iv) date, language, and full text of articles. The articles that fulfilled the inclusion criteria were read full and categorized by the articles' study design to assess the methodological quality using JBI Critical Appraisal. Selected articles will be extracted based on the data obtained in the form of participants criteria (age, gender, and other related conditions), type, duration, frequency, and other information of music intervention, and methods of measurement of outcome.

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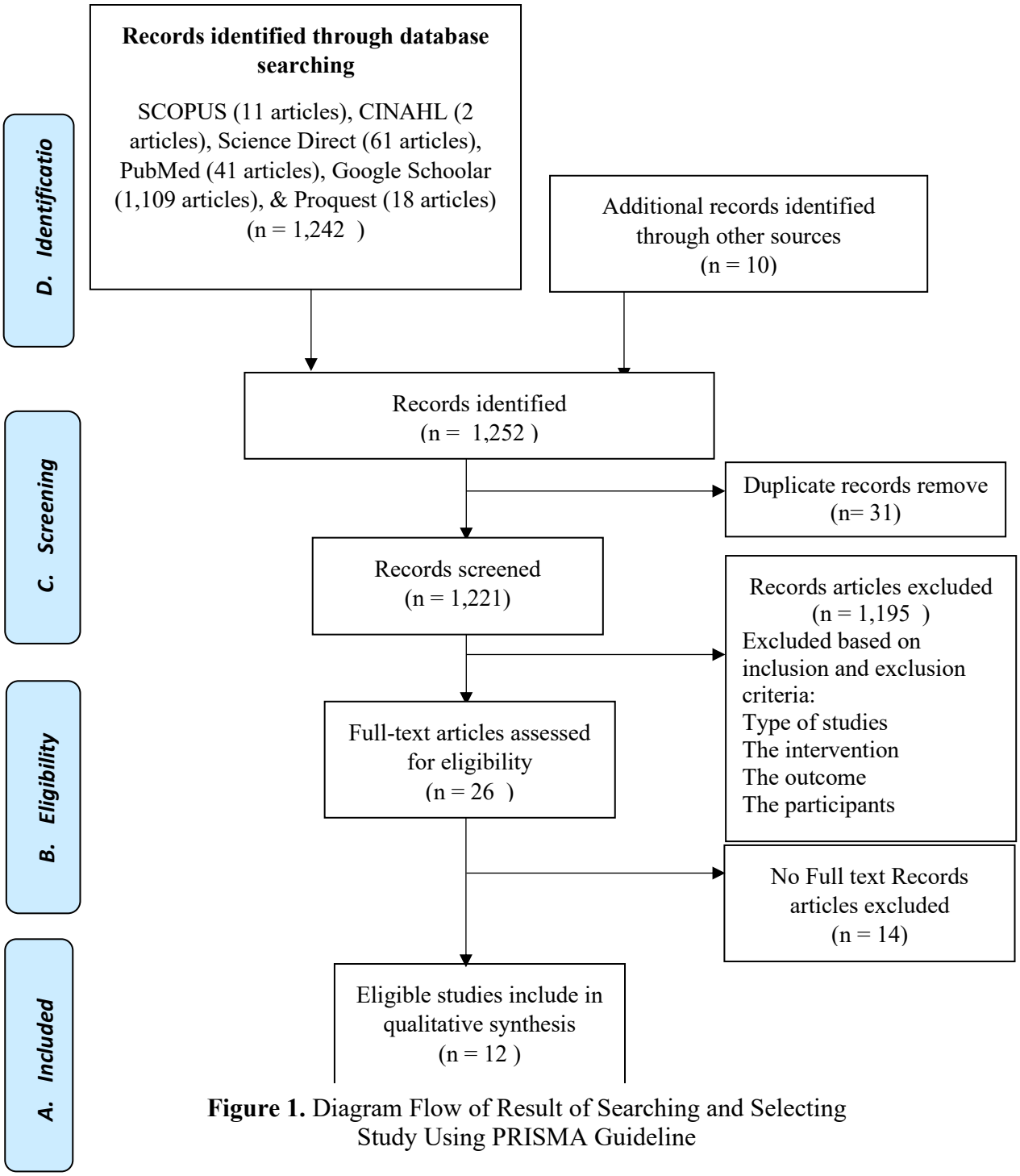

