STRADA Jurnal Ilmiah Kesehatan
DOI: 10.30994/sjik.v10i1.663
ISSN: 2252-3847 (print); 2614-350X (online) Vol.10 No.1 May 2021 Page. 505-516

The Effectiveness of Music Therapy on Stress in Children with Cerebral Palsy: Integrated Literature Review

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ABSTRACT
Cerebral palsy is generally caused by ischemia or hemorrhage of the brain blood vessels from the antenatal to postnatal period. Multidimensional problems in children make him quickly experience negative stress. This study aims to determine the effectiveness of music therapy on stress in children with cerebral palsy. Research using the integrated literature review method took journals from 2012 to 2020 and only eight journals were the inclusion criteria. The results of a journal review show that music therapy given for 10 to 50 minutes to children with cerebral palsy can reduce anxiety, comfort, reduce depression, overcome sleep problems, increase curiosity, focus, not easily forget when studying, and dare to interact with other people. It can be concluded that music therapy is an inexpensive and easy way to deal with stress in children with cerebral palsy so that it can be the right choice when the child is undergoing treatment.

Keywords: Children with Cerebral Palsy, Music Therapy, Stress

Received January 3, 2021; Revised February 24, 2021; Accepted March 23, 2021

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BACKGROUND

Before entering the 20th century, most of the parents expected healing for children with disabilities. They come to a place that smells mystical or perform religious rituals according to their beliefs. However, this action has no impact on children suffering from cerebral palsy (Patel at al., 2020).

Cerebral palsy is a chronic disease caused by ischemia or bleeding in the brain blood vessels of children (Natsir, Noviana, & Rustyanto, 2017). This incident occurs during brain development in the antenatal to the postnatal period, including children who have brain injuries. In 2019, WHO recorded that the prevalence of children suffering from cerebral palsy worldwide was 1.5 to 2.5 per 1000 live births (Jonsson et al., 2019). The incidence of cerebral palsy in high-income countries is recorded at 2.11 per 1000 live births, and in low-middle income countries, it reaches 10 per 1000 live births (Pujasari, Rusmil, & Somasetia, 2020). In Indonesia, the prevalence of children with cerebral palsy is recorded as 3 per 1000 live births (Selekta, 2018)

Multidimensional problems that often cause children with cerebral palsy include: musculoskeletal, gastrointestinal, respiratory, motor, scholastic, cognitive, and emotional unstable disorders (Trisnowiyanto, 2020). So that it causes children to easily experience negative stress, such as events, frustration, and depression. Published research states that until now children suffering from cerebral palsy are still a scourge for families (Weber et al., 2016). Cerebral children also prefer to isolate themselves from the environment, do not want to communicate because they are less able to communicate, and experience limited activities in carrying out daily activities (Aditama, 2018).

Many published studies are still developing medical and pharmacological methods to improve motor, sensory, and cognitive systems in children with cerebral palsy (Underland et al., 2012). The success of medical and pharmacological methods only helps children with cerebral palsy in the physical aspect, and parents have to pay a lot of money in providing the treatment (Budiman, Atrup, & Mashuri, 2020).

In addition to medical and pharmacological methods, there are also non-pharmacological therapies that should be taken into account in the development of health science and research (Monteiro, & Dias, 2014). Non-pharmacological therapy is believed to be able to help the achievement of cerebral palsy children in carrying out their activities, namely by looking at psychological, social, spiritual, and physical aspects (Naomitsu et al., (2017). One of the non-pharmacological therapies that the researchers studied is music therapy. Music therapy is a sound therapy that is made in such a way that it contains rhythm, song, and harmony, including the sound produced through devices that can produce sounds that give a variety of responses to the listener (Projects, & Payne, 2019).

Therefore, the researcher wanted to examine published journals to determine whether the effectiveness of giving music therapy to stress in cerebral palsy children.

