Box Musik Terapi (BMT) for Hypertensive Patient in Methodist Hospital Medan: Used MPX5050dp and GSR

by Ance Panggabean

Submission date: 20-Jan-2024 03:42PM (UTC+0700)
Submission ID: 2274440838
File name: 6._WOS-_JOURNAL_OF_COASTAL_LIFE_MEDICINE-WOS.pdf (285.52K)
Word count: 2091
Character count: 11536

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4

Journal of Coastal Life Medicine

Box Musik Terapi (BMT) for Hypertensive Patient in Methodist Hospital Medan: Used MPX5050dp and GSR

Received: 26 October 2022, **Revised:** 19 November 2022, **Accepted:** 26 December 2022

[1]*Junita Batubara, [2]Juliaster Marbun, [3]Ance Panggabean, [4]Emmi Simangunsong, [5] Rony Arahta Sembiring

[1]Universitas HKBP Nommensen Medan, North Sumatera, Indonesia

junitabatubara@uhn.ac.id*

Keywords

Box musik Terapi (BmT), Nature Greets, MPX5050dp Sensor, Galvanic Skin Resistance Sensor (GSR), Hypertension.

Abstract

Music therapy is often used by people who suffer from certain diseases. The benefits of this therapy could be felt by everyone who does it. Researchers have conducted music therapy tests on people with drug disorders. This music therapy had been successful, and researchers published an article entitled Utilization of Music Therapy as Alternative Medicine for Victims of Drug Abuse at the Mutiara Abadi Binjai Rehabilitation Institution. Music therapy is a therapeutic tool to improve, maintain and develop mental, physical, and emotional health and is a form of therapy in the health sector. The tool used as a conductor for therapy music is a Box musik Terapi (BmT) consisting of: (i) MPX5050dp sensor as a blood pressure sensor designed to detect air pressure with an output of voltage in units of volts, (ii) Galvanic Skin Resistance (GCR) sensor as measuring the conductivity level of different skin (this sensor is used to determine human psychological and physiological levels), (iii) Head Set, and (iv) Memory Card for storing music data.

Music data used for this therapy is "Alam Menyapa". Overall, the four components were assembled in such a way as to form a unified whole in BmT. The purpose of research through BmT is as a form of therapy for hypertensive patients where 1) patients are expected to gain peace after hearing BmT, which could reduce hypertension, 2) Being able to design a prototype of music therapy as an alternative treatment solution for hypertensive patients through Box musik Terapi (BmT). The methods used were qualitative and quantitative, where the results to be obtained were that BmT is useful in reducing stress levels in hypertensive patients. The results indicate the benefits of BmT for patients in hospitals, especially for hypertensive patients.

1. Introduction

Hypertension often occurs hidden where the signs and symptoms experienced by the patient are not visible on the surface. WHO (World Health Organization) states that hypertension affects 22% of the world's population and reaches 36% of the incidence in Southeast Asia. Hypertension is also the cause of death, with 23.7% of Indonesia's total 1.7 million deaths in 2018 (Kemenk RI, 2019). If a hypertensive patient experiences an increase in blood pressure, this indicates a warning sign to implement lifestyle changes where positive efforts are needed (WHO, 2020). Hypertensive patients who experience an increase in blood pressure need to look for efforts so can control this condition. Seeing the situation during the COVID-19 pandemic, which has lasted for two years, it is found that many patients at the Medan Methodist Hospital experience stress, which increases hypertension[3][6][7].

Many efforts could be selected and carried out by hypertensive patients to control blood pressure, which in general could be divided into two parts: through and without treatment. According to James et al. 2014 in Wahyuni (2021: 2 says if through treatment then, the recommendation of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC 8) states that people with hypertension must implement lifestyle modifications namely: stops smoking, controls glucose blood and lipids follows the DASH diet, limits alcohol consumption, reduce odium intake to 2,400 mg/day, do regular physical activity 3-4 days a week with an

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

average of 40 minutes per session, and takes medication. [5].

Therefore, serious treatment is needed to treat and cure hypertension patients. One of the efforts to treat hypertension patients is through music therapy. Based on the author's experience with a group of people at the Mutiara Abadi Binjai Foundation in overcoming stress levels in drug-affected patients, music therapy is carried out through the Box musik Terapi (BmT) tool. In this study, researchers succeeded in conducting a BmT trial on eight drugs[1]. Furthermore, the researchers wished that there should be further research on using BmT with patients with different diseases. Researchers conducted another trial of hypertension patients at The Medan Methodist Hospital.

The specific objectives of this study are as follows: (1) To obtain a new method approach in the treatment of hypertensive patients by carrying out health protocols in real-time by utilizing instrumental music therapy innovations, (2) To be able to design a prototype of music therapy as an alternative treatment solution for hypertensive patients through music instrumental. The urgency of this research is very important, where a new formula is found for hypertensive patients undergoing treatment by utilizing five sensors, including monitoring temperature, blood pressure, and controlling stress; where this is a solution that could replace manual methods in dealing with hypertensive patients and support the industrial world in the field of health technology.