Figure 1. Diagram Flow of Result of Searching and Selecting Study Using PRISMA Guideline

RESULT

Quality of Study

The quality of twelve studies had assessed using JBI Critical Appraisal questionnaire scores like in table 3. Score based on the answer to the question, score one for answering "yes" and score zero for answering "No, Unable to determine, and Not applicable". Eight to thirteen questions had to be answered to get the score and categories of quality for the articles

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studies. Of the twelve studies, only 1 study had low quality (8.3%); the study design was a case report. Two studies were moderate (16.7%) and nine were high quality (75%). There were five randomized control studies, six quasi-experimental studies, and one case report in this systematic review.

Study Characteristics

Participants

A total of 717 patients were included in this study. The sample size of participants was variants due to the variants of included study design in this systematic review. The participants in all studies include males and females. The major age of patients was around 60 years old, ranging between 30 and 90 years old. The clinical conditions of participants were diagnosed with hypertension in some stage with hypertension stage 2 as the major stage of hypertension in this study.

Intervention of Music therapy

All these studies reviewed had a variant intervention; seven studies conducted music therapy only (Martiniano et al., 2018; Im-oun et al., 2018;Fitriani, Pratiwi, Cahyaningtyas, & Poddar, 2020), five studies conducted music therapy with combination intervention (Kunikullaya et al., 2016;Nurjanah, Harmayetty, & Mishbahatul, 2019;)Ping et al., 2018;Astuti, Rekawati, & Wati, 2017;Siauta, Yusuf, & Suprajitno, 2017), and three studies conducted music therapy with comparison intervention (Kunikullaya et al., 2015;Herdiman & Ilbert, 2019;Wirakhmi, Utami, & Purnawan, 2018). The combination intervention consisted of lifestyle modification, foot massage, guided deep breathing, PMR (progressive muscle relaxation), and relaxation handgrip. The comparison interventions that were compared with the music therapy involved religious music compared with murattal which is not included in the category of either music or religious music based on the studies reviewed, classical music compared with murattal, and music compared with lifestyle modification.

The music that was used for the therapy were had variations from a different country. There were western music, namely classical music, and eastern music, namely *Thai* folk music, traditional Sundanese music (*kecapi suling*), instrumental music *Bansuri, Raga,* and *Bhimpalas/Abheri,* Turkish classical music, religious music, and also usual music those include music sound of CD, telematic music and music sedative and the rest studies did not mention what type of the music that was used. From all the studies, there is no state whether music therapy that they used is with lyric or not. The type of music that listen to mostly as the therapy was classical music.

The intervention of music therapy from 15 studies had different duration, frequency, and time in the application. The duration, frequency, and time of all music therapies in these studies were 25 minutes daily for 28 days, 15 minutes daily during the same time for 3 months, 15 minutes daily for 3 until 7 consecutive days, 60 minutes after medication, 32 minutes for 30 days, and 22 minutes for five days during 3 months. The average duration that spent to did music therapy was 20 minutes and the average frequency was 30 days daily, but significant results can be generated with less frequency i.e. six to thirteen days based on the results of the quality of the study which showed significant results with the less frequency (Astuti et al., 2017;Im-oun et al., 2018;Herdiman & Ilbert, 2019). For the conducted time of music therapy, it should be done at the same time daily for consecutive days.

