The Effect of Circuit Training towards Gross Motor Skill for a student with Moderate Intellectual Disability

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Abstract : Children with special needs have different characteristics with other children in both emotion and intellectual. The intellectual disability children have below average. The purpose of this research is to know the effect of circuit training on gross motor abilities in students of students moderate intellectual disability being in SDLBN Kedungkandang Malang. This research uses Single Subject Research method with A-B-A design. The subjects of the study were children with grade 1 student with moderate Intellectual disability. The data were collected for 18 sessions. The results of this study indicated that there was effect circuit Training towards the abusive motor abilities of students with student moderate intellectual disability. This is evidenced by an overlap percentage of 0%. The conclusion is Circuit Training has an effect on motor abusive ability of student intelectual disability.

Keywords : Moderate Mental Retardation, *Circuit Training, Gross Motor Skill*

INTRODUCTION

Children with special needs are children who have different characteristics compared to other normal children, the differences of children with special needs usually lie in their physical and intellectual characteristics. One type of intellectual barriers in children is intellectual disability. Mental disability is aterm that is used to describe children with IQ between 25 and 50 or commonly called as moderate mental disability which is categorized by their ability to take care of themselves through daily activities (Efendi, 2006).

According to Law No. 23 of 2003 concerning National Education System, a good practice is needed to implement the education, particularly physical education, in order to improve the resentation of the field of study (Susanto, 2015). Improving and developing sports, specifically adaptive sports for children with moderate intellectual disability, aim to design a teaching and learning process in the form of physical activities which also includes some biological aspects such as emotional, intellectual, and social developments. The implementation of physical education for children with intellectual disorder is a means to foster the quality of human resources in Indonesia which is expected to achieve and take a quite long time. Therefore, the attempts in fostering students, especially with moderate intellectual disability, through adaptive sports need patience, sincerity, and continuous systematic programs. As an effort in education, we expect that adaptive sports in one of special needs institutions is developed more rapidly in order to be the national standard od sports coaching.

Circuit training is a sport that trains the balance of whole body motion, muscle strength, and physical strength of sports which combines the benefits of physical adaptive sports. In *circuit training*, there is a concept which provides some bases for students to go through. There are five bases, and students do the *circuit training* by passing through a barrier like a *cone ice cream* with observations on time and distance.

Hurlock (1991) stated that motor development is a body motion served as an element of children development and the brain served as the center of the body motion. Motion development can be done well if children have the chance to do physical training that involves all body parts.

Motoric development in children consists of gross motor development and fine motor development. Gross motor development is the coordination of physical ability which requires the majority of the children's body. This motor movement involves the activities of large muscles such as leg muscles and all body parts. According to Sugiyanto and Sudjarwo (1992), the ability can be improved by movement that occurs in line with the improvement of eyes, handa, and legs coordination.

Circuit training is one type of sports that can repair all body parts at once. In each base, there is a training with specific function and purpose.

The purpose of circuit training is basically to combine some sports to improve some physical components gradually, systematically, and continuously (Ambarwati, Hermawan, & Jubaedi, 2015). According to Ambarwati, Hermawan, & Jubaedi (2015), circuit

training is a training program which consists of some bases, and a person should do the training that is design in each base. A circuit training is done when an athlete have finished the trainings in all bases according to the set time.

This circuit is performed by children with special needs, especially those with moderate intellectual disability. By doing combained sports, or commonly called as circuit training, children will not get bored in doing the physical expercise. Gross motor is body motion using the majoty of large muscles or all parts of the body which is influenced by the muscle maturiry of the children including locomotor, nonlocomotor, and manipulative (Gustiana, 2014) as stated in Hakim (2015). Fundamentally, gross motor is the movements of all parts of the body as well as the large muscles which is influenced by the mucle maturity in children with moderate intellectual disability consisting of locomotor and nonlocomotor movements.

Gross motor skill is an element of control and maturity of a body movement, motor skills, and motor control. Somantri (2012) as quoted in Asis (2015) stated that gross motor skills are individual ability that underlies the appearance of various motor skills. This motor skill and individual capacity are related with demonstration and implementation since childhood. Gross motor skill includes all parts of the body. The motor skills are defined as basic motions in child development. The motion basically develops along with owned reflex motion and a process which is trained continuously.

