

Implementation of the Learning Drum Musical Instrument To Improving Motor Development of Down Syndrome Children

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Abstract: The number of down syndrome children in Indonesia in 2010 was 0.12% and increased in 2013 to 0.13%.¹ One of the problems in children with down syndrome is the limitation or delay in motor development due to chromosomal abnormalities,² so it takes an effort to improve motor development, one of them is by implementing the learning of drum instruments. This study aims to determine the differences in motor development of children with down syndrome before and after being given the learning of drum music instruments at the SKH Negeri 01 Tangerang Regency. This research is a quasi-experimental study with pre and posttest without control design. The number of samples is 12 samples used purposive sampling. Measurement of motor development using Guidelines for Adaptive Physical Education Implementation for Students with Special Needs (Down syndrome) in Inclusion Schools. Data were analysed by univariate and bivariate using Wilcoxon test. The results showed that the mean score of pretest motoric development was 13.50, whereas after being given intervention was 15.58. There is a difference in the average score of motor development between before and after being given learning with a drum instrument in children with Down syndrome ($p = 0.02$), where there was an increase in the average score of motor development after being given intervention with a difference in score of 2.08. It can be concluded that the implementation of the learning of drum musical instruments has an effect on improving the motor development of children with Down syndrome.

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I. Introduction

Down syndrome is a disorder of development that is brought from birth and one of the most common types of congenital syndromes.³ Children with Down syndrome are children who experience mental retardation caused by gene abnormalities and excess chromosomes. This can affect the physical development and learning ability of people with Down syndrome, one of which is the limitations or delays in the development of a child's motorbike.⁴ According to Sujarwanto in Melyana, children with Down syndrome experience delays ranging from moving, smiling, showing interest in various things or objects using his hands, sitting, walking, talking, understanding, etc.⁵ This motor delay can also be influenced by the intelligence or intelligence of a child, because intelligence can influence children to capture and understand related to cognitive and motor aspects.²

Delay in coordination of the muscles of the fingers, arm and mouth is a common Down syndrome problem.⁶ Management of developing motorized Down syndrome children can be done by giving exercises using music or musical instruments. A number of studies show that the relationship between musical activities that involve motion can stimulate children with special needs to improve mental, motoric, and intelligence functions.⁷ Playing musical instruments can help children with Down syndrome in exercising motoric ability. All types of musical instruments can be used as therapy, especially these instruments can stimulate coarse and fine motoric simultaneously. One of them is in the drum musical instrument which is played simultaneously and uses all organs of body movements, namely the hands and feet.

II. Material And Methods

This comparative study was carried out on Down syndrome children in SKH Negeri 01 Tangerang Regency, at Caringin II street, Saga Village 02/ 02, Balaraja Districts, Tangerang Regency, Banten Province (15610) from February to August 2018. Samples of 12 children were carried out by variable controllers confounding is used as a subject in this study.

Study Design: Quasi-experimental study with pre and posttest without control design

Study Location: This study conducted in SKH Negeri 01 Tangerang Regency, at Caringin II street, Saga Village 02/ 02, Balaraja Districts, Tangerang Regency, Banten Province (15610).

Study Duration: February 2018 to August 2018.

Sample size: 12 children with Down syndrome.

Sample size calculation: The population in this study were all children with Down syndrome in SKH Negeri 01 Tangerang Regency as many as 27 children. The sample in this study were mild and moderate Down syndrome children in SKH Negeri 01 Tangerang Regency as many as 12 samples after controlling for confounding variables.

Subjects & selection method: The sampling technique used was purposive sampling using research inclusion and exclusion criteria. After controlling the confounding variables, 12 subjects were used as the study sample, while 15 subjects did not meet the requirements or there were criteria for confounding variables.

Inclusion criteria:

1. Down syndrome children with mild and moderate DS types
2. Complete learning of the drum musical instrument to completion
3. Willing to participate in research and be approved by parents.

Exclusion criteria:

1. Children with severe Down syndrome
2. Children with a history of cerebral palsy (CP)
3. Children with poor and poor nutritional status
4. Children who suffer from chronic infections or illnesses
5. Subjects who are sick or not present when taking measurements or when learning drum instruments
6. Parents refuse their children to be used as research subjects.