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Clinical Outcome

Seven studies (70%) showed a significant result that music therapy effectively reduces high blood pressure from ten studies that evaluate blood pressure as the primary outcome. Nine studies that include high and moderate-quality that include BP as the outcome showed only five studies gave the significant result of music therapy to reduce high blood pressure. It means 60% studies stated the significant result based on the quality of the study. Three (Martiniano et al., 2018;Kunikullaya et al., 2015;Wirakhmi et al., 2018) studies from twelve studies evaluated HR, pain and stress level as the primary outcome. The result of two studies showed a significant decrease in the level of stress, and heart rate in elderly with hypertension, and one study showed that pain decreased by music but a significant decrease was shown in the murattal group that included harmony and spirituality.

Reported adverse events

There was no adverse report in this study during the intervention, but one of the studies mentioned that if there were any adverse incident, it would take resting time before starting the intervention again. The adverse incident included headache or other unwell feelings.

DISCUSSION

This systematic review was carried out to summarize and evaluate music therapy performed in the elderly with hypertension. This study consisted of 379 elderly with hypertension who received music therapy and 338 elderly who did not receive music therapy. From ten studies that evaluated blood pressure as the primary outcome, one study showed significant systolic reduction but for the diastolic reduction was no significant. One study was the opposite that showed the significant reduction in diastolic pressure. There was no significant in systolic pressure, but the other studies showed the significant result in reduction not only in systolic pressure but also diastolic pressure. This systematic review showed a significant reduction in blood pressure, heart rate, stress, and pain levels in the elderly with hypertension. The decrease in blood pressure and heart rate serves to relax the elderly both physiologically and mentally, leading to, or representing anxiety decreasing, this is demonstrated in many studies on the health benefits of music (Loomba, Shah, Chandrasekar, Arora, & Molnar, 2012). In addition, listen the song frequently turn out to be the useful effect on sleep, mood, and treatment completion (Hohmann, Bradt, Stegemann, & Koelsch, 2017).

For centuries, music has been used to raise people's spirits. The power of music in promoting mental and physical health was already recognized in the ancient Greeks. Pythagoras was intrigued by the fact that people valued consonant music. He discovered that the harmony of music can calm people and heal ailments of mind, body, and soul. In addition, he believed that the harmony of the music could trigger a different kind of emotions. According to the American Music Therapy Associations, music therapy includes elements of sound, melody, rhythm, harmony, tempo, and dynamic to accomplish individual goals within a therapeutic relationship by health professionals who have approved music therapy through the music therapy program (Mofredj, Alaya, Tassaioust, Bahloul, & Mrabet, 2016). Recent studies confirm that listening to music for pleasure is related to a change in emotional desire. In this era, music has a positive effect on psychological well-being, giving rise to a higher level of performance. Growing evidence shows that listening to music exhibits beneficial cardiology and neurological function(Pauwels, Volterrani 2014, n.d.).

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Music and Cardiovascular

The increasing of blood pressure remains the morbidity, mortality, and cardiovascular disease risk. The underlying biological pathways that promote hypertension are long-term blood pressure overload, impaired autonomic function, and aging factors that affect the elasticity of blood vessels(Masi, Chiriacò, & Virdis, 2019). In hypertension cases is sometimes accompanied by an increase in heart rate and this is a sign of a bad condition. Heart rate is the primary determinant of myocardial oxygen demand, myocardial performance, and coronary blood flow, and affects almost all stages of cardiovascular disease(Florian et al., 2011).

The direct effect of music on autonomic cardiac balance has been approved by several studies including research conducted by Loomba *et al* (2012), which showed that participants who received music therapy had a significant reduction in systolic (with difference mean SBP before and after -2.629) and diastolic (with difference mean BP before and after -1.112) blood pressure also had significant reducing heart rate ($p<0.0001$)(Loomba et al., 2012). Another study had a similar result with a decrease in systolic pressure he also found in his study that music therapy could reduce SBP by 6mmHg in the individual with hypertension, that considering of 5mmHg reduction in SBP related to 13% lowering the risk of stroke(Do Amaral et al., 2016). The benefit of music therapy also notices in patients who were recovering from acute myocardial infarction, which helps reduction in heart rate, respiratory rate, and anxiety level compared with a control group that received a usual treatment(Pauwels et al., n.d.).