In Indonesia, the term *"anak tunagrahita"* (children with intellectual disability) is taken from *Sanskrit*. The word *"tuna"* means loss or damage and *"grahita"* means thinking. The term "tunagrahita" (intellectual disability) is used formally in Indonesia since the Government Regulation of Special Needs Education. Based on the limitation set by the experts, stated that children who are special or have special needs are those who are significantly different in some important dimensions of their humanitarian functions. Children with special needs have limitations in terms of physical, psychological, cognitive and social which hinder their needs and potentials. In a broader context, those who are deaf, blind, have speech disorder and emotional disorder also included as children special needs because of the assistance from trained profesionals (Mangunsong, 2014).

METHOD

The methodology used in this research is experimental with the design of *Single Subject Research* (SSR), which is conducted on one subject continuously for a period of time.

The research applied A-B-A design in which the data analysis is used to identify the changing of *target behavior* where (A1) is the *baseline*, B is the *intervention*, and (A2) is the second *baseline*. Target behavioui is measured continuously in the state of baseline (A1) for a period of time, and then measured in the state of intervention (B) so that it show a functional relationship between independent variables and dependent variables. (Sunanto, 2005).

The research design of communication ability of children with moderate intellectual ability is conducted for 18 sessions. The state of baseline-1 (A1) is conducted for 6 sessions, the state of of intervention (B) for 6 sessions, and the state of baseline-2 (A2) for 6 sessions.

This research used two variables which are *dependent variable* and *independent variable*. Dependent variable in this research is Gross Motor Skills in children with moderate intellectual disability that is showed by their scores after intervention, while the independent variable is Circuit Training.

The subject in this research is a 1st Grade Student in SDLBN Kedungkandang Malang who has moderate intellectual disability. The data is taken from the result of student's communication skills measured by observation sheets which has been validated by experts and test.

Somantri (2012) stated that construct vaildity can be measured using the judgement from the experts. In this case, after the instruments about the aspects to be measured have been constructed, it is consulted to the experts. These experts will be asked to share their opinios about the instruments and give their judgements whether or not there needs to be revisions.

Validition is conducted by designing instrument items abot gross motor skills. After that, it is evaluated by the experts in the form of checklist in validation sheet, table 3.

Based on the results of test validit, Validator 1 gave a total score of 15 (75%), while Validator 2 gave a total score of 16 (80%). This means the instruments used in this research are valid with only some revisions and are acceptable to be used in the research, table 1, table 2.

The data were analyzed using descriptive analysis technique which consists of analysis in te conditions and analysis among conditions. Because this is a single subject research, it focuses o invidual data compared to group data. Visual analysis method is conducting obesration on the data presented in a line graph.

Analysis in the condition is analysing the change of data in a certain condition, for example the baseline condition or the intervention, while component to be analyzed is level of stability toward the level of change. The analysis referred in this research is graphic data.

In nalysisng the changing of data inter conditions, stable date smust preceed the condition to be analyzed (Elba, 2015). If baseline data is not stable, it will cause some difficulties in interpreting the ffect of intervention on the dependent variable. Beside the stability, the effect of intervention on dependent variable also depends on the change of level, the distance that occurs between the two conditions analyzed.

Table 1. Criteria of Validity for Media and Materials

No.	Criteria Validity	Level of Validity
1.	76,00 % - 100%	Acceptebe without revisions
2.	51,00% - 75%	Acceptable with some revisions
3.	26,00% - 50,00%	Acceptable with many revisions
4.	0% - 25%	Unacceptable

Table 2. Score Categories for Instrument Validition

Options	Score
Extremely Valid	4
Valid	3
Fairly Valid	2
Less Valid	1

Table 3. The Results of Expert Validation

No.	Validator	Percentage	Criteria
1.	Media	15%	Acceptable with some revisions
2.	Materials	16%	Acceptable without revisions

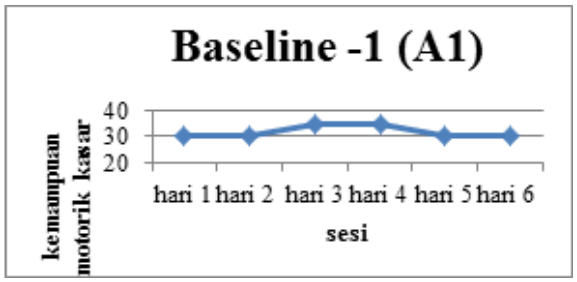

Figure 1. Graph of Baseline-1 (A1)

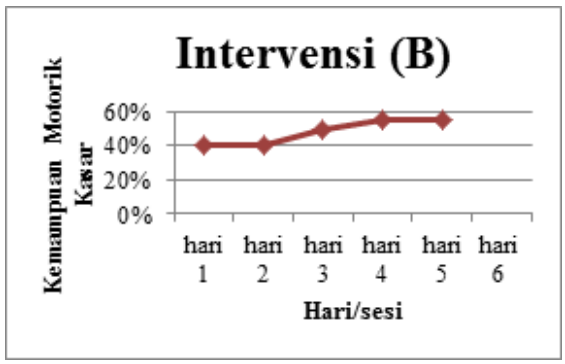

Figure 2. Graph of Intervention (B)