METHODS

The research method used is the Integrated Literature Review. By searching for journals or literature on the effectiveness of music therapy on stress in children with cerebral palsy. In this study, researchers took published journals from international journals, such as Science Direct, Pub Med, NCBI, Taylor, and Francis. Journals according to the PICO question to make it easier for researchers to use, including:

1. Is music therapy effective in dealing with stress in children with cerebral palsy?
2. Does music therapy have an impact on reducing stress in children with cerebral palsy?

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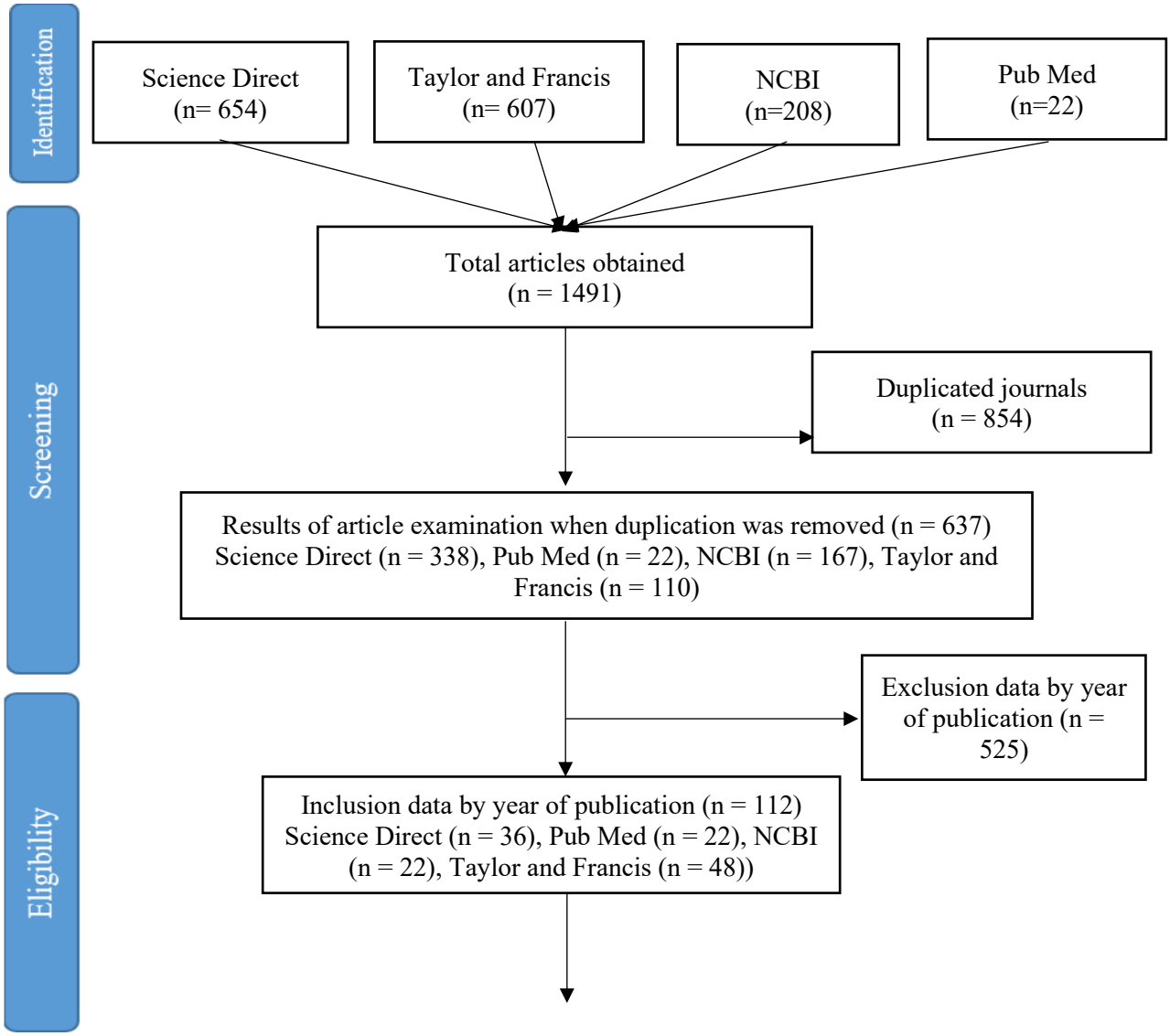
This study used inclusion criteria and exclusion criteria. Inclusion criteria include: taking journals that have been published in 2012 to 2020; quantitative research; original research; children with head trauma, cerebral ischemia, cerebral hemorrhage; classification of children with spastic and mixed cerebral palsy; children aged 2 to 18 years; a child who is able to sing, hear, and move hand or leg muscles; children taking brain vitamins; and journals that discuss stress in children with cerebral palsy.