Decreasing blood pressure was related to sympathetic nervous system activity(P Mitrovic et al., 2011). Soft, slow, non-lyrical music with harmonies, percussion instruments, and slow temp, significantly decrease blood pressure, heart rate, oxygen saturation demand, and respiratory rate. Music has roles in the parasympathetic system's activity that leads to generates a response with alpha brainwave frequencies electroencephalogram, and physiologically manifests as a state of muscle relaxation with regular deep breathing and a lower heart rate(Mofredj et al., 2016).

Music and Stress

In many studies, music therapy had beneficial effects on changing mood and emotions that let positive mood grow and change the negative mood (anxiety, depression, and anger) into a positive mood (enjoyment and happiness) (Hohmann et al., 2017). Another study by X. Li *et al* (2014) demonstrated that interval perception was correlated with daily emotional experiences, which suggest an intrinsic link between music and emotion. Neuro-imaging studies have shown that music listening involves many brain structures important for emotional, sensory motor skills, and emotional, particularly the mesocorticolimbic system. The amygdala, a core of the component from neural circuits of emotional processing and emotional experiences, has attracted attention for its significance in processing music. Previous functional neuroimaging studies have demonstrated the amygdala-attracted attention for its significance in processing music (Li et al., 2014). Positive short-term effects on variables such desirability may reflect benefits for mental health even on a neurobiological level(Hohmann et al., 2017). Thus, in the study by Kunikullya *et al* (2015) showed that with slow music rhytem effect the mood and make the participants feel calm and showed significant reduction in stress levels ($p \leq 0.001$).

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Music and Pain

This effect was substantial in participants who listened to music more frequently, with an increasing number of episodes of quality-enhancing music would allow pain reduction effect(Linnemann, Kappert, Fischer, & Doerr, 2015). Patients who suffer from chronic pain often have a low quality of life, and music could help them regain their chronic pain. They often have a low quality of life and music could help them gain back their sense of independence and, thus, improve their quality of lives(Holden, 2013). Music therapy works in reducing pain. In several studies music therapy was associated with the decrease of sympathetic nervous system activity, which releases endorphins, namely the happy hormone(Do Amaral et al., 2016), that lead to reduction in pain feeling.

Music has some positive effects on the body, such as lowering blood pressure, heart rate, stress, and pain. Music therapy could be done without any reported adverse event in all studies, which means that there is no harmful effect to conduct this intervention for the elderly. From those positive effects, music has a dominant effect to lower blood pressure. This refers to the review result from seven studies that evaluate blood pressure as the outcome. Besides that, if we look at the risk factors for an increase in blood pressure, stress and pain conditions contribute to increased blood pressure. The results show that music can reduce stress and pain level, indirectly affecting blood pressure reduction. A lowering in blood pressure allows for the prevention of cardiovascular disease caused by hypertension.

The types of music involved in the studies reviewed varied widely and showed significant results. The type of music most widely used was classical music. A study conducted on the effect of musical tempo on blood pressure showed no significant difference in blood pressure in both the medium tempo group or the fast tempo group. Whereas in the group that did not include music to music group there was a significant difference in blood pressure, indicating that music affected maintaining or lowering blood pressure.(Sugiharto et al., 2019). This showed that classical music has a major impact or more effective because many studies involved it and showed a significant effect, compared to other types of music where the number of studies is still relatively small.

The limitation of this review was the limited number of relevant articles that had the associated outcome with research questions and a variety of study designs, make this review using a qualitative methodology of the outcome of each study. In some studies, the participants' range age is various start at 30 years old, and there is no exact number of how many elderly participated compared with the adults. There is no further explanation in some studies about the tempo or rhythm and whether the music involved lyric or not, which could be a discussion to find out what type of music has a significant effect and what types of music could release endorphins. Future studies can continue current studies both in original or review to be used as evidence-based on lowering blood pressure in elderly with hypertension.