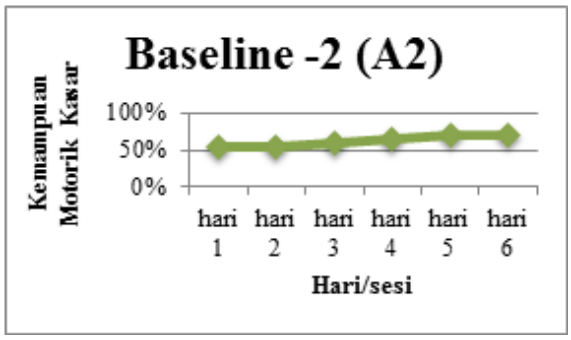

Figure 3. Graph of Baseline-2 (A2)

FINDINGS AND DISCUSSION

Findings

The first step in data collection is measuring the initial stage of gross motor skills before giving the intervension. Gross motor skill refers to the ability to do the circuit training. Baseline-1 condition (A1) was measured twice in a week on 14-15 March with 3 sessions in each day. For two days, each session lasted for 30 minutes. In baseline-1 condition (A1), an observation is conducted without giving any intervenstion to identify the initial ability of the subject. The graph below is the result of data collection from baseline-1 (A1) in percentage.

Figure 1 presents the initial gross motor skill of the sucject that was observed before the intervention. Based on the data, the highest gross motor skills is 35% found in Day 3 dan Day 4, while the lowest was 30% found in Day 1, Day 2, Day 5, and Day 6. From Day 1 and Day 2, children's gross motor skills tended to stay stable. On Day 3 and 4, it rose and went down on Day 5 and 6. The next step was giving the intervention on the subject for 3 days. Measurment of the intervention (B) was conducted on 21, 22, and 28 of March with 6 treatment/intervention and 6 sessions of data collection which took 30 minutes/session. In Intervension (B), children receieved an intervention in the form of circuit training. The measurement was conducted after the circuit training. The data from Intervention (B) until it reached a stable condition show in figure 2.

The result of Intervension (B) showed that that there was an increase compare to the condition in Baseline-1.The highest percentage was on Day 6 with 55%, while the lowest was on Day 2 and Day 4 with 45%.

The measurement was conducted for 6 sessions with 30 minutes/session. In this measurement, the subject did not get any treatment of circuit training. The measurement of Baseline-2 (A2) was conducted on 4 and 5 of April. The result of data collection in BAsseline-2 is presented in the Figure 3.

Table 4. Results on the Research of Gross Motor Skill in Children with Moderate Intelectual Disability

Session	Condition	Result
1		30,00%
2		30,00%
3		35,00%
4	A1	35,00%
5		30,00%
6		30,00%
7		40,00%
8		40,00%
9		40,00%
10		50,00%
11	B	55,00%
12		55,00%
13		55,00%
14		55,00%
15		60,00%
16	A2	65,00%
17		70,00%
18		70,00%

The hraph above describes the gross motor skill of the subject without the intervention. The highest percentage found on the graph eas 70& on Day 5 and 6, while the lowest was 55% on Day 1 and 2, table 4.

Discussion

Before the intervention, the ability of the subject was tested using an action test that was written in an observation sheet. From the result, it showed that the subject was bale to do the circuit training from Base 1 to 4 with a disctance of less than 3 meters within the period of 1 minute.As it was repeted over times, the subject strength became weaker. The expected duration to complete the training could not be met. The behaviors of the subject are directed visually (imitating the researcher) and verbally. The subject had a difficulty in doing the circuit training in the form of zig zag running and going up and down the stairs. When doing the zig zag running, the subject tended to jump like a toad, while for the going up and down the stairs, the subject went up 2 steps of the stairs instead of just one. When kicking ball, the subject understood that in the last base they had to throw the ball, but they found some difficulties in the distances that have been determined. However, they tried to do their best in throwing the ball to the distance that has been set by the researcher. Previous research was conducted by Rachnad Abdul Asis entitled "Tingkat Kemampuan Motorik Kasar Anak Tunagrahita Kategori Ringan Di SDLBN Pembina Giwangan Umbulharjo Yogyakarta". Data obtained from the test of gross motor skill was used as the instrument. The population in the research was 22 students and the subject was all students of SLBN Negeri Pembina Yogyakarta Grade I-VI with 22 students with special needs. The value of test validity was obtained using correlation formula product moment from Karl Person. The result of validity was the instrument to measure the running test in the distance of 40 meters and it was categorized as valid with the cooefecient correlation of 0,91245. Then in the test of throwing ball, it was also categorized as valid with coeficient correlation of 0,87152. For the instrument used to measure a jum over a 15cm brick was also categorized as valid with coefecient correlation of 0,71698. The instrument used to measure the ability to stand on one foot for 10 second was also categorized as valid with coeficient correlative of 0,78124.

