

## The Effect of Music Therapy on Stress Level of Hypertension Patients at Methodist Hospital Medan, Indonesia

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**Abstract:** Hypertension or high blood pressure is a disease that is called the silent killer because it is very dangerous without warning for its victims. Not only in Indonesia, but hypertension is also a problem throughout the world. According to Yonata in Purwanti, *et al.*, (2022: 3) WHO data shows that 26.4% of people worldwide have hypertension, that number is around 972 million people and is likely to increase in 2025 to 29.2%. Of the 972 million people worldwide, there are 333 million people in developed countries and the remaining 639 million people are in developing countries like Indonesia. Therefore, various attempts were made to treat it. Apart from medical treatment, music therapy is now also an effort to reduce stress levels in people with hypertension. So that a new innovation was created through the Music Therapy Box (BmT) which is equipped with a GSR (Galvanic Skin Response) sensor to measure the patient's stress level while participating in music therapy. This study was conducted on hypertensive patients at Medan Methodist Hospital. The hypertensive patient is a patient handled by dr. Joseph Partogi Sibarani, Sp.PD. He treats around 1,046 patients and there are around 700 patients with hypertension. There were 7 hypertensive patients who participated in this study using music therapy. The results showed that 5 out of 7 hypertensive patients experienced a decrease in stress numbers towards normal (0-300) on GSR at Box Music Therapy (BmT).

**Keywords:** Hypertension, BmT, GSR sensor, Music Therapy, Medan Methodist Hospital.

### INTRODUCTION

According to anti Widiyari and Putra, (2022:18), hypertension is a health problem that is quite dangerous worldwide because this disease is a major risk factor that leads to cardiovascular disease such as heart attack, heart failure, stroke and kidney disease. Hypertension, which is better known as high blood pressure, is a condition when a human has blood pressure ranging from 120/80 mmHg or even more. According to Sudarso, *et al.*, (2019) in Harsismanto, J., *et al.*, (2020: 2) Cardiovascular disease occurs because the human condition is getting older so that the blood vessel walls experience a decrease in elasticity which causes the elderly to be susceptible to high blood pressure (hypertension). According to Yonata in Purwanti, *et al.*, (2022: 3) WHO data shows that 26.4% of people worldwide have hypertension, that number is around 972 million people and is likely to increase in 2025 to 29.2%. Of the 972 million people worldwide, there are 333 million people in developed countries and the remaining 639 million people are in developing countries like Indonesia. Symptoms of hypertension that usually appear are headaches, fatigue, heart palpitations, difficulty breathing after activities, blurred vision, nosebleeds, frequent urination at night, vertigo and ringing in the ears. Patients with hypertension have the potential to experience a coma due to brain swelling. Hypertension itself is a factor causing other diseases such as kidney failure, stroke and heart. According to Nortajulu, B. *et al.*, (2023: 2660) hypertension is often called a "silent killer"

because it is detected during a physical examination due to certain conditions or diseases that cause complications in other organs of the body.

According to dr. Yekti S and Ari Wulandari This disease can attack humans for several reasons including: (1) Toxins: when the liver and kidneys are injured, cleaning of toxins cannot be carried out so that toxins that should be excreted through the urinary tract, intestines and skin become dispersed into the blood. This toxin buildup in the blood, if not neutralized, can cause various diseases including hypertension. (2) Genetic factors: parents with hypertension pass twice the risk of hypertension on to their offspring. (3) Age: people aged > 60 years have higher blood pressure. (4) Gender: men are at risk of suffering from hypertension earlier, while women are more prone to suffer from hypertension when they are > 50 years old. (5) Ethnicity: hypertension is more common in black people because their renin levels are lower and their sensitivity to vasopressin is lower. (6) Stress: can generate sympathetic nerves that trigger the work of the heart and cause blood pressure to increase. (7) Obesity: body weight has a relationship with blood pressure because the upper body will have an increased amount of fat. (8) Nutrition: high salt intake can cause the natriuretic hormone to experience a lot of expenditure, thus triggering an increase in blood pressure. (9) Lack of exercise: humans who lack exercise trigger high cholesterol and blood

pressure which continues to increase, thus triggering hypertension.

according to dr. Joseph P.Sibarani, Sp.PD, hypertension patients are divided into 3 stages as presented in Table 1 below.

**Table 1:** The stage of hypertension

Stage	Systolic blood pressure /mmHg
Stage I	140-149
Stage II	150-159
Stage III	>160

Based on information from dr. Joseph P. Sibarani, Sp.PD (8-2-2023), hypertension is also divided into two types based on blood pressure conditions. Primary hypertension is defined as a condition in which high blood pressure occurs with a prevalence of 95% which is caused by several factors, including lifestyle factors, namely inactivity and diet. Meanwhile, secondary hypertension is defined as a condition where high blood pressure occurs with a lower prevalence, namely 5%, which is caused by a medical condition (such as kidney disease) or a reaction to certain drugs (such as birth control pills).

So far, the handling of hypertension treatment given to patients has experienced many obstacles. In Retnowati, *et al.*, (2022: 119) there are various factors that affect adherence to treatment of elderly hypertension, namely: age, gender (women pay more attention to health), level of education (affects one's knowledge of disease), physical status (physiological decline syndrome related to vulnerability). According to Andrianto, (2022: 64) Management of hypertension must also be attempted by modifying the patient's lifestyle such as losing weight, limiting salt intake, high-fiber and low-fat diet, reducing alcohol intake, and increasing physical activity. Therefore, a new innovation was found using music therapy. Therapy is an attempt to restore the health of people who are sick; disease treatment; disease treatment (Fajri, 2008: 809)

In Margiyati & Cahyo, B. D. (2022: 49) Music therapy is a therapy that is very safe, cheap, and effective to reduce anxiety, even music therapy can provide a sense of comfort for listeners. Several other studies state that the use of music therapy can help with various problems. According to data from Nurul, (2017) in Marina, *et al.*, (2022: 155) a study of 10 people with hypertension used classical music by W.A. Mozart showed the results of 6 of them became normal. Meanwhile, in another study by Rachmawati, F., Satiadarma, &

Chris (2021: 314) music therapy used the work of J.S. Bach for cervical cancer sufferers shows that cervical cancer sufferers feel more relaxed and are able to imagine being in a comfortable place. All of these research results are in accordance with Yora, N. & Cindi L.A. (2022) that music therapy is the use of music as a therapeutic tool to improve, maintain, improve mental, physical and emotional states. For people with hypertension or high blood pressure, music can be used as an effective therapy to lower blood pressure. In this research, the latest music therapy innovation is used, namely by using contemporary music. This therapy music, titled "Activity" was created by Prof. Junita Batubara, S.Sn., M.Sn., Ph.D with the composition of bird sounds, string instruments, percussion instruments and the sound of water. This "activity" music, is used through BmT.

The BmT therapy tool is also a therapeutic tool created by good ideas and collaboration between students and lecturers at the Faculty of Languages and Arts, University of HKBP Nommensen Medan after receiving grant funding in order to take part in the Student Creativity Program - Karsa Cipta (PKM-KC) organized by KEMENDIKBUDRISTEK. The name Box Music Therapy (BmT) then received a Simple Patent with number S00202211126. Before being used for hypertension therapy, this BmT was used for relaxation therapy at the Mutiara Abadi Binjai Rehabilitation Center. The existence of music in the world of health also proves that music does not die and continues to develop to produce new works that are not only entertaining but also participate in answering health problems in society. This is in accordance with Reni, Iis Komang, (2020:3) music can stimulate the body to produce Nitric Oxide molecules (molecules that can reduce blood pressure in blood vessels).

In this research, the music "Activity" by Prof. Junita Batubara, S.Sn., M.Sn., Ph.D. used to reduce the stress level of hypertensive patients at Medan Methodist Hospital. Medan Methodist Hospital is a hospital that was built in 1975 on the site of a former Ksatria College school. One year later, on October 16, 1976, Bishop J. Gultom inaugurated the Medan Methodist Hospital on the initiative of a number of Gloria church leaders and assistance from J. E. Sudibyo. In accordance with Law No. 29 of 2004 concerning health and the revision of Law No. 44 of 2009 states that hospitals must provide protection for patient safety, improve quality, provide treatment according to hospital service standards such as

outpatient care, inpatient rooms, emergency rooms (IGD), operating rooms, health care rooms, radiology rooms, laboratories, sterilization rooms, pharmacy, administrative rooms, waiting rooms, kitchen rooms, morgues, waste management, and parking. Medan Methodist Hospital is also equipped with regulated infrastructure including water installations, steam installations, medical gas installations, evacuation facilities, and ambulances.

To comply with the health law, since 2006 Medan Methodist Hospital has made 14 specialist clinics, 124 beds (12 beds in VVIP, 18 beds in VIP, 26 beds in class I, 12 beds in class II, 47 beds in class III, and 9 beds in ICU), Radiology, Endoscopy, Emergency Room and Pharmacy. To help provide services to general patients, BPJS, Jasa Rahardja, and other insurances, Medan Methodist Hospital prepares 23 specialist doctors (4 doctors for internal medicine poly, 2 doctors for pediatric poly, 1 doctor for pulmonary poly, 1 doctor for ophthalmology poly, 2 doctors for psychiatric poly, 2 doctors for orthopedic poly, 2 doctors for ENT-KL poly, 1 doctor for skin poly, 2 doctors for neuro poly, 1 doctor for cardiac poly, 1 doctor for obstetric/gynecological polyclinic, 1 doctor for urology poly, 1 doctor for cardiac poly, 2 doctors for general surgery), 12 General Practitioners and 123 nurses this data is based on data collection at Medan Methodist Hospital as of March 1 2019.

Dr. Joseph Partogi Sibarani, Sp.PD. is one of the doctors who treat hypertension and has experience for 7 years. Of the 1,046 patients he treated, 700 of them were hypertensive patients. One of the most common causes of hypertension is stress. According to Hidayati & Harsono in Sitepu, R., & N. Hutapea, L. M., (2022: 240) stress is a condition in which an individual experiences or is facing an unpleasant situation, causing frustration, resulting in the appearance of sadness, anxiety, and anger which causes a change in an individual's life to be a good change or a bad change. An increase in blood pressure when stressed occurs because the sympathetic nerves trigger the performance of the heart so that blood pressure rises. One way to overcome this is to do music therapy.

The BmT has a GSR (Galvanic Skin Response) sensor, which is a device that measures the electrical conductance between 2 points, usually between 2 fingers as the highest density of sweat glands on the hands and feet (in this study, the GSR sensor was used on the hands). The GSR sensor works to detect the observed nerve-mediated effects through the sweat glands. Through this GSR sensor, one can see a person's stress level based on skin conductance. According to Regina Seran, et al., in Komang Wiradharma, et al., (2022: 219) stress levels have the following levels as presented in Table 2.

**Table 2:** Stress Levels Based on Skin Conductance Values

Condition of Patients	GSR $\mu$ siemens	GSR (bits)	GSR (voltage)
Normal	0-0,415	0-300	0-1,46
Relax	0,417-1,054	301-525	1,47-2,56
Light Stress	1,058-1,418	526-600	2,57-2,92
Moderate Stress	1,424-2,433	601-725	2,93-3,54
Heavy Stress	2,444-4,166	726-825	3,54-4,02
Extremely Stressful	>4,166	826-1023	4,03-4,99

Changes in stress levels are seen by the GSR sensor through changes in sweat secretion and sweat gland activity as a result of changes in sympathetic nervous system activity. The working principle of GSR is to measure the level of stress based on skin resistance. This sensor measures the skin's resistance to sweat and interprets it as a psychological level of stress

An increase in blood pressure when stressed occurs because the sympathetic nerves trigger the performance of the heart so that blood pressure rises. According to Sitepu, R. & N. Hutapea, L. M., (2022: 240) excessive stress can cause a sudden increase in blood pressure that affects physical condition and triggers other health

problems such as stroke and heart disease. Hypertension sufferers are highly recommended to manage their emotions so as not to experience stress. With this music therapy, it is hoped that it can help reduce stress levels in people with hypertension. Apart from being used for health purposes, music therapy is also very good for entertaining and relaxing listeners.

**RESEARCH METHODOLOGY**

To be able to express the research of this work well, the Participation Action Research (PAR) research method was used with qualitative research. According to Norman K. Denzin in Batubara, et al., (2021: 472) it is explained that

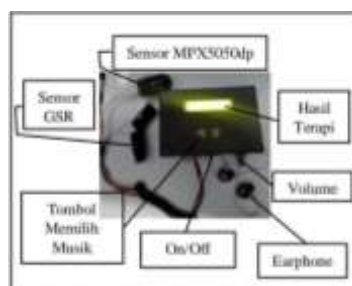
there are 3 words that form a cycle and are interrelated with one another, namely participation, research and action. Participation is a form of caring for people with hypertension. So research was carried out to form a new breakthrough that helps people with hypertension through music research and the discovery of Box Music Therphy (BmT). Before Box Music Therapy (BmT) was used for hypertension therapy at Medan Methodist Hospital (RSM), previously Box Music Therapy (BmT) had been used as an alternative treatment for victims of drug abuse at the Mutiara Abadi Binjai Rehabilitation Center. In Batubara, *et al.*, (2021: 474) The results of music therapy for victims of drug abuse using Box Music Therapy (BmT) state that every patient who takes part in music therapy is able to build new reactions through his body such as whistling, clapping, chest clapping, finger snaps, thigh clapping and so on. After participating in music therapy, patients who are victims of drug abuse (shabu-shabu, ecstane and marijuana) bring them into a relaxed atmosphere both in mind and body.

## RESULTS AND DISCUSSION

Hypertension, which is often referred to as high blood pressure, according to Wade, (2023:21) blood pressure in question is the amount of pressure used in the bloodstream when it passes through the arteries. The function of this blood pressure is to move blood through the circulatory system and will experience ups and downs. In people who experience blood pressure that goes up (high), and does not go back down, it is called high blood pressure (hypertension). Blood pressure can be said to be normal if it shows the numbers 120/80 (general numbers that can change according to a person's condition). Hypertension is divided into 2 types according to Andrianto, (2022: 4). Primary hypertension is a type of hypertension whose specific cause is not known, while secondary hypertension occurs due to other identifiable diseases.

The music used for this hypertension therapy music is contemporary music. In Nugraha, (2022: 13) Contemporary music was created not to meet the need for entertainment facilities in the midst of society because contemporary music actually emphasizes artistic value for art. Contemporary music composers, do not care about the existence of contemporary music creations in society because they do not pursue the popularity or tastes of society. With all the considerations and inspiration, Prof. Junita Batubara S.Sn., M.Sn., Ph.D., created contemporary therapy music entitled "Aktifitas", which was then put into BmT to be used as a means of music therapy. This BmT is equipped with 2 types of sensors, namely the MPX5050DP sensor to determine blood pressure and the GSR Sensor (Galvanic Skin Response Sensor) to calculate stress levels. The two sensors will be used on the patient's fingers while sitting. Then earphones will be paired so that the patient can listen and even enjoy music properly. The GSR sensor works through electrical conductance in the skin or sweat glands (Komang Wiradharma, *et al.*, 2022: 219). This GSR sensor measures the level of stress based on the activity of the sweat glands. Based on Bakti, W.T. & Wardati, N.K. (2019:94) skin conductance can be influenced by blood type, gender, surrounding circumstances, and partly influenced by the sympathetic nervous system. When in a state of anxiety, then the body's resistance will be even greater. This sensor works well through a series of wires connected to 2 aluminum foils that are placed on the fingers to capture electrical signals in the body.

Medan Methodist Hospital was chosen as the location for this music therapy test. There are patients with hypertension who take part in music therapy until they are 73 years old who take part in music therapy using BmT. The form of BmT used in the study is as follows:



**Figure 1:** Box music Therapy (BMT)

**Table 3:** Data on patients with hypertension who take part in music therapy

No.	Initial Name	Age	Sex	Control date	Initial GSR	GSR results of music therapy
1.	A.S.	65	M	19-10-2022	676	672
2.	P.S.	68	F	10-11-2022	672	670
3.	H	44	M	26-10-2022	466	429
4.	N.P.	63	F	10-11-2022	682	670
5.	H	68	F	10-11-2022	677	680
6.	L.T.	73	F	9 -11-2022	661	640
7.	T	52	M	20-10-2022	550	597

Through the table above, it is known that the average patient experiences moderate stress to mild stress. The 5-minute therapy showed that 5 out of 7 hypertensive patients experienced a decrease in stress levels. Mr. AS (moderately stressed) is a hypertensive patient who works as a pedicab driver every day. When he joined this music therapy, he said he felt taken to a beautiful nature so he felt like he was releasing all the burdens on his mind. Mr. AS also built a reaction in his body by flicking his index finger on his thigh. Mrs. PS (moderately stressed) is enjoying her old days at home playing with her grandchildren. She feels quite happy because she feels very close to God's creation when she listens to therapeutic music. While listening to therapy music Mrs. PS nodded her head to the music. Mr. H (relaxed state) is an honorary teacher who tells of his tiredness dealing with children at school. When listening to therapy music he stated that he could not enjoy music because he likes rock genre songs. Mrs. NP (moderate stress) who works as a vegetable seller in the market admits that the day was quite tiring for her, she enjoys music well and builds reactions by moving her fingers to the music. Mrs. LT (a state of moderate stress) came sitting in a wheelchair, while attending therapy she closed her eyes slowly showing signs of really enjoying the music she heard. After listening to the therapy music, Mrs. LT said that the feeling of tightness in her chest had slowly decreased since the therapy music was heard. Mr. T (a state of mild

stress) is a patient who complains about the lives of his children and he also comes too late so he waits too long resulting in this music therapy activity not being carried out optimally.

According to dr. Joseph P. Sibarani, Sp.PD on average his patients suffer from hypertension of unknown cause (idiopathic). So he did an examination and consultation before giving a prescription. After that the patient can follow music therapy. The duration of following the music therapy is 5 minutes in a reclining sitting position. Before and after the music is over, the patient's blood pressure will be checked and the GSR results will be recorded through BmT (Box Music Therapy). In BmT there is a song called "Activity" which will be played alternately when attending therapy.

Every patient who follows therapy has a different reaction. There are patients who close their eyes, frown, shake their legs and lower their heads. Some hypertensive sufferers who take part in this therapy admit that they experience stress due to life problems such as their children's education and businesses that go bankrupt due to Covid-19. There is a mother with hypertension who works in the world of politics who admits that the presence of music therapy helps her become more relaxed and calm after facing various activities at home and at work.



**Figure 2:** Hypertensive patients while listening to therapy music

In Batubara, *et al.*, (2023: 860) through the Galvanic Response Skin (GSR) sensor, changes in psychological state can be seen through the activity of sweat glands on the skin (sweat glands are active when the body is under stress). This is very easy for the GSR sensor to read because sweat water contains electrolyte ions (Na<sup>+</sup>, K<sup>+</sup>, Cl<sup>-</sup>) which are conductors.

Music entitled "Activity" is the music used for patients participating in therapy in this study. This music was specially created by Prof. Junita Batubara, S.Sn., M.Sn., Ph.D. for use as a means of music therapy. This music was created to create a calm atmosphere so that it is very comfortable to be heard by patients taking part in therapy. This music is captured by the ear and then affects the limbic system, then goes to the autonomic nerves with various bodily abilities to unwittingly lower blood pressure, pulse and respiration to produce a relaxation response.

According to Batubara, (2021:469), research on contemporary music proves that music can work to harmonize and balance all the rhythms of the human body such as heart rate, blood pressure, breathing rate, primary respirator speed and brain wave frequency.

## CONCLUSION

Blood pressure is the amount of pressure exerted on the bloodstream as it passes through the arteries. Blood pressure can be said to be normal if it shows the numbers 120/80 (general numbers that can change according to a person's condition). Hypertension occurs when a person experiences an

increase in blood pressure that does not decrease again. Medan Methodist Hospital is one of the hospitals serving hypertensive patients with BPJS, general and insurance. One of the internal medicine specialists who treats hypertension is dr. Joseph P. Sibarani, Sp.PD. He is a doctor who has experience serving patients for 7 years and treated 1,064 patients and 700 of them were hypertension sufferers. There are patients with hypertension who take part in music therapy until they are 73 years old who take part in music therapy using BmT. The music used for music therapy with BmT entitled "Aktifitas" was created to sound a calm atmosphere so that it is very comfortable to be heard by patients taking part in therapy. There are 5 out of 7 patients with hypertension who experience a decrease in stress levels after listening to music entitled "Activities". The existence of music therapy entitled "Activities" in music therapy is a form that was just created after the music by Wolfgang Amadeus Mozart was used to carry out various activities using music therapy.

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