CONCLUSION

This systematic review suggests that music is an effective and safe therapy for the elderly with many beneficial effects especially to lower blood pressure that could prevent cardiovascular disease.

ABBREVIATIONS

DBP: Diastolic Blood Pressure; SBP: Systolic Blood Pressure; SAP: Systolic Arterial Pressure; DAP: Diastolic Arterial Pressure; HRV: Heart Rate Variability; JBI: Joanna

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Briggs Institute; AMI: Acute Myocardial Infarction; EPA: Early Post-infarction Angina; ISH: International Society of Hypertension

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APPENDICES

Table 1. Search strategy

Concept 1	Concept 2	Concept 3
1. Hypertension	3. Music therapy	5. Elderly
2. High blood pressure	4. Music intervention	6. Older adult
		7. Geriatric

Table 2. PICO

	Search terms
P	*Elderly, older adults, geriatric*
I	*Music therapy, music intervention*
C	*No intervention, other intervention*
O	*Lowering blood pressure, or any other positive effect*

Table 3. Quality Assesment using JBI Score

No	**Study**	**JBI Critical Appraisal**													**Total %**	**Quality Rating**
		Number of item														
		1	2	3	4	5	6	7	8	9	10	11	12	13		
1.	(Bekiroglu *et al,* 2013)(Bekiroglu et al., 2013)	Y	UN	UN	Y	UN	UN	Y	Y	Y	Y	Y	Y	Y	69.2%	Moderate
2.	(Kunikullaya *et al.,* 2016)(Kunikullaya et al., 2016)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100%	High
3.	(Nurjanah, *et al.,* 2019)(Nurjanah et al., 2019)	Y	N	N	N	Y	UN	Y	Y	Y					55.5%	Moderate
4.	(Ping *et al.,* 2018)(Ping et al., 2018)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100%	High
5.	(Martiniano *et al*., 2018)(Martiniano et al., 2018)	Y	Y	Y	Y	UN	UN	Y	Y	Y					77.7%	High
6.	(Astuti *et al.,* 20177)(Astuti et al., 2017)	Y	Y	N	Y	N	Y	Y	Y	Y					77.8%	High

No	Study	JBI Critical Appraisal													Total %	Quality Rating
		Number of item														
		1	2	3	4	5	6	7	8	9	10	11	12	13		
7.	(Im-oun *et al*., 2018)(Im-oun et al., 2018)	Y	Y	N	Y	Y	UN	Y	Y	Y	Y	Y	Y	Y	84.6%	High
8.	(Kunikullaya *et al*., 2015)(Kunikullaya et al., 2015)	Y	Y	Y	Y	UN	UN	Y	Y	Y	Y	Y	Y	Y	84.6%	High
9.	(Herdiman & Ilbert,2019)(Herdiman & Ilbert, 2019)	Y	Y	Y	N	N	Y	Y	Y	Y					77.8%	High
10.	(Wirakhmi, Utami, & Purnawan, 2018)(Wirakhmi et al., 2018)	Y	Y	Y	N	N	Y	Y	Y	Y					77.8%	High
11.	(Siauta *et al.,* 2017)(Siauta et al., 2017)	Y	Y	Y	Y	Y	Y	Y	Y	Y					100%	High
12.	(Fitriani *et al.,* 2020)(Fitriani et al., 2020)	N	N	Y	N	N	Y	N	Y						37.5%	Low
		The scores : high = > 75%, moderate = 50-74%, low = 50%; N= 0; UN = 0; Y = 1; NA=0 N = no; UN = Unclear; Y = Yes; NA = Not Aplicable														