The exclusion criteria included: research less than 2012, abstract, qualitative research, systematic review, literature review, and discussing parents in children with cerebral palsy. Researchers have described the literature search in table 1 and filtering on flowchart 1.

RESULTS

Giving music therapy for stress to children with cerebral palsy after a review of the journal shows mixed results and can be seen in table 2.

Flowchart 1. Literature Screening



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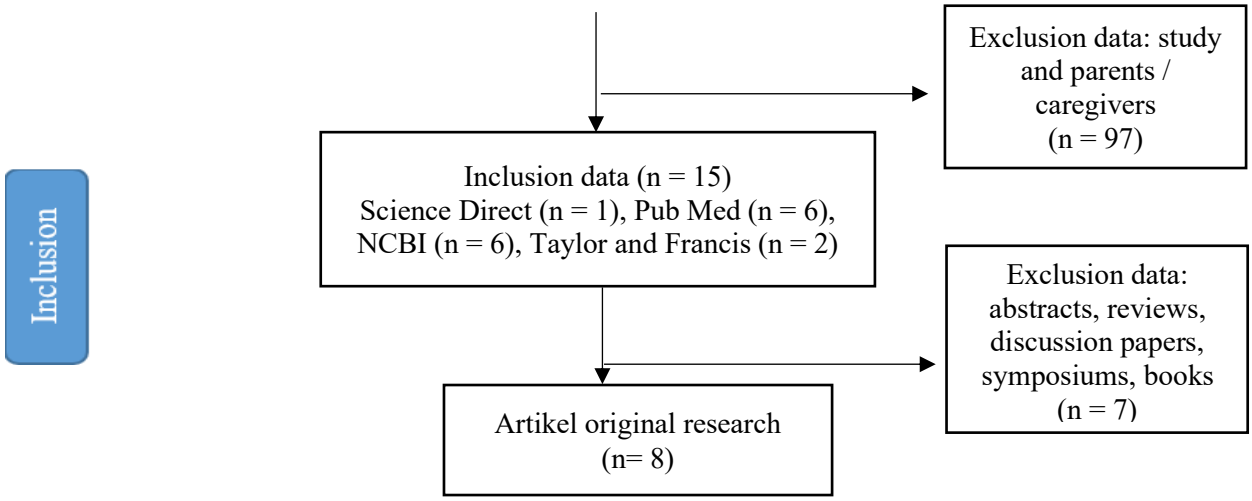