In the world of healing with music, there are two types of music therapy, namely Active Music Therapy and Passive Music Therapy. Active music therapy patients are invited to sing, learn to play, use musical instruments, imitate notes, and even compose short songs. In other words, the patient interacts actively with the world of music. Filling the requirement, the guidance of a competent music therapy expert is needed. Next is passive music therapy. This therapy is done easily and effectively without playing a musical instrument. Patients only listen to certain music that is adapted to their disease problems. The most important thing in Passive Music Therapy is that the type of music selection must be appropriate to the patient's needs. Therefore, we make trials of self-composed instrumental music tailored to the needs.

The Central Bureau of Statistics for the City of Medan (2020) states that in 2016 - 2020 hypertension was the second most common disease after ARI (upper respiratory tract infection) suffered by outpatients at the Medan City Health Center. The number of outpatients suffering from hypertension was 18.03%. Based on the interview with dr. Joseph Sibarani Sp.PD at The Medan Methodist Hospital found that from 2020 to 2021, patients who come for treatment are dominated by patients with hypertension, heart problems, diabetes and fever. Therefore, hypertensive patients become dominant come for treatment at the practice site[7].

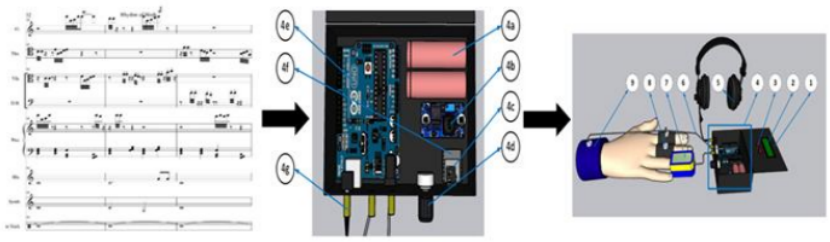

Figure 1. BmT design concept integrated MPX5050dp sensor and GSR sensor

Seeing the situation, the researchers conducted various trials by making a Box musik Terapi (BmT). BmT is a tool used to analysis body movements, blood pressure and skin electrical conductivity (stress level) by connecting two sensors, the MPX5050dp and Galvanic Skin Response (GSR) sensors and digital instrumental music programs. The working principle is that the headphones are placed in the ear. Then music is propagated, which produces a longitudinal wave frequency and enters the eardrum to stimulate the hypothalamus dendritic nerves. In this study, the instrumental music tested on patients was "Alam Menyapa". This study used a quasi-experimental method with a pre-test and post-test approach without a control group. Stress levels, blood pressure and heart rate, compared before and after listening to music. This research was conducted in the Methodist hospital Medan which is located at Jl. M.H Thamrin No. 105, Sei Rengas Permata, Kec. Medan Area, Medan City, North Sumatra, Indonesia. The population used was 23 hypertensive patients who took regular treatment. In

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

practice dr. Joseph Sibarani, SpPD. Researchers, in collaboration with dr. Joseph Sibarani, SpPD, in conducting the research because the 23 patients as the trial sample were his patients.

2. Discussion

The Box musik Terapi (BmT) section consists of the MPX5050dp sensor and the Galvanic Skin Resistance (GSR) sensor. The MPX5050dp sensor works as a sensor for blood pressure. The MPX5050dp pressure sensor is a piezoresistive transducer made of silicon and designed for various applications, especially those using a microcontroller on a chip. This sensor detects air pressure with an output that is the voltage in Volt units. The MPX5050dp pressure sensor is a piezoresistive transducer made of silicon and designed for various applications, especially those using a microcontroller. This sensor is equipped with signal conditioning, temperature compensation, and calibrated chips [2]. Galvanic Skin Response (GSR) is a psychological change in the skin as a result of changes in the activity of the sweat glands, where the sweat glands activate when the body is under stress. Even if very little, an increase in the amount of sweat would reduce the skin's resistance because sweat consists of water and electrolyte ions (Na+, K+, Cl-) which are conductor materials[4].

BmT is created by merging two sensors where the two sensors become one unit in one box, as displayed in the image below:

The picture below explains the procedure for conducting research using BmT on patients from dr. Joseph Sibarani, SpPD. The first thing to do is measure the initial tension before listening to instrumental music. Then, when listening to the instrumental music "Alam Menyapa" to completion, BmT measures the patient's stress level and heart rate.

Figure 2. The use of BmT on patients at the Medan Methodist Hospital

The picture below explains how the procedure for conducting research using BmT on patients from dr. Joseph Sibarani, SpPD. The first thing to do is measure the initial tension before listening to instrumental music. Then, when listening to the instrumental music "Alam Menyapa" to completion, BmT measures the patient's stress level and heart rate.

The results of trials conducted on 23 patients, of which ten were female, and 13 were male, showed that from 36 measurements, 23 measurements (63.89%) showed that the BPM of patients with the MPX5050dp sensor decreased after listening to the instrumental music "Alam Menyapa". The decrease in BPM with the MPX5050dp sensor is between 1.20% to 26.67%, with an average of 7.65%. Then from 36 measurements, 31 measurements (86.11%) showed a decrease in GSR in bits, 5.5% did not show any changes, and 8.3% showed an increase after hearing the instrumental music "Alam Menyapa". The decrease in GSR in bits is between 0.46% to 64.54%, with an average of 12.88%.