Table 4. Summarize of Selected Study

Authors and years	Study design	Participant	Intervention	Control group intervention	Outcome evaluation	Results
(Bekiroglu *et al,* 2013)(Bekiroglu et al., 2013)	A randomized controlled trial	60 hypertensive patients, age above 60 years old	Turkish classical music: 25 minutes for 28 days everyday (n=30)	25 mintues in rest position for 28 days everyday (n=30)	Blood pressure: sphygmomanometer at brachial Anxiety: Hamilton anxiety scale (HAM-A) with 14 items	There was no significant differencies between treatment group and control group (95% CI 0.82-1.92). But there was reduction systolic BP about 13.00 mmHg and 10.00 mmHg in diastolic BP in music group
(Kunikullaya *et al.,* 2016)(Kunikullaya et al., 2016)	A prospective randomized control trial	100 participants with hypertension, age 30-60 years old, mean age 46.69	Combination music and lifestyle modification: Instrumental music raga Bhimpalas: 15 minutes daily (during the same time) at least 5 days	Only lifestyle modification: using JNC VII as guidelines (n= 50)	24 hours ambulatory blood pressure: using sphygmomanometer and was recording using Schiller BR 102 Plus 24/48 h ABP monitor (ABPM) that has been standardized	The diastolic blood pressure was significantly decreasing in combination group (P=0.0004) with mean pre and

			a week for 3 months. Lifestyle modification: using JNC VII as guidelines (n=50)		and validated by BHS (British Hypertension Society) and AAMI (Association for the Advanced of Medical Instrumentation) Stress level: using STAI (State Trait Anxiety Inventory)	post= 85.1 (6.8) and 83(8.7)
(Nurjanah, *et al.,* 2019)(Nurjanah et al., 2019)	The pre-experimental design (one group pretest-posttest design)	14 participants, age 60-90 years old with hypertension	Combination foot masage and *kecapi suling* music teharpy: Traditional Sundanese *kecapi suling* music therapy: 15 minutes for 7 consecutive days (n=14)	No control group	Blood pressure: using sphygmomanometer and a stethoscope, 15 minutes after the intervention everyday for 7 consecutive days	There is an significant effect in decreasing blood pressure (p-value= 0.000): systolic mean pre and post= 154.64 mmHg and 138.86 mmHg Diastolic mean pre and post= 92.21 mmHg and 88.00 mmHg
(Ping *et al.,* 2018)(Ping et al., 2018)	A participant blinded, multi-centre, randomized controlled trial	87 patients with hypertension, 46 males and 41 females with mean age 61.1 years old	Listening the music CD with sound and voice to guide deep breathing. The duration of breathing was 4 seconds for	Listening the music CD and did the relaxation technique without breathing exercise (n=45)	Blood pressure: automated device, MAP (Mean Arterial Pressure): using formula= diastolic BP + 1/3 (systolic BP-diastolic BP)	There was significant reduction in systolic and diastolic blood pressure ($p<0.001$) in intervention

			inspiration and 8 seconds for expirations with breath rate of 5 breaths per minutes for 15 minutes each day (n=42)			group with mean systolic BP pre and post= 10.5mmHg and 8.3mmHg; and diastolic BP reduction in control and intervention groups were 5.2 mmHg and 5.6 mmHg
(Martiniano *et al*., 2018)(Martiniano et al., 2018)	An experimental studies	37 hypertensive patients	Listening music for 60 minutes after medication	Resting condition for 10 minutes, 20 minutes and 40 minutes before medication	Heart rate variability (HRV): using HR monitor Systolic arterial pressure (SAP) Diastolic arterial pressure (DAP)	Heart rate decrease in group intervention and there was no significant different between intervention and control group in SAP (p= 0.25) and DAP (p= 0.53)
(Astuti *et al.,* 20177)(Astuti et al., 2017)	A quasi experimental design with pre and post test control group	100 participants with hypertension: SBP ≥140mmHg and DBP ≥90mmHg with mean age 66.54	Combination PMR (progressive muscle relaxation) with music therapy: conducted 11 sessions for 6 days in the morning and evening in 3 times repeating practice	Unclear, no mentioned (n=60)	Blood pressure	Systolic blood pressure decrease significantly ($p<0.001$) but diastolic blood pressure also decrease, but not showed significant result ($p>0.167$)