Table 1. Journal Search Strategy

Strategy	#1 AND #2 AND #3 AND #4
#1	*("CP" OR "Cerebral Palsy in Child" OR "Chronic Disease; Cerebral Palsy in Pediatric" OR "Cerebral Palsy Spastic" OR "Diplegic in Children" OR "Hemiplegia in Child" OR "Spastic Hemiplegia in Child" OR "Cerebral Palsy Mixed in Pediatric" OR "Cerebral Palsy Quadriplegic in Child" OR "Monoplegic in Pediactric" OR "Congenital Cerebral Palsy" OR "Diplegia Spastic" OR "Brain Tissue Demage in Child" OR "Permanent Brain Lesions in Child" OR "Neurological Development Disorder in Child" OR "Trauma Brain Injury in Children" OR Stoke in Children" OR Hemisparalysis in Child" OR " Non-Haemoragic Stroke in Child")*
#2	*("Music Therapy" OR " Music" OR "Sing" OR " Song" OR "Neurological Music Therapy" OR " Therapeutic Music" OR "Rhythmic Acoustics" OR " Acoustic Stimulus" OR "Tempo of The Music Tone" OR "Rhythm of Notes")*
#3	*("Standart Intervention Hospital" OR "Medicine" OR "Nothing Treatment" OR "Acupuncture")*
#4	*("Stress" OR "Eustress" OR "Happy" OR "Laugh" OR "Smile" OR "Distress" OR "Frustration" OR " Sad" OR "Cry" OR "Angry" OR "Anxiety" OR "Lone" OR "Listless" OR "Silent" OR "Quiet" OR "Depression" OR "Neustress" OR "Tired" OR "Convulsive" OR "Painful" OR "Pain" OR "Nausea" OR "Dizzy" OR "No Appetite")*

Table 2. Review of journals on the effectiveness of music therapy on stress in children with cerebral palsy

No	Author (s)	Publication	Year	Country	Research Title	Method	Sample	Aim	Result
1	Orita et al.	Journal of Experimental Medicine -NCBI	2012	Japan	*Monitoring the Autonomic Nervous Activity as the Objective Evaluation of Music Therapy for Severely and Multiply*	A Cross Sectional Design	Adolescents aged 18 years to 26 years of age in young adults with Severely and Multiply Disabled	to evaluate the effectiveness of music therapy at SMDC using autonomic nervous system change monitoring, with	There was a significant decrease in HR in the intervention group compared to the control group with mean HR: 06.9 ± 4.9 *, (p = 0.03) ; decrease in anxiety when given HF music therapy in the

					Disabled Children		Children (SMDC) as many as 6 respondents	frequency domain analysis of heart rate variability as a detection of anxiety	intervention group compared to the control group (p = 0.03). When given high sound wave music therapy, after evaluation, heart rhythm decreased (p <0.001)
2	López et al	*Chicago, USA : Taylor and Francis*	2012	USA	*Dance program for physical rehabilitation and participation in children with cerebral palsy*	*A Pilot Exploratory Study*	Children aged> 8 years with cerebral palsy, spastic hemiplegia and diplegia were 8 respondents	To determine the effectiveness of a classic ballet program designed for children with cerebral palsy (CP) as a physical rehabilitation modality	children with cerebral palsy are very happy given music and dance therapy (p <0.0001); want to participate continuously (p <0.0001) and become a new interest for taking music and dance classes (p = 0.04); Parents felt the benefits of music and dance therapy for their children (p <0, 0001); Being an alternative healing therapy (p = 0.04); and this therapy is cheap and simple (p = 0.0001).
3	Cavalcante et al.	*Revista Brasileira de Enfermagem* - NCBI	2015	Brazil	*Children with neuropsychomotor development delay: music therapy promoting quality of life*	*Quasi Experimental Research*	17 children aged 5 to 12 years with NPMDD or children with congenital brain disorders and moderate to severe head trauma	To identify the effect of music therapy on the behavior and quality of life of children with delayed neuropsychomotor development (NPMDD)	evaluating the value of emotional capacity in children with NPMDD, music therapy can overcome sleep problems in children (p = 0.014), reduce depression (p = 0.005); children are more enthusiastic in class (p = 0.007), children are more focused in class (p = 0.000); and