An intervension was given in the form of circuit training on groos motor skill with the indocator of zigzag running, going up and down the stairs, and kicking and throwing balls. Data analysis compared the condition of the subject in the research with 3 phases which were baseline-1 (A1) phase, intervention phase (B), and baseline-2 (A2) phase.

In the baseline condition, the strength and endurance of the subject were still low, the direction and movement were also disynchronized. After getting the treatment, the motor skills showed an improvement. The improvement of gross motor skill was shown in the increasing of mean level, and after the intervention, motor skill also showed an improvement. The improvement was shown by the increasing of data point and mean level. From the result of the research, it showed that the gross motor skill improved.

The results of the data point showed a range from 30% to 70%. In baseline-1 (A1), the mean level was 31,66%, intervention (B) was 46.66&, and baseline-2 (A2) was 62,5%. The results indicated that circuit training affected the improvement of gross motor skill of the subject. Analyisis inter-condition explains that the subject experienced an improve from baseline-1 (A1)tp intervention (B) and from intervension (B) to baseline-2 (A2).

The researcher did not find any overlapping data from intervension (B) to baseline-1 (A1). The overlapping percentage was 0%. The smaller the overlapping percentage, the better its effect of intervention o target behavior. Therefore, it can be interpreted that circuit training is able to improve gross motor skill in students with moderate intellectual disability.

The intervention used in this research was conducting circuit training to students with intellectual diasability in SDLBN Kedungkandang Malang. Based on the data analysis presented above, it is proven that

the gross motor ability of students with intellectual disability showed an improvement in speed, strength, balance, and agility after given the circuit training. The subject was able to run in zigzag, go up and down the stairs, kick ball, and throw the ball into a basket. When throwing the ball in the basket withing the distance of 2-3 meters, the subject was able to do it in a right manner for 8 times. The subject was able to do the circuit training without off limit. The endurance, strength, and agility of the subject showed an improvement, while the posture and direction were good. Therefore, it can be said the subject is able to meet the successful criteria of the research.

Previous research by Triwarsono (2006), entitled "Kemampuan Motorik Kasar Anak Tunagrahita Mampudidik Sekolah Luar Biasa (SLB) Negeri 3 Yogyakarta" with 40 students of the total population of 50 students, showed that 2,5% (1 siswa) was in low category, 2,5% (1 student) was in moderate category, and 95% (38 studets) were in good category.

The result of validity was the instrument to measure the running test in the distance of 40 meters and it was categorized as valid with the cooefecient correlation of 0,91245. Then in the test of throwing ball, it was also categorized as valid with coeficient correlation of 0,87152. For the instrument used to measure a jum over a 15cm brick was also categorized as valid with coefecient correlation of 0,71698.

Therefore, the hypothesis is accepted and it is concluded that the gross motor skill of children with mild intellectual disability is categorized as very good (59,1). Based on the indicator of fast running at 40 meters, they obtained score 1 (81,9%) or categorized as not good. In throwing ball, they obtained score 3 (54,5) or categorized as very good. In jumping over a 15 cm block, they obtained score 1 and 3 (45,5) or categorized as good and very good. In long jump without running, students obtained score 2 (59,1%) or categorized as good. Finally, in standing with one leg for 10 students, students were able to get score 3 (90,9%) or very good. Based on the score, the highest percentage of students' gross motor skills was 80% (9 dari 22 siswa). It was also found that based on the level of gross motor skill, standing with one leg for 10 seconds placed at the highest position with 97%.

CONCLUSION

Based on the findings, it was found that there was no overlap between the *intervension* (B) on *baseline*-1 (A1) with overlapping percentage close to 0%. The smaller the overlap percentage, the better it is on the effect of intervension on the target behavior. Thefore, it is concluded that circuit training improves gross motor skills of students with moderate intellectual disability.

The researcher suggests teachers to use the results in this research as a reference to solve problems related to students' gross motor skills, particulary in circuit training. For future researchers, it is suggested to use tis research as a guideline to develop new ideas based on the current findings or try it out to other students.

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