3. Conclusion

Box musik Terapi (BmT) is an alternative treatment for hypertension patients at Methodist Hospital Medan. The results of the experiments showed that the BmT, integrated with the MPX5050dp sensor and the GSR, selects the instrumental music "Alam Mengapa", is useful for reducing stress levels and heart pressure, as could be seen from the test results of 23 patients with hypertension. The trial was carried out by doing a pre-test before listening to instrumental music and a post-test during and after listening to instrumental music. The results of this study were the results of the first trial for patients with hypertension. From the results of two studies conducted with patients affected by drugs and hypertension using BmT, it could be assumed that these trials show that BmT functions effectively to reduce stress levels and heart pressure for patients affected by drugs and hypertension.

4. Acknowledgement

The researchers' thanks go to the Ministry of Education and Culture for the research funding so this research can be carried out to completion. Furthermore, the researcher also thanked the methodist hospital who was willing to provide a place for carrying out this research program. Researchers also did not forget to thank dr. Joseph Sibarani Sp.PD for his cooperation in carrying out this study in which patients with hypertension can be well observed.

References

[1] Batubara, Junita et. Pemanfaatan Terapi Musik sebagai Pengobatan Alternatif Korban Penyalahgunaaan Narkoba di Panti Rehabilitasi Mutiara Abadi Binjai. Jurnal

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

Panggung V31/N4/12/2021. ISBI Bandung, 2021.

[2] Ervianto, Okta & Heru Winarno. 2022. Gluterma Meter Digital Dengan Sensor Mpx5050dp Untuk Menghitung Denyut Nadi Berbasis Mikrokontroler Atmega85335. http://eprints.undip.ac.id/20730/1/okta.pdf. Sabtu 12 November 2022, pukul 16.15 wib

[3] Kemenkes RI. 2019. Penyakit hipertensi penyebab kematian tertinggi, Kemenkes ingatkan CERDIK [internet]. Jakarta Selatan: Kementerian Kesehatan Republik Indonesia, 2019

[4] Sera, Regina et. Sensor Galvanic Skin Response (GSR) Berbasis Arduino Uno Sebagai Pendeteksi Tingkat Stres Manusia. Prosiding SKF 2015. ISBN: 978-602-19655-9-7, 2015.

[5] Wahyuni, Emmi. 2021. Intervensi pengurangan garam terhadap penurunan tekanan darah pada penderita hipertensi: a systematic review. Thesis Magister Keperawatan Fakultas keperawatan, Universitas Hasanuddin, Makasar, 2021.

[6] World Health Organization, A Global Brief On Hypertension: Silent Killer. Global Public Health Crisis, 2021.

[7] https://medankota.bps.go.id/statictable/2019/11/16/127/ jumlah-penderita-sepuluh-penyakit-terbesar-seluruh-puskesmas-kota-medan-tahun-2018.html

Box Musik Terapi (BMT) for Hypertensive Patient in Methodist Hospital Medan: Used MPX5050dp and GSR

ORIGINALITY REPORT

13%	9%	7%	6%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	journal.ipm2kpe.or.id Internet Source	2%
2	Fildzah Aure Gehara Zhafirah, Rika Rokhana, Riyanto Sigit, Bima Sena Bayu Dewantara. "Support Vector Machine Method for Predicting Children's Emotions", 2022 9th International Conference on Electrical Engineering, Computer Science and Informatics (EECSI), 2022 Publication	2%
3	garuda.kemdikbud.go.id Internet Source	2%
4	jurnal.isbi.ac.id Internet Source	1%
5	ejournal-kertacendekia.id Internet Source	1%
6	clinicalhypertension.biomedcentral.com Internet Source	1%
	jurnal.ulb.ac.id	

7	Internet Source	1 %
8	Submitted to Badan PPSDM Kesehatan Kementerian Kesehatan Student Paper	1 %
9	Submitted to SAE Institute (Worldwide) Student Paper	1 %
10	Submitted to The University of Texas at Arlington Student Paper	1 %
11	Yixiu Han, Rui Tang, Zhenqi Liao, Bingnian Zhai, Junliang Fan. "A Novel Hybrid GOA-XGB Model for Estimating Wheat Aboveground Biomass Using UAV-Based Multispectral Vegetation Indices", Remote Sensing, 2022 Publication	1 %
12	www.mdpi.com Internet Source	1 %
13	Sri Wahyuni Adriani, Yuyus Febysna Feronika, Cindhy Ayu Meillani, Silvia Lestari, Dodik Dwi Hadiansah. "Effectiveness Of Hypertension Exercise And Health Education On Decreasing Blood Pressure", Jurnal Kesehatan dr. Soebandi, 2021 Publication	<1 %

Exclude quotes	On	Exclude matches	Off
Exclude bibliography	On		