									children do not easily forget school lessons (p = 0.003)
4	Karbandi et al	Evidence Based Care Journal-NCBI	2015	Iran	*Effect of Music Therapy and Distraction Cards on Anxiety among Hospitalized Children with Chronic Diseases*	*A Randomized Controlled Trial*	There were 83 children aged 8 to 12 years with all diagnoses of chronic diseases	To determine the effect of music therapy and disorder cards on anxiety in children hospitalized with chronic diseases.	The control group using music therapy can reduce anxiety in children (p = 0.003); The intervention group with a combination of music and card therapy was more effective in dealing with children's anxiety (p = 0.001)
5	Bringas.	*Frontiers in Neuroscience -Pub Med*	2015	Cuba	*Effectiveness of music therapy as an aid to neurorestoration of children with severe neurological disorders*	*A Randomized Controlled Trial*	252 children aged 3 to 12 years with central nervous system lesions, damage to the cerebral context and / or other neurological disorders	To test the effectiveness of EEG testing on anxiety when given music therapy to children with severe neurological disorders	On the LORETA EEG examination, showed a decrease in anxiety when given music therapy and neurorestorative therapy (p = 0.041) and the administration of this therapy had an effect on the average age of the child and the sex of the child (p = 0.44)

6	Jang-won, Kyun, & Hwa	*International Journal of Humanities and Social Science Invention - Pub Med*	2016	Republic of Korea	*The Effectiveness of Music Therapy on Cerebral Palsy Patients Receiving*	*Retrospective Study*	50 pediatric patients with cerebral palsy	This is to determine the effect of music therapy with children receiving conventional rehabilitation treatment plus music therapy.	Music therapy can improve feeling comfortable, gross motor function (p = 0.032), fine motor function (p = 0.029), improve vocabulary and language (p = 0.026), and improve the ability to interact with others (p = 0.019).
7	Ben-Pazi et al	PLoS ONE-Pub Med	2018	Israel	*Auditory stimulation improves motor function and caretaker burden in children with cerebral palsy-A randomized double blind study*	*Quasi Experimental Research*	Children with cerebral palsy aged 2 years 5 months to 18 years were 45 respondents	To investigate the impact of auditory stimulation on motor function comfort and hypertonia.	music therapy provides comfort and reduces hypertonia (p = 0.002); the child seemed calm answering questions from parents without muscle stiffness (p = 0.002); anxiety was reduced when communicating with others (p = 0.008).
8	Duymaz,	The Annals of Clinical & Analytical Medicine - Pub Med	2020	Istanbul	*The effects of music therapy on gross motor functions, pain and level of functional independence in children with cerebral palsy*	*Experimental – Clinical Trial*	There were 40 children aged 5 to 11 years with cerebral palsy	To determine the effect of music on brain paralyzed children on the development of gross motor function, pain, and functional independence	FACES assessment, the child was not anxious, only felt mild pain (p = 0.016); after 3 months after music therapy therapy was given, the child only felt mild pain (p <0.001).

Table 3. Analysis of the Strengths and Disadvantages of Giving Music Therapy Against Stress in Children with Cerebral Palsy

No	Type of Action / Characteristics	Music Therapy
1	Advantages	Children with cerebral palsy do not experience stress if given a number of sound waves when given music therapy (Orita et al., 2012); Music and dance therapy makes children feel very happy and want to attend dance classes intensely (López et al., 2012); There was a decrease in sadness or depression, a decrease in anger, the problem of insomnia was resolved, enthusiasm, and focus) (Cavalcante et al., (2015)); Children's anxiety during hospitalization can be shifted to playing cards + listening to music and able to overcome children's anxiety (Karbandi et al., 2020); Can improve the motor system, fine motor skills, improve vocabulary and language, and begin to interact socially (Jang-won, Kyun, & Hwa, 2016); Music therapy provides calm and comfort, willing to interact with friends or other people (Ben-Pazi et al., 2018); Giving music therapy can reduce pain while undergoing medical rehabilitation therapy (Duymaz, 2020)
2	Disadvantages	Still rigid in interacting, children still have difficulty managing school work, still show an angry attitude, and are still anxious (Cavalcante et al., 2015); children find it difficult to socialize or socialize with new people (Jang-won, Kyun, & Hwa, 2016; music therapy must be done regularly, if it stops, the child returns to the beginning of learning (Marrades et al., 2018); Music provided is only songs children's favorites and classical music (Ben-Pazi et al., 2018)