			for 15 minutes (n=63)			
(Im-oun *et al*., 2018)(Im-oun et al., 2018)	A randomized controlled trial	114 participants with diagnosed hypertension stage 2 with (SBP 140 ≥ mmHg and DBP 90 ≥ mmHg), age range 40-80 years old (age mean=51.65)	Thai instrumental folk music: 32 minutes listening everyday for 30 days, the music is slow instrumental with 60-80 beats per minute and ranged between 40-60 dB At day 31th until 120th, participants are not allowed to listen any music (n=57)	Did not listen to any music during 30 days (n=57)	Blood pressure: home BP monitoring (HBPM) using validated Thai FDA-approved automatic BP devices (TD-3140B) (during day 0th-30th)and office blood pressure using electronic medical record (day 0th-120th)	Systolic and diastolic blood pressure decreased significantly compared with baseline (−9.5 ± 7.1 mmHg (95%CI −11.43, −7.64) and −6.1 ± 5.7 mmHg (95%CI −7.51, −4.53), respectively).
(Kunikullaya *et al*., 2015)(Kunikullaya et al., 2015)	A prospective randomized controlled trial	100 hypertensive patients, age 30-60 years old (age mean= 46.69)	Music intervention: instrumental music (*Bansuri*), playing *raga* (musical scale) *Bhimpalas/Abheri* for 22 minutes during the same time everyday (at least 15 minutes for 5 days) for 3 months (n=50)	Lifestyle intervention: JNC VII as guideline (n=50)	Heart rate variability (HRV): using Electrocardiogram (ECG) recorded in Lead II (sample rate of 1000 Hz), Blood pressue, and Stress levels: using State Trait Anxiety Inventory Score (STAI)	In both group showed significant reduction in stress levels ($p \leq 0.001$). Decreasing systolic and diastolic blood pressure in music group with mean pre and post (SBP: 130.74 and 130.02); (DBP: 85.1 and 83)

(Herdiman & Ilbert,2019)(Herdiman & Ilbert, 2019)	A quasi-experimental with a pretest-posttest design	30 participants with hypertension diagnosed	Religious music therapy: 15 minutes for 3 consecutive days (n=15)	Murottal letter Al-Baqarah: 15 minutes for 3 consecutive days (n=15)	Blood pressure was measured after the intervention	There was significant result in reducing blood pressure in both of group (p=0.001)
(Wirakhmi, Utami, & Purnawan, 2018)(Wirakhmi et al., 2018)	A quasi experiment with pre-test and post-test with two groups design	30 participants with hypertensioan diagnosed, with age mean 68.8	Music therapy: classical music mozart by Wolfgang Amadeus which tempo is 114.79 beats per minute for 15 minutes (n=15)	Murottal therapy: letter Ar-Rahman by Muzammil Hasballah as the qory, listened for 15 minutes (n=15)	Pain level: using VAS (visual analog scale)	There was significant result in murattal group (p=0.002) and for music group there is no significant result (p=0.051)
(Siauta *et al.,* 2017)(Siauta et al., 2017)	A quasi experiment control group	28 participants with hypertension, aged range 40-70 years old	Combination Relaxation handgrip and classical music: 15 minutes for 3 days (n=7)	Group 1. Relaxation handgrip intervention: 15 minutes for 3 days (n=7) Group 2. Classical music intervention: 15 minutes for 3 days (n=7) Group 3. Control group (no intervention) (n=7)	Blood pressure: using calibrated mercury spigmamoteri; Headache: using Numeric Rating Scale Pain	Systolic decrease (p=0.003); diastolic decrease (p-0.014); pain decrease (p=0.001) significantly in relaxation handgrip group

(Fitriani *et al.,* 2020)(Fitriani et al., 2020)	A case report	17 participants with hypertension, aged above 60 years old	Classical music therapy: 15 minutes for 12 days (n=17)	No comparison group	Blood pressure: systolic blood pressure	Reduction on blood pressure with systolic average decrease 21 mmHg with p=0.000