Procedure methodology

Data collection tools in this study use a set of drums set to provide intervention or treatment to improve motor development of children with Down syndrome. Instruments to determine motor development of Down syndrome children using questionnaires in the form of a check list sheet, which is a questionnaire based on the Directorate of PK-PLK Diksar (2013) regarding Adaptive Physical Education Guidelines for Special Needs Students (Down syndrome) in Inclusion Schools. This questionnaire consists of motoric and cognitive aspects including practice knowledge and attitude. On the motoric aspect, it is seen from the type of assistance, where each item is given a score between 1-3 ie score 1 with guidance or assistance, score 2 with the help of instructions, and score 3 if it is independent without assistance. The number of aspects tested is 6 main aspects with a total score between 6-18.

After obtaining subjects who were willing to become research respondents and had signed informed consent sheets, the researchers conducted several stages starting from the pretest, doing the intervention and posttest. At the pretest and posttest stages, the test was conducted to determine the child's motor development in the hall of the SKH Negeri 01 Tangerang Regency, while the intervention process was conducted in the art room of the SKH Negeri 01 Tangerang Regency.

In the pretest that is knowing how the motor development of children with Down syndrome by testing several activities based on the questionnaire used. The measurement of DS motoric development consists of six task items namely; 1) The locomotor base motion goes and steps back, front, right and left and drags; 2) Enabling both feet (right foot and left foot) to take turns in stepping; 3) Demonstrating running movements in various directions; 4) Imitating varied running movements: running straight, running winding, running fast, running slowly, and running interspersed with jumps; 5) Imitating jumping movements in various directions; and 6) Jumping movements vary: jumping with a squat, jumping on one leg, jumping up and standing. Furthermore, the child is seen whether in doing the practice is needed with assistance, only assistance with instructions, or self-help / without assistance. The pretest was carried out for 1 day, because the researcher only made observations by instructing the subject to do some aspects that were tested.

After completing the pretest, the next researcher prepares the subject to be given a learning drum instrument. The intervention phase was carried out for 4 days, where one child received two interventions, in one intervention, the child played drumming for 4x10 minutes. After completing the learning of the drum musical instrument, the researcher made observations on the child's motor development (posttest) in the same way at the pretest.

Statistical analysis

Data were analysed using SPSS version 22. T-test analysis was used to ascertain the significance of differences between motor development before and after being given the intervention of learning drum instruments. The data was then tested for normality and produced abnormal data distribution, then this result was confirmed by the Wilcoxon test which is a non-parametric test comparing two groups in pairs.

III. Result

This study was conducted on 12 children with Down syndrome after eliminating 15 children with Down syndrome based on confounding variables, because the 15 children did not meet the criteria for the study. In this study conducted on 12 children in which 5 children with mild DS type and 7 respondents with moderate DS, the average age of children was 11 years with an age range ranging from 7-18 years, where 4 respondents were boys and 8 respondents is a woman. The following researchers describe the results of the research that has been obtained.

Table 1 shows that the average total score of motor syndrome in Down syndrome children at the pretest or before being given the drum musical learning was 13.50 and a standard deviation of 3,680 with a total drinking score of 6 and a maximum of 18.

Table 1 Average Motor Development Score of Down Syndrome Children Before Learning Drum Instruments

Motor Development	Mean	Median	Std. Deviasi	Mini - Mak
Pretest Total Score	13,50	13,00	3,680	6 - 18

Table 2 shows that the average total score of the respondent's motoric development at posttest or after being given the learning of a drum musical instrument is 15.58 and a standard deviation of 3.679 with a total drinking score of 6 and a maximum of 18.

Table 2 Average Motor Development Score of Down Syndrome Children After Learning Drum Instruments

Motor Development	Mean	Median	Std. Deviasi	Mini - Mak
Posttest Total Score	15,58	17,50	3,679	6 - 18

Table 3 shows that the average total score of the respondent's motoric development at the pretest or before being given the learning of the drum musical instrument was 13.50, while at the posttest time the average score of the total motoric development of the respondents was 15.58. The difference in the average total score of the respondent's motoric development between pretest and posttest was 2.08. Obtained 1 respondent experienced a decrease in motor development scores between pretest and posttest with a difference in score of 1.5, it is known that 7 respondents had an increase in motor development scores between pretest and posttest with a difference of 4.93 and 4 respondents had the same motor development score between pretest and posttest. The results of statistical tests with Wilcoxon test obtained p value $0.020 < \alpha 0.05$, so H_a was accepted and H_o was rejected, it can be concluded that there were differences in motor development of children with Down syndrome before and after being given the learning of drum instruments.

Tabel 3 Differences in Motor Development of Down Syndrome Children Before and After Drum Musical Instrument Learning

Motor Development	Mean	Mean Rank	Negative Ranks (Mean Ranks)	Positive Ranks (Mean Ranks)	Ties	P value
Pretest	13,50	2,08	1 (1,5)	7 (4,93)	4	0,020
Posttest	15,58					

Based on the results of the study, it can be seen that there is an increase in the average value of motor development scores for children with Down syndrome at the time of posttest, where the average score of the development score at posttest is greater than the pretest ($\bar{x}_2 = 15.58 > \bar{x}_1 = 13.50$), so that in this case the implementation of the learning of drum musical instruments has an effect on improving the motor development of Down syndrome children in SKH Negeri 01 Tangerang Regency.

IV. Discussion

The results of the research data show that there are differences in motor development of Down syndrome children in SKH Negeri 01 Tangerang Regency before and after being given the learning of drum instruments. From the results of the study it can be seen that there is an increase in the average value of the motor development score of children with Down syndrome at the time of posttest, so that in this case the implementation of the learning of drum instruments has an effect on improving motor development of children with Down syndrome.

The results of the above research are in line with the previous research that has been done by Ardina which explains that music learning can develop mental and motorized Down syndrome children by providing rhythmic musical instruments and playing various types of seasons, namely pop, rock, jazz, classical.⁸ Research Diana explained music learning is able to develop aspects of student motor development, which in terms of motoric, music learning can develop physical coordination⁹

The improvement in motoric development can be seen from the results of the average total score of the respondent's motorbike development at the pretest or before being given the learning of the drum musical instrument is 13.50, while at the posttest time the average total score of the respondent's motoric development is 15.58. The difference in the average total score of the respondent's motoric development between pretest and posttest was 2.08.

Based on the research data, it is known that out of 1 child who at the time of pretest needs help still needs help at the time of posttest. Of the 6 children who at the time of pretest needed help with instructions known at the time of posttest 2 children still needed help with instruction, while 4 children could do it independently or without help. Of the 5 children who were able to do independently at the time of the pretest it was known that the posttest had not changed or was still independent. The results of this study indicate that with the learning of drum instruments, children with Down syndrome can practice physical, motor skills and skills in this case how to harmonize all the limbs that are the key to motor development.

Drum musical instrument learning can be one of the rhythm therapy programs as one of the media to develop and improve motor development for children with Down syndrome. This therapeutic program aims to enable children to play rhythmic and rhythm in which there are therapies to train concentration and train the nerves in the child's body through exercise,

taste, and mental processing when playing drum instruments. The rhythm movement is very effective in developing motor skills, agility, balance and coordination.

Drum music instruments can train and improve children's motor development. Drum instruments that are played with both hands and occasionally accompanied by the help of feet can train how to coordinate these organs. The activities of the left and right limbs can activate the work function of the left and right hemispheres while training the balance of limb movements. When a child plays a drum, the child will train his gross motor coordination and practice following the beat of the wasp. Therefore, learning to play musical instruments is very beneficial for the physical development of children.

Drum instrument learning is one of the best stimulations to train children's motor development, especially gross motor skills in children. Drum instruments will encourage children to move more, because when children play drums, the child will hold both sticks and swing both hands to beat the instrument according to rhythm and interspersed with the movement of the foot on the drum pedal. When playing the hand drums the child will hold the stick to ring the snare drum, toms and cymbals, while the foot will step on the pedal to ring the bass drum and hi-hat. With the balance or harmony between hand and foot coordination, it will produce a good music rhythm. This shows that the ability to coordinate his hands and feet is getting better. By training the motor, then the child will become more trained in carrying out his activities, especially in children with Down syndrome.

The results showed that from 5 children with mild DS at pretest, 1 child (20%) needed help, 1 child (20%) needed instruction assistance, and 3 children (60%) were independent, while at the time of posttest there was no change, namely as many as 1 child (20%) needed help, 1 child (20%) needed instruction assistance, and 3 children (60%) were independent. In 7 children with DS were known at the time of pretest there were 5 children (71.4%) with the help of instruction and 2 children (28.6%) were able to be independent, while at posttest there were 1 child (14.3%) with the help of instructions and 6 children (85.7%) can be independent. Judging from the increase in scores known from 5 children with mild DS as many as 2 children (40%) experienced an increase in scores and 3 children (60%) had the same score, while in 7 children with DS were known 6 children (85.7%) experienced increased scores and 1 child (14.3%) have the same value.

Based on the results of the above study, it can be seen that in children with mild DS most have the same score between pretest and posttest where the average is already independent, whereas for children with moderate DS most score increases between pretest and posttest to be independent. This explains that learning this drum instrument can be applied to children with mild and moderate DS.

Research conducted by Amelia who explained that the game of drum instruments was able to improve the motor skills of spastic type cerebral palsy children in SLB Az-Zakiyah.¹⁰ According to Shannon et al.'s study, using the continuation synchronization paradigm during continuous bimanual playback with different in 17 people with Down syndrome. The task requires participants to hit two drums with their hands at the same time following the music signal. In general, when all groups follow musical cues, the participants' movements are faster than the participants' movements in hearing, verbal and visual conditions. In addition, when following visual cues, all groups produce more accurate and consistently coordinated movements compared to other types of cues.¹¹

Music learning can improve the ability of various movements and the coordination that can increase the potential of students. The presence of movement in the limbs allows an increase in development in its movement. So in this case, every child will be able to determine the direction of motion in accordance with the instinct of a trained child through the form of exercises in the learning of drum instruments. Learning and training can certainly improve motor development of children with Down syndrome.

Based on the description above, it can be seen that by providing education in the form of learning drum instruments can improve motor development of children with Down syndrome. This happens because of the interaction between nurses or researchers and teachers as caregivers, children, and the environment such as learning drum instruments, schools and research conducted by researchers. This is certainly consistent with Kathryn E. Barnard's Parent Child Interaction nursing model concept. Kathryn E. Barnard's Parent Child Interaction Theory, is a middle range theory that focuses on developing studies to evaluate children's health, growth and development. With the learning of drum musical instruments can be able to improve children's development for the better. The role of nurses in this case is to design, facilitate, and evaluate what happened or become a problem that is how to improve motor development of children with Down syndrome. Barnard developed his theory by using the Child Health Assessment Interaction Theory concept which has 3 basic concepts, namely the model of The Child Health Assessment Interaction Model, in which there are interactions between the environment (place, research and others), care giver (mother, parents, nurses, and others), and children.¹²

In this study, researchers are in the area or system of the environment and caregiver to provide and facilitate children in developing their motoric development by providing learning drum instruments. In addition, the presence of inclusive education can help children with special needs to overcome their limitations and be able to facilitate them. In this study the form of support in education is learning drum instruments in improving motor development of children with Down syndrome. Drum instrument learning can be an intervention from the nursing process, so that children can improve in their motoric development by practicing drumming.

Based on the description, then with the support, facilities and others can be able to develop child development. With the existence of a facility or tool to develop and stimulate child development, the child's development will increase. When linked to this research, the researcher as a caregiver and in the environmental system tries to conduct research and provide learning in improving children's motor development through learning drum instruments. The results of the research and discussion above can be concluded that with the stimulation, learning and mutual system of interaction between children, parents, nurses and other elements can be able to improve motor development of children with Down syndrome. This is evident from the results of this

study that the learning of drum instruments is able to improve motor development of children with Down syndrome. It can be said that with the application of the Parent Child Interaction Barnard theory in this study is able to provide an implication on improving children's health.

V. Conclusion

There are differences in motor development of children with Down syndrome before and after being given the learning of drum instruments, with an average score of pretest motor development is 13.5 and posttest is 15.58 (p value 0.02). It can be concluded that the implementation of the learning of drum musical instruments has an effect on improving the motor development of Down syndrome children in SKH Negeri 01 Tangerang Regency.

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