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DISCUSSION

Cerebral palsy is a group of motor and sensory development disorders that are permanent and non-progressive. This causes limited activity due to brain damage (Pujasari, Rusmil, & Somasetia, 2020). Growth in children with CP is certainly different from that of children in the general population. The growth of children with CP is generally not good along with the increasing degree of weight of gross motor function, fine motor skills, cognitive and emotional. Cerebral palsy children need non-pharmacological therapy that can increase their positive emotions so as to minimize anger; anxiety; and their self-distrust by providing music therapy that stimulates them to listen to songs, play musical instruments, and sing (Pitale, & Bolte, 2018). After describing all the research results that have been reviewed, it turns out that giving music therapy will not be meaningful if it is done in one meeting, but it takes a long time to show the changes that have occurred in the child. Researchers also described the disadvantages and advantages of giving music therapy to stress in children with cerebral palsy (Table 3). Requires a regular time such as 3 times per week for a month or more, with each meeting session 10 minutes to 50 minutes (Orita et al., 2012; López et al., 2012; Cavalcante et al., 2015; Karbandi, et al. ., 2020; Bringas et al., 2015).

To see the effectiveness of music therapy, some researchers used stress measurement instruments before and after therapy was given. If not, then the researcher does not get the meaning of the research carried out. The instruments used by the researchers to see stress in children with cerebral palsy included: using the emotional capacity to assess fear (Cavalcante et al 2015), sadness, anger, sleep problems in children; using the study of life habits (Life-H) to see changes in children with cerebral palsy (López et al., 2012); using rhythmic auditory stimulation (RAS) and DDST-2 to see anxiety and development of cerebral palsy children when communicating with others (Jang-won, Kyun, & Hwa, 2016); using the children's anxiety scale (SCAS) instrument to see the anxiety experienced by children (Ben-Pazi et al., 2018); using the Faces Pain Rating Scale (FACES) instrument to assess pain and see the facial expressions of children with cerebral palsy while undergoing therapy (Duymaz, 2020); using a bi-axial accelerometer (ACM) instrument, thermometer, ECG, and LORETA EEG to assess the level of stress in children with cerebral palsy physiologically (Orita et al., 2012; Bringas, 2015)

In addition, combining music therapy with other therapies can actually improve the quality of life of children with cerebral palsy, such as providing music therapy accompanied by dancing or dancing. The effect of this combined therapy makes children feel happy and enthusiastic about joining continuous therapy classes (López et al., 2012); providing other combination therapy such as music and card therapy, has a positive effect in reducing anxiety in children while undergoing treatment in the hospital (Karbandi et al., 2020); providing combination therapy such as music therapy and Neuro Restorative Program (NRP) therapy can help children improve cognitive and behavioral abilities, so that children's excessive anxiety can be overcome (Bringas et al., 2015); giving music therapy when a child is undergoing NDT therapy in a medical rehabilitation unit can reduce pain in children (Duymaz, 2020).

CONCLUSION

Overall, it can be concluded that giving music therapy to children with cerebral palsy is effective in reducing anxiety, depression, and frustration. Other effects can increase feelings of pleasure, calm, and feel empowered. Music therapy is an inexpensive and easy

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procedure, is also safe to use, so it can be the right choice when your child is undergoing treatment. In addition, not many hospitals in Indonesia use this therapy.

LIMITATIONS

Literature searches from various databases yielded many articles but only a few that fit the inclusion criteria set by the authors. Therefore, more databases are needed to be used in order to obtain more reading sources so as to enrich the discussion of articles.

ACKNOWLEDGMENTS AND AFFILIATES

The author would like to thank the thesis supervisor who always taught and directed me to the Faculty of Nursing, University of Indonesia, who always taught and directed me well. The researcher also thanked FKIK UKRIDA, where the researchers